mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT:	**Camel Thorn Group Pty Ltd**
TEL NO:	**076 304 9920**
POSTAL ADDRESS:	**PO BOX 110823** **HADISONPARK** **KIMBERLEY** **8306**
PHYSICAL ADDRESS:	**CNR Hendrick van Eck & IAM Flemming** **KATHU** **8446**

FILE REFERENCE NUMBER SAMRAD: **(NC) 30/5/1/1/3/2/1/13349 PR**

1. IMPORTANT NOTICE

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

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

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

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

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

2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

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

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

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

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

  (i) the nature, significance, consequence, extent, duration and probability of the impacts occurring to; and
  (ii) the degree to which these impacts—
    (aa) can be reserved;
    (bb) may cause irreplaceable loss of resources; and
    (cc) can be managed, avoided, or mitigated.

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
  (i) identify and motivate a preferred site, activity and technology alternative;
  (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and
  (iii) identify residual risks that need to be managed and monitored.

PART A
SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

Contact Person and Correspondence Address

a) Details of

i) Details of the EAP

Name of the Practitioner: ROELIEN OOSTHUIZEN
Tel No.: 084 208 9088
Fax No.: 086 510 7120
E-mail address: roosthuizen950@gmail.com

ii) Expertise of the EAP

(1) **The qualifications of the EAP**
(with evidence)
MEM (MASTERS IN ENVIRONMENTAL MANAGEMENT (UFS))
B-Comm in Human and Industrial- Psychology (NWU).
(with evidence attached as **Appendix 1**)

(2) **Summary of the EAP's past experience**
(In carrying out the Environmental Impact Assessment Procedure)

Relevant past experiences in carrying out the Environmental Impact Assessment Procedures include Environmental Impact Assessments, Environmental Management Plans/Programmes/ Reports, Performance assessments, Rehabilitation progress assessments, Environmental Liability assessments, Environmental compliance monitoring, Scoping Reports, etc. See attached CV. (with evidence attached as **Appendix 2**)

b) Description of the property

Farm Name:	PORTION 3 (A PORTION OF PORTION 2 - ASBESTOS HILLS); PORTION 13 (A PORTION OF PORTION 9) OF THE FARM RIETFONTEIN 11 AND REMAINING EXTENT, PORTION 1, REMAINING EXTENT OF PORTION 2 (NAUGA A), PORTION 3 (A PORTION OF PORTION 2 - NAUGA EAST) OF THE FARM NAUGA 17; AND PORTION 4 OF THE FARM NAUGA 17, PRIESKA IN EXTENT: 17 678.7351 HA
Application area (Ha):	17 678.7351 Hectares (seventeen thousand six hundred and seventy-eight comma seven three five one hectares.)
Administrative district:	Prieska
Distance and direction from nearest town:	Approximately 35 km north west of Prieska you can reach the farms via the tar R32 from Douglas through Prieska next to the Orange River in the Northern Cape in the Northern Cape province.

c) Locality map (show nearest town, scale not smaller than 1:250000)

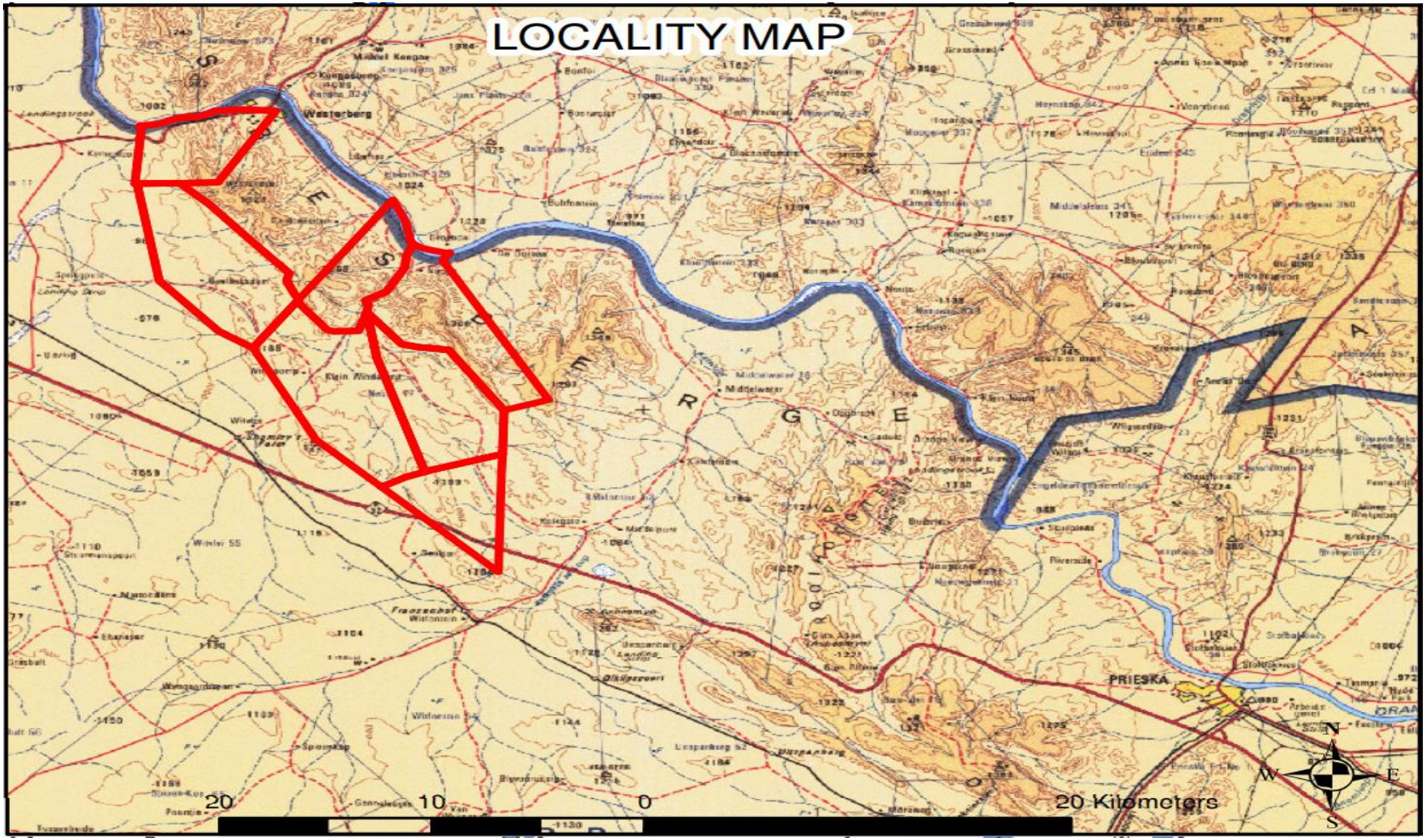


***Figure 1**. The application is situated in the Administrative district of Prieska. Locality indicated in Red.*

d) **Description of the scope of the proposed overall activity** (provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site).

Figure 2. The prospecting area is indicated in red, with the proposed core footprint of prospecting activities indicated in white. The drill grid must still be established after mapping was completed (first non-invasive phase of prospecting planning).

(i) DESCRIPTION OF PLANNED ACTIVITIES:

Prospecting Phases

Diamond drilling will consist of 12 holes of TNW, TBW and BQ core size to depths ranging from 20m to 50m below surface, thus producing a total of approximately 300 meters drilled. Core sampling, chemical analysis and geotechnical testing will occur on completion of the drilling programme.

A further approximately 36 holes will be planned if any of the 12 initial holes proved to be positive.

Phase 1 – Surface Mapping (10 months)

Surface mapping will focus on assessing surface infrastructure and land distribution patterns which may affect future prospecting, as well as locating the mineralised areas and sub-outcrop positions of the iron, manganese, copper, lead, zinc and nickel. This will aid in the understanding of the structural setting and nature of the underlying geology.

- Structural interpretation revisited with follow up field mapping – 3 months

Phase 2 – Access roads and drill-pad construction (10 months)

This phase entails the construction of the 12 drill-pads such that they meet the requirements of industry safety standards which entail things such as safety berms, proper wire fencing and lighting as well as security if necessary. And will undergo regular inspections by the appointed geologist and local community.

Phase 3 – Surface Drilling (14 months)

The phase 3 drilling programme is envisaged within the following timeframe:

- Health and safety, environment, and community – 1 month
- HSEC risk assessment – 3 days
- Engage contractor – 6 weeks
- Safety induction of contractor – 3 days
- Road Construction – 5Km
- Site establishment / inter site move – 1 day per site
- Approval of Environmental Management Programme – 5 months
- Commencement of drilling – within 1 month of approval of EMP and will take 3 months to complete.
- Rehabilitation will be carried out for each site prior to relocating the drilling to the next site.
- Logging of core, capturing and validating into database – concurrently with drilling on an ongoing basis but at least 4months work

- Chemical analyses – concurrently with drilling.

Additional holes may be drilled depending on the outcome of the first phase of drilling.

Phase 4 – Geological Modelling (16 months)

- Validation of data and input into computer software package
- Generation of geological model and generation of mineral resource estimates – 3 months
- Structural interpretation revisited with follow up field mapping – 3 months

Phase 5 - Rehabilitation

Rehabilitation of drill-sites will be done immediately as each hole is completed. Access road rehabilitation is carried out when all prospecting phases are completed at the end of the diamond drilling activity. Rehabilitated sites will be monitored after drilling and trenching has been completed to ensure vegetation growth re-occurs.

The exact location of the drilling holes will only be determined when the first phases of the prospecting programme have been completed.

i) Listed and specified activities

NAME OF ACTIVITY **(E.g. for prospecting** – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route, etc. … etc. … etc. **E.g. for prospecting** – excavations, blasing, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc. … etc. … etc.)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY (Mark with an **X** where applicable or affected).	APPLICABLE LISTING NOTICE ***(GNR 544, GNR 545 or GNR 546)***	WASTE MANAGEMENT AUTHORISATION (Indicate whether an authorisation is required in terms of the Waste Management Act). **(Mark with an X)**
Activity 20 of Listing Notice 1 Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	17 678ha application lodged for ONLY DRILLING INVASIVE WILL BE DONE WHICH WILL BE (12 HOLES) ±7ha	X	NEMA LN 1 (GNR 327)	
Activity 24 of Listing Notice 1 The development of a road- (i) For which an environmental authorization was obtained for the route determination in terms of activity 5 in Government Notice 545 of 2010; or **(ii)** With a reserve wider than 13,5 meters, or where no reserve	Tracs for the drill rig	X	NEMA LN 1 (GNR 327)	

<table>
<tr><td>exists where the road is wider than 8 meters</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Activity 27 of Listing Notice 1
The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is
required for—
(i) the undertaking of a linear activity; or
(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</td><td>17 678ha on the total hectares of the area a total of 12 DRILL HOLES will be disturbed with the drill pads, drill holes.</td><td>X</td><td>NEMA LN1
(GNR 327)</td><td></td></tr>
<tr><td>Activity 12(g) i & ii of Listing Notice 3

The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. -

i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;

ii. Within critically biodiversity areas identified in bioregional plans;</td><td>17 678 ha on the total hectares of the area a total of ±7 ha will be disturbed with the drill pads, drill holes.

In terms of the screening tool the area falls into Critical biodiversity area 1 and Ecological support area as well as FEPA subcatchments.

<table><tr><th>Sensitivity</th><th>Feature(s)</th></tr><tr><td>Low</td><td>Low Sensitivity</td></tr><tr><td>Very High</td><td>Critical biodiveristy area 1</td></tr><tr><td>Very High</td><td>Ecological support area</td></tr><tr><td>Very High</td><td>FEPA Subcatchments</td></tr></table></td><td>X</td><td>NEMA LN3
(GNR 324)</td><td></td></tr>
</table>

OTHER ACTIVITIES (Associated infrastructure not considered to be listed activities) Ablution Facilities	±25m²		NOT LISTED	

ii) Description of the activities to be undertaken

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

In terms of Regulation 7(1)(f) of the Minerals and Petroleum Resources Development Act (the Act), the following prospecting activities are planned for the prospecting area:

Prospecting work to be performed

(i) Mapping

A first phase of mapping is proposed to assist in the evaluation of the iron, manganese, copper, lead, zink and nickel potential. This mapping is focused primarily on the assessment of opencast mineral resources, specifically undisturbed structural blocks.

(ii) **Geochemical surveys**

The use of geochemical surveys is not relevant for the style of mineralization and thus none are planned.

(iii) **Geophysical surveys**

Ground magnetics and ground gravity on a pre-determined grid will be undertaken to determine the location of the iron, manganese, copper, lead, zink and nickel potential formations.

(iv) **Invasive prospecting activities**

A programme of twelfe (12) surface diamond drill holes are planned, comprising TNW, TBW and BQ size core and depths ranging from 20m to 50m, thus producing an estimated 350m drilled core. The drilling will be laid out on a random grid, which will allow for the determining of a Samrec category of mineral resource classification.

(v) **Road construction and drill pads**

This phase entails the grading of 5 kilometre of new road, the construction of 5 kilometre of new road, and the construction of the twelfe (12) drill-pads.

e) Policy and Legislative Context

Applicable Legislation and Guidelines used to compile the report (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)	Reference where applied	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g In terms of the National Water Act:-Water Use License has/has not been applied for).
Conservation of Agricultural Resources Act (Act 43 of 1983) and Regulations (CARA)	- Section 5: Implementation of control measures for alien and invasive plant species; - Section 6: Control measures. - Regulation GN R1048, published on 25 May 1984, in terms of CARA	- Control measures are to be implemented upon the approval of the EMPR.
Constitution of South Africa (Act 108 of 1996)	- Section 24: Environmental right - Section 25: Rights in Property - Section 27: Water and sanitation right	- To be implemented upon the approval of the EMPR.
Environment Conservation Act (Act 73 of 1989) and Regulations (ECA)	- Sections 21, 22, 25, 26 and 28: EIA Regulations, including listed activities that still relate to the existing section of ECA. - Section 28A: Exemptions.	- To be implemented upon the approval of the EMPR.
Fencing Act (Act 31 of 1963)	- Section 17: States that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5m on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.	- Control measures are to be implemented upon the approval of the EMPR.

Hazardous Substances Act (Act 15 of 1973) and Regulations read together with NEMA and NEMWA	- Definition, classification, use, operation, modification, disposal or dumping of hazardous substances.	- Noted and Considered measures are to be implemented upon the approval of the EMPR.
Intergovernmental Relations Act (Act 13 of 2005)	- This Act establishes a framework for the National, Provincial and Local Governments to promote and facilitate intergovernmental relations.	
Mine, Health and Safety Act (Act 29 of 1996) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Mineral and Petroleum Resources Development Act (Act 28 of 2002) and Regulations as amended	- Entire Act. - Regulations GN R527	- A prospecting right application was lodged under reference number NC 30/5/1/1/2/13349 PR - Rights and obligations to be adhered to.
National Environmental Management Act (Act 107 of 1998) and Regulations as amended	- Section 2: Strategic environmental management principles, goals and objectives. - Section 24: Foundation for Environmental Management frameworks. - Section 24N: - Section 24O: - Section 28: The developer has a general duty to care for the environment and to institute such measures to demonstrate such care. - Regulations GN R547, more specifically Chapters 5 and 7, where applicable (the remainder was repealed) published on 18 June 2010 in terms of NEMA (Environmental Management Framework Regulations) - Regulations GN R982 to R985, published on 4 December 2014 in terms of NEMA (Listed Activities) - Regulations GN R993, published on 8 December 2014 in terms of NEMA (Appeal)	- The document is being compiled in order to fulfil the requirements thereof.

	- Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption) - Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations) - Regulations GN R1147, published on 20 November 2015 in terms of NEMA (Financial Provision)	
National Environmental Management: Air Quality Act (Act 39 of 2004)	- Section 32: Control of dust - Section 34: Control of noise - Section 35: Control of offensive odours - Regulation GN R551, published on 12 June 2015 (amended Categories 1 to 5 of GN 983) in terms of NEM:AQA (Atmospheric emission which have a significant detrimental effect on the environment) - Regulation GN R283, published on 2 April 2015 in terms of NEM:AQA (National Atmospheric Emissions Reporting Regulations) (Group C-Mines)	- Control measures are to be implemented upon the approval of the EMPR. - This is also legislated by Mine Health and Safety from DMR and is to be adhered to.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	- Section 52 of The National Environmental Management Act: Biodiversity Act (NEMBA) (Act 10 of 2004) states that the MEC/Minister is to list ecosystems that are threatened and in need of protection. - Section 53 states that the Minister may identify any process or activity in such a listed ecosystem as a threatening process. - A list of threatened and protected species has been published in terms of Section 56(1) GG 29657 GNR 151 and GNR 152, Threatened or Protected Species Regulations.	- A permit application regarding protected plant species need to be lodged with DENC if necessary. - Control measures are to be implemented upon the approval of the EMPR.

	Commencement of Threatened or Protected Species Regulations 2007: 1 June 2007 GNR 150/GG 29657/23-02-2007 Publication of lists of critically endangered, vulnerable and protected species GNR 151/GG 29657/23-02-2007 * Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 * - Sections 65 – 69: These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species. - Sections 71 and 73: These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species. - Regulation GN R151, published on 23 February 2007 (List of Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM: BA - Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA - Regulations GN R507 to 509 of 2013 and GN 599 of 2014 in terms of NEM:BA (Alien Species)	
The National Environmental Management Act: Protected Areas Act (NEMPAA) (Act 57 of 2003) provides for the protection of ecologically viable areas that are representative of South Africa's natural biodiversity and its landscapes and seascapes.	- Chapter 2 lists all protected areas.	- Not applicable. The prospecting operation does not fall within any protected area.

National Environmental Management: Waste Management Act (Act 59 of 2008)	- Chapter 4: Waste management activities - Regulations GN R634 published on 23 August 2013 in terms of NEM:WA (Waste Classification and Management Regulations) - Regulations GN R921 published on 29 November 2013 in terms of NEM:WA (Categories A to C – Listed activities) - National Norms and Standards for the Remediation of contaminated Land and Soil Quality published on 2 May 2014 in terms of NEM:WA (Contaminated land regulations) - Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations) - Regulations GN R632 published on 24 July 2015 in terms of NEM: WA (Planning and Management of Mineral Residue Deposits and Mineral Residue Stockpiles) - Regulations GN R633 published on 24 July 2015 in terms of NEM: WA (Amendments to the waste management activities list published under GN921)	- To be implemented upon the approval of the EMPR.
National Forest Act (Act 84 of 1998) and Regulations	- Section 15: No person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.	- A permit application regarding protected tree species need to be lodged with DAFF if any protected trees is encountered. - Control measures are to be implemented upon the approval of the EMPR.
National Heritage Resources Act (Act 25 of 1999) and Regulations	- Section 34: No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority. - Section 35: No person may, without a permit issued by the responsible heritage resources	- Control measures are to be implemented upon the approval of the EMPR.

	authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site. - Section 36: No person may, without a permit issued by SAHRA or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a forma cemetery administered by a local authority. - Section 38: This section provides for HIA which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during HIA process. - Regulation GN R548 published on 2 June 2000 in terms of NHRA	
National Water Act (Act 36 of 1998) and regulations as amended, *inter alia* Government Notice No. 704 of 1999	- Section 4: Use of water and licensing. - Section 19: Prevention and remedying the effects of pollution. - Section 20: Control of emergency incidents. - Section 21: Water uses In terms of Section 21 a licence is required for: (a) taking water from a water resource; (b) storing water; (c) impeding or diverting the flow of water in a watercourse; (f) Waste discharge related water use; (g) disposing of waste in a manner which may detrimentally impact on a water resource; (i) altering the bed, banks, course or characteristics of a watercourse;	- A water use application will not be submitted at this stage until there is a water requirement later in the prospecting operation (DWS). - Control measures are to be implemented upon the approval of the EMPR.

	(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and; - Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities) - Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered) - Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams) - Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j)) - Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b)) - Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i) – rehabilitation of wetlands) - Regulations GN R1199, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i)) - Regulations GN R665, published on 6 September 2013 in terms of the National Water Act (Amended GN 398 and 399 – Section 21 (e), (f), (h), (g), (j))	
Nature Conservation Ordinance (Ord 19 of 1974)	- Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of Flora.	- Control measures are to be implemented upon the approval of the EMPR.

Northern Cape Nature Conservation Act (Act 9 of 2009)	- Addresses protected species in the Northern Cape and the permit application process related thereto.	- A permit application regarding provincially protected plant species as well as for large-scale harvesting of indigenous flora need to be lodged with DENC if applicable. - Control measures are to be implemented upon the approval of the EMPR.
Occupational Health and Safety Act (Act 85 of 1993) and Regulations	- Section 8: General duties of employers to their employees. - Section 9: General duties of employers and self-employed persons to persons other than their employees.	- Control measures are to be implemented upon the approval of the EMPR.
Road Traffic Act (Act 93 of 1997) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Water Services Amendment Act (Act 30 of 2007)	- It serves to provide the right to basic water and sanitation to the citizens of South Africa (giving effect to section 27 of the Constitution).	- Control measures are to be implemented upon the approval of the EMPR.
National Land Transport Act, (Act 5 of 1998)		- To take note.
Northern Cape Planning and Development Act (Act 7 of 1998)	- To control planning and development	- To be implemented upon the approval of the EMPR.
Spatial Planning and Land Use Management (Act 16 of 2013 (SPLUMA) and regulations	- To provide a framework for spatial planning and land use management in the Republic; - To specify the relationship between the spatial planning and the land use management, amongst others - Regulations GN R239 published on 23 March 2015 in terms of SPLUMA	- To be implemented upon the approval of the EMPR.
Subdivision of Agricultural Land Act, 70 of 1970 and regulations	- Regulations GN R373 published on 9 March 1979 in terms of Subdivision of Agricultural Land	- To take note.

Basic Conditions of Employment Act (Act 3 of 1997)) as amended	- To regulate employment aspects	- To be implemented upon the approval of the EMPR
Community Development (Act 3 of 1966)	- To promote community development	- To be implemented upon the approval of the EMPR
Development Facilitation (Act 67 of 1995) and regulations	- To provide for planning and development	- To take note.
Development Facilitation (GN24, PG329, 24/07/1998)	- Regulations re Northern Cape LDO's	- To take note.
Development Facilitation (GNR1, GG20775, 07/01/2000)	- Regulations re application rules S26, S46, S59	- To take note.
Development Facilitation (GN732, GG14765, 30/04/2004)	- Determines amount, see S7(b)(ii)	- To take note.
Land Survey Act (Act 8 of 1997)) and regulations, more specifically GN R1130	- To control land surveying, beacons etc. and the like; - Agriculture, land survey S10	- To take note.
National Veld and Forest Fire Act (Act 101 of 1998)) and regulations, more specifically GN R1775	- To regulate law on veld and forest fires - (Draft regulations s21)	- To be implemented upon approval of the EMPR
Municipal Ordinance, 20/1974	- To control pollution, sewers etc.	- To be implemented upon approval of the EMPR
Municipal Ordinance, PN955, 29/08/1975	- Nature conservation Regulations	- To be implemented upon approval of the EMPR
Cape Land Use Planning Ordinance, 15/85	- To control land use planning	- To take note.
Cape Land Use Planning Ordinance, PN1050, 05/12/1988	- Land use planning Regulations	- To take note.

f) Need and desirability of the proposed activities

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

The Camel Thorn Trading Project is in line with the 'Beneficiation Strategy for the Minerals Industry of South Africa' (DMR, 2011) in terms of aiming to beneficiate Zinc-, Lead-, Iron-, Manganese-, Copper and Nickel Ore for sale/export. The benefits of this will fall directly to the Northern Cape Province and, specifically, the Prieska District if this project proves to be positive.

In addition, the South African National Development Plan aims to eliminate poverty and reduce inequality by 2030. South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society. The Camel Thorn Trading Exploration Project will contribute to achieving this plan in terms of direct and indirect employment of people from the local and district municipalities as well as investment in the region and on a national scale.

Desirability:

No	Description	Yes/No
1	Does the proposed land use / development fit the surrounding area?	Yes
2	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	Yes
3	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	Yes
4	Will the proposed land use / development impact on the sense of place?	Yes
5	Will the proposed land use / development set a precedent?	No
6	Will any person's rights be affected by the proposed land use / development?	Yes
7	Will the proposed land use / development compromise the "urban edge"?	No

Benefits:

No	Description	Yes/No
1	Will the land use / development have any benefits for society in general?	Yes
2	Will the land use / development have any benefits for the local communities where it will be located?	Yes

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

A Prospecting Right application was lodged to identify the preferred areas on the property. The prospecting will be done with drilling which will indicate if there are areas on the property that can be viably mined or if there is a Zinc-, Lead-, Iron-, Manganese-, Copper and Nickel Ore resource to prospect even further.

The Holder of the prospecting right does have the necessary technical skill to execute the prospecting work set out in the Prospecting Work Programme which includes the ability to record, map and write reports. All the micro probing will be done by competent laboratories with the necessary equipment and skilled personnel. Camel Thorn Trading (Pty) Ltd will conduct and manage all prospecting activities on the application area subjected to the terms and conditions of the prospecting right and all relevant legislation including but not limited to the MPRDA, all health and Safety, Environmental and labour laws, regulations and codes.

The prospecting method of drilling is the only economic viable method currently being used by the Zinc-, Lead-, Iron-, Manganese-, Copper and Nickel Ore fraternity; it is also the only cost-effective method. An application for a bulk sample can also be done but it is not cost effective if drilling did not prove a reserve to bulk sample. There is no alternative prospecting method.

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

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

There are no alternatives, as the application area applied for is the area where the applicant has identified a potential for a Zinc-, Lead-, Iron-, Manganese-, Copper and Nickel Ore prospecting operation. The study area is found within the known Superior-type banded iron formation (BIF) of the Transvaal Supergroup crop out along the western margin of the Kaapvaal craton in the Northern Cape Province of South Africa. These iron formations can be traced as a prominent range of hills in a broken arc for some 400km from Prieska in the south to Pomfret in the north.

Camel Thorn Trading (Pty) Ltd has applied for a Prospecting Right application at Department of Mineral Resources and Energy to do drilling whereby the presence of a resource will be determined.

i) Details of the development footprint alternatives considered

With reference to the site plan provided as Figure 1 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

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

(a) The property on which or location where it is proposed to undertake the activity:

The registered description of the land to which the prospecting right application relates:

PORTION 3 (A PORTION OF PORTION 2 - ASBESTOS HILLS), PORTION 13 (A PORTION OF PORTION 9) OF THE FARM RIETFONTEIN 11

AND

REMAINING EXTENT, PORTION 1, REMAINING EXTENT OF PORTION 2 (NAUGA A), PORTION 3 (A PORTION OF PORTION 2 - NAUGA EAST) AND PORTION 4 OF THE FARM NAUGA 17, PRIESKA

IN EXTENT: 17 678.7351 HA

The properties on which the Prospecting Right has been applied for is determined by the geological location of the mineral resource. Therefore, there are no alternatives for the location of the activity, except for not proceeding with the operation. This will however cause the underutilisation of a national economic resource.

The property is accessible via good roads from different directions.

Infrastructure in the area is developed with gravel roads, electricity grid and underground water. Experienced labour is available in the area as is an extensive network of secondary industries geared towards small and large-scale prospecting.

The surrounding areas rely on surface water (Orange River) and groundwater for both domestic and livestock watering purpose. The rest of the water sources are used primarily for game and livestock watering and to a lesser extent for domestic purpose.

Alternatives considered: -

As the Prospecting Right has been accepted over the said area, it would not be viable to consider an alternative site for the prospecting.

Therefore, there are no alternatives to the area.

(b) The type of activity to be undertaken:

Scout and delineation drilling for Zinc-, Lead-, Iron-, Manganese-, Copper and Nickel Ore

Alternatives considered: -

The only alternative land use is livestock, game farming.

Further, since a prospecting right has been accepted the option of amending the prospecting area or the type of activity is neither available nor considerable.

(c) The design or layout of the activity:

The site infrastructure will need to be strategically placed by incorporating prospecting project demands and environmental sensitivities identified during the Environmental Impact Assessment process. Thus, the site layout will primarily be based on proximity to the access roads, proximity to the areas earmarked for prospecting as well as limited additional impact on the environmental (non-perennial drainage lines and wind direction), heritage resources.

The following infrastructure will be established and will be associated with the prospecting operation:

Scout and delineation drilling. If carried out, drilling may necessitate the establishment of access tracks and minor bush clearing for establishment of drill pads. The need for drilling can only be established once phase 1 of the Prospecting Works Program have been completed.

(d) The technology to be used in the activity:

- Technique

  A first phase of mapping is proposed to assist in the evaluation of the iron, manganese, copper, lead, zink and nickel potential. This mapping is focused primarily on the assessment of opencast mineral resources, specifically undisturbed structural blocks.

  Ground magnetics and ground gravity on a pre-determined grid will be undertaken to determine the location of the iron, manganese, copper, lead, zink and nickel potential formations.

  A programme of twelfe (12) surface diamond drill holes are planned, comprising TNW, TBW and BQ size core and depths ranging from 20m to 50m, thus producing an estimated 300m drilled core. The drilling will be laid out on a random grid, which will allow for the determining of a Samrec category of mineral resource classification.

  This phase entails the grading of 5 kilometre of new road, the construction of 5 kilometre of new road, and the construction of the twelfe (12) drill-pads.

  Prospecting activities will primarily make use of existing roads where possible, but reconnaissance tracks will be created in order to access the drilling grid. Minor bush clearing will also be done to establish the drill pads. A mobile container office with mobile toilets might be positioned in the vicinity of the drill grid, but no permanent infrastructure will be established on site.

Alternatives considered: -

The planned prospecting activities include Mapping, Geophysical surveys and drilling if previous results proved positive and possible. These are the most economic viable method currently being used by the iron, manganese, copper, lead, zink and nickel ore fraternity. There is no other feasible, alternative prospecting method for the prospecting and drilling for iron, manganese, copper, lead, zink and nickel ore.

(e) The operational aspects of the activity:

Please refer to d) for a complete description of the prospecting methods.

Prospecting activities will primarily make use of existing roads created by farming, but additional roads / tracks will most likely be created.

Alternatives considered: -

The planned prospecting activities include Mapping, Geophysical surveys and drilling if previous results proved positive and possible. These are the most economic viable method currently being used by the iron, manganese, copper, lead, zink and nickel ore fraternity. There is no other feasible, alternative prospecting method for the prospecting and drilling for iron, manganese, copper, lead, zink and nickel ore.

(f) The option of not implementing the activity:

The major land use in the area is agriculture. According to AGIS, the land capability of the study site is moderate on the plains and low to very low on the mountains. Irrigation suitability is good on the plains, but poor on the mountains. The region is demarcated for sheep farming, with the grazing capacity on site being 32 ha/LSU. Apart from the proposed prospecting activities, the prospecting right application area is mainly utilised as natural pastures for livestock grazing. Disturbances from past asbestos mining activities and cultivation practices are evident, and existing infrastructure include homesteads and farm buildings, farm dams, and roads.

The most significant impacts associated with grazing activities include the provision of water. These are not expected to have a serious/any impact on the existing groundwater features. Cumulative impacts associated with grazing include overgrazing and destruction of natural vegetation. The cumulative effects of prospecting activities on the property are expected to be equal to any potential negative effects that agriculture might have.

The Camel Thorn Trading project aims to uplift the local community. If the operation does not continue it would hold back any potential employment for the region and the families who are likely to benefit from the positive employment opportunities. Simultaneously, it may have a stagnant effect on the economy of South Africa and the iron, manganese, copper, lead, zink and nickel ore industry

as a whole. Substantial tax benefits to the State and Local Government will also be inhibited.
Mining forms an integrated part of the social and economic growth of South Africa and more specifically the Northern Cape Province.

Alternative Prospecting Methods
The prospecting method of drilling is the only economic viable method currently being used by the iron, manganese, copper, lead, zink and nickel ore fraternity; it is also the only cost-effective method. There is no alternative prospecting method.

Consequence if not proceeding with the Operation
The operation will make provision for 5- 15 job opportunities. This will be lost if the project does not proceed. Substantial tax benefits to the State and Local Government will also be lost. The property will not be potentially prospected for iron, manganese, copper, lead, zink and nickel ore that naturally occur in this area and the relevant job opportunities and positive impacts that can be made in the surrounding communities will not be happening.

Heritage:
Heritage: All information has been taken out of the Heritage impact Assessment done by Dr. Edward Matenga.

Considering the findings of the desk assessment, the mine prospecting can go ahead. The study is mindful that some important discoveries may be made during prospecting. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

ii) Details of the Public Participation Process Followed

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

The consultation process with interested and affected parties is ongoing (Appendix 3).

The process as described by NEMA for Environmental Authorisation was followed. See table 1 below for the identification of Interested and Affected Parties to be consulted with.

A copy of the Background Information Document with a cover letter and comments form to invite their comments was sent by registered post to the farm owners and government departments

See Appendix 3 as proof, in order for other interested parties to come forward and to register as interested parties in the project.

An advert was placed in the Gemsbok on 3 February 2023 to inform the public that a Prospecting Right was accepted for Camel Thorn Trading (Pty) Ltd and that any interested or affected parties must register (copy attached).

Notices were placed at the/on the fences of the farms to make all relevant parties aware of the application.

Figure 3. Location of notices brought up.

With this site notice all passers-by are requested to register and submit any written comments to be forwarded to the consultant.

A notification letter on the BAR document was send to all I & APs and the BAR will be placed at the library and municipality in Prieska for easy access by all parties, the documents will also be available on the Wadala Website.

iii) Summary of issues raised by I&APs

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

Please see Appendix 3

iv)The Environmental attributes associated with the development footprint alternatives (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

(1) **Baseline Environment**

(a) Type of environment affected by the proposed activity (its current geographical, physical, biological, socio-economic, and cultural character)

Regional Geology

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Camel Thorn Trading to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area and to determine the possible impact of prospecting on the diversity and ecological status of the application area geology was described and included in this report as part of the ecological study (Complete study appended as Appendix 4 to the report).

According to 1:250 000 Geological Map of 2922 Prieska, published by the Council for Geoscience in 1995, the geological features on Rietfontein and Nauga comprise Quaternary, Mokolian, Vaalian, Randian and Swazian deposits. The mountains comprise Kuruman Banded Ironstone and Daniëlskuil Jaspilite from the Asbestos Hills Subgroup of the Griqualand West Supergroup (Ghaap Group) as well as intrusive Diabase (Figure 4). Surface rubble is found across the mountains and the northern plains (Figure 4). The plains primarily comprise red wind-blown sand with dunes, but outcrops of Zeekoebaart Andesite of the Ventersdorp Supergroup (Platberg Group) and Skalkseput Granite are found in the north. East of the Doringberg fault, Griqualand West Supergroup outcrops, including Vryburg Quartzite, Clearwater Shale (Schmidtsdrif Subgroup), Campbell Rand Dolomitic limestone and Porphyritic basic lava become more prominent (Figure 4). Calcrete outcrops are also present here. The metal deposits areexpected to be associated with the Banded Ironstone formation.

The terrain in the west is primarily characterised by plains with open low hills, but open high hills occur sporadically. The footslopes along the centre of the property are characterised by rolling or irregular plains with high hills, while the terrain in the east is characterised by low mountains. Altitude rangesfrom 900 m along the river, 920 – 980 m on the plains, 1 000 – 1 080m on the mountain slopes, to 1 100 - 1 300 m on the mountain tops. The terrain is indicated by a gentle slope of 1 - 3 % on the plains and mountain plateaus, with a slight increase to 6 - 10 % on the foot slopes, while very steep slopes of 20 – 47 % are found along the mountains slopes.

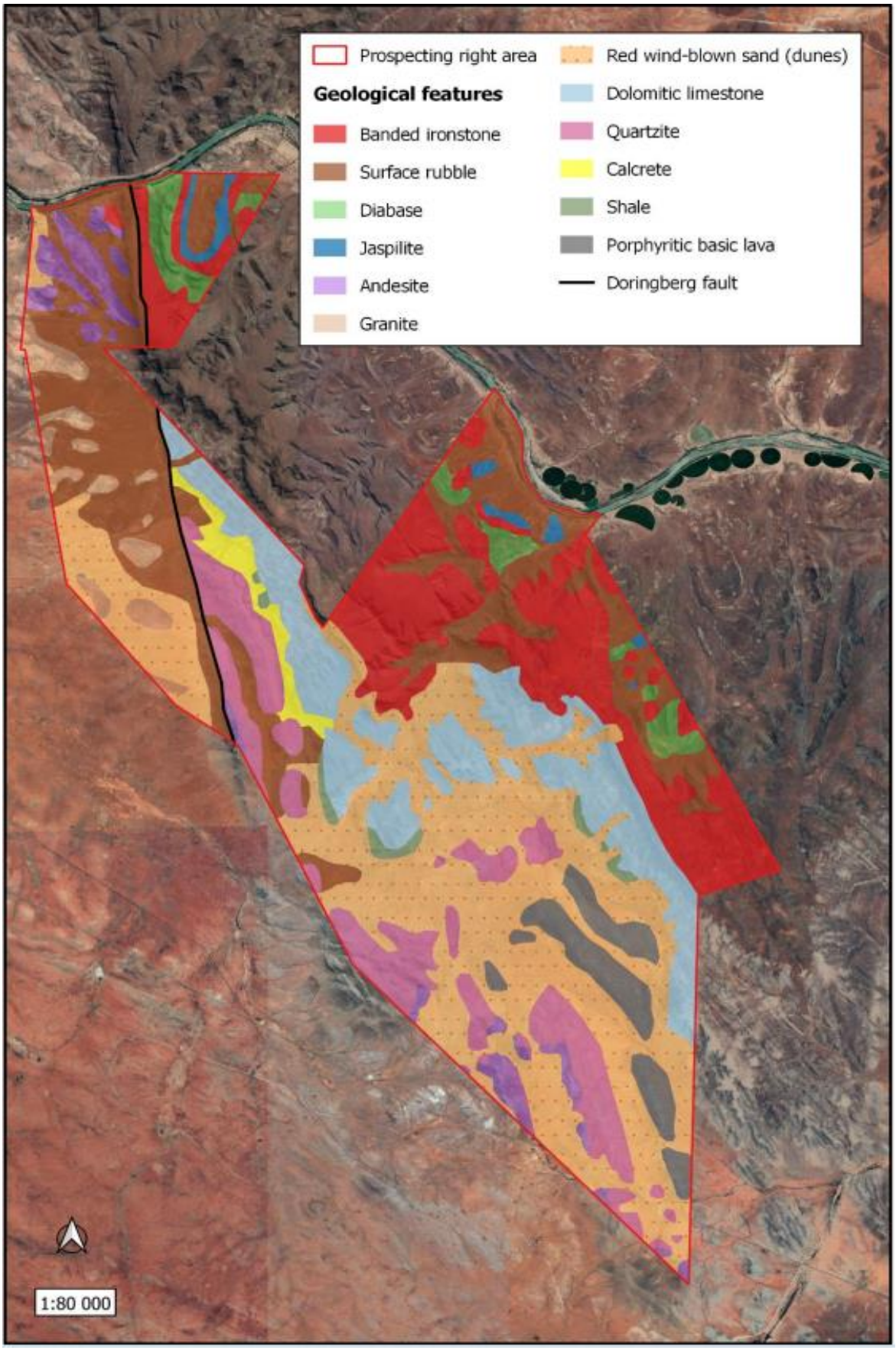


Figure 4. The distribution of geological features in the study area.

Superior-type banded iron formation (BIF) of the Transvaal Supergroup crop out along the western margin of the Kaapvaal craton in the Northern Cape Province of South Africa. These iron formations can be traced as a prominent range of hills in a broken arc for some 400km from Prieska in the south to Pomfret in the north. The bulk of the hematite ore is found in the vicinity of Postmasburg and Sishen. Within this sub region, iron ore and associated lithologies of the Transvaal and Olifantshoek Supergroups crop out intermittently along an arcuate belt (the Maremane anticline) for 60km. Sishen Iron Ore Mine is located at the northern end of the anticline. At this locality, the bulk of the hematite ores lies buried beneath younger cover lighologies. Similarly, there is very little outcrop of iron ore at the Kolomela mine area, which is situated at the southern end of the same structure. The Gamagara rand forms a prominent line of west dipping outcrops between Sishen and Postmasburg. Localised occurrences of high-grade hematite ore (associated with the Kuruman Hills Banded Iron Ore Formations) are also found along this ridge.

There is a definite potential for buried iron ore deposits similar to Sishen, Khumani, Beeshoek and Kolomela to the west of the Gamagara rand.

The mining activities relating to copper zinc lead and lead further west of Prieska is well known and documented with Orion Minerals being the most recent development and further exploration may result in additional mineable reserves being found including iron ore, manganese, nickel and lead in the surrounding areas and specifically the area on which prospecting is envisaged.

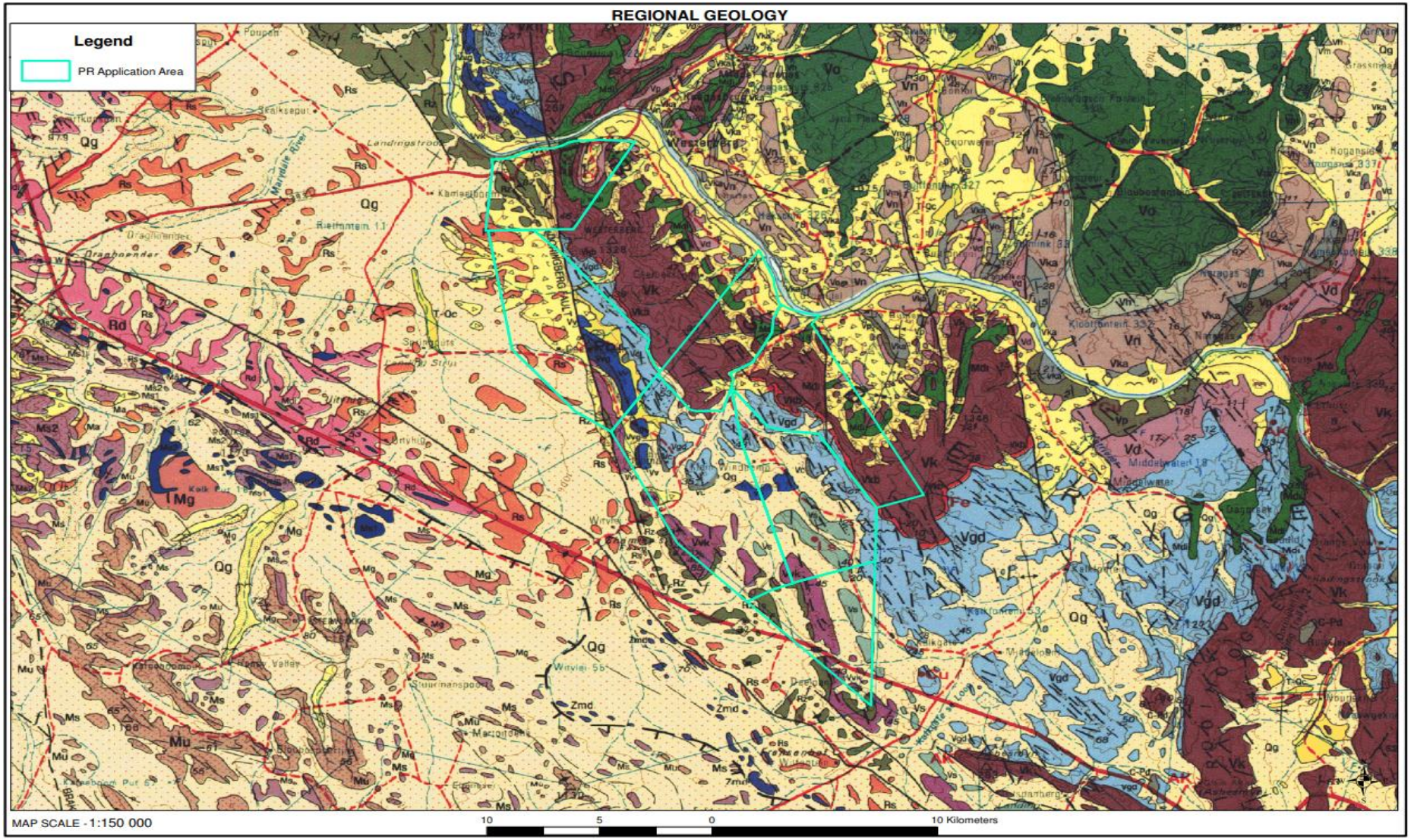


Figure 5. Geological Map of the application area.

Climate:

Regional Climate: -

The Northern Cape is classified as a semi-dessert and is known to have summer rains with high temperatures in the Summer (as high as 38°C to 40°C) and cold Winters (temperatures ranging from -4°C to -6°C). The sun shines approximately 80% during Summer and approximately 70% during the Winter.

Average Annual Rainfall: -

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Ave rainfall (mm)	77	69	67	40	17	6	5	10	19	38	55	60	**463**
Ave rain days/month	6.5	5.7	6.2	4	1.6	0.9	0.8	1	1.6	3.5	5.2	5.9	**43**

Rainfall Intensity: -

Most of the rainfalls occur during thunderstorms in the Summer months as well as during cloud bursts where maximum rainfalls were measured of up to 112.5mm at a downpour of approximately 60 minutes.

Average Maximum and Minimum Temperatures:

The average maximum temperature measured during the Summer is 30.9°C and the minimum during the Winter months is 3.4°C.

Average Monthly Wind Direction and Speed: -

The prevailing wind direction in the area is mainly from the north to north-westerly with the strongest winds from the west-southwest to north-northwest that occurs between August and December. October and November month are common for high wind speeds of up to 4.85 meters per second.

Average Monthly Evaporation: -

It is estimated that the average annual evaporation rate is approximately 2365mm which indicates the dry climate conditions in this area.

Presence of Extreme Climatic Conditions: -

Hail:	October to March
Frost:	May to September
Strong Winds:	Occasional strong winds occur but not often
Droughts:	Normal for a dessert area – approximately 6 out of 10 years.

Topography:

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Camel Thorn Trading to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area. and to determine the possible impact of prospecting on the diversity and ecological status of the application area topography was described and included in this report as part of the ecological study (Complete study appended as Appendix 4 to the report).

The terrain in the west is primarily characterised by plains with open low hills, but open high hills occur sporadically. The footslopes along the centre of the property are characterised by rolling or irregular plains with high hills, while the terrain in the east is characterised by low mountains. Altitude rangesfrom 900 m along the river, 920 – 980 m on the plains, 1 000 – 1 080 m on the mountain slopes, to 1 100 - 1 300 m on the mountain tops. The terrain is indicated by a gentle slope of 1 - 3 % on the plains and mountain plateaus, with a slight increase to 6 - 10 % on the foot slopes, while very steep slopes of 20 – 47 % are found along the mountains slopes.

Soil:

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Camel Thorn Trading to provide an ecological assessment in order to highlight the ecological characteristics of the proposed prospecting area. and to determine the possible impact of prospecting on the diversity and ecological status of the application area soils was described and included in this report as part of the ecological study (Complete study appended as Appendix 4 to the report).

Land types found on the property include Ae275, Ag140, Fb378, Fb383, Fb388, Fb390, Ib340 and Ic152 (Figure 6). The plains, represented by the Ae and Ag landtypes are characterised by red-yellow apedal, freely drained soils, red, with high base status. In the north the soil is deeper than 300 mm deep (Ae275), while in the south it is less than 300mm deep (Ag140). The mountains and high hills are represented by the Ib and Ic landtypes. Here, miscellaneous land classes are found, but the soil is very rocky with little or no soils (Ic152) or with miscellaneous soils(Ib340). The mountain plateau, footslopes and valleys are represented by the Fb landtypes. The soils found here are characterised by Glenrosa and/or Mispah forms, with lime rare or absent in upland soils but generally present in low-lying soils.

Soils of the study area have moderately high to very high wind erosion susceptibility. Water erosion susceptibility is moderate to high, but rainfall erosivity is low due to the arid climate.Crusting and compaction susceptibility is moderately high.

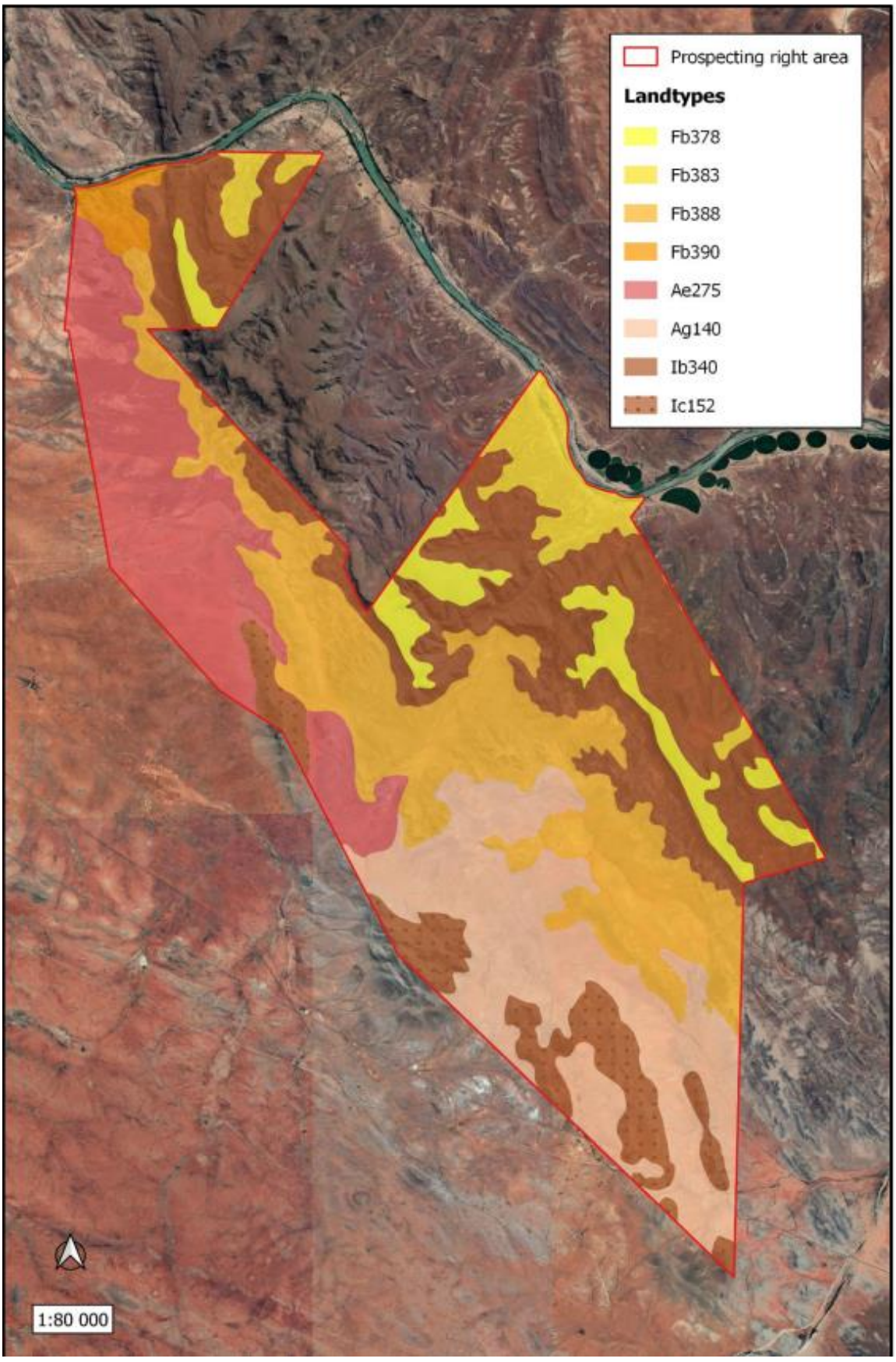


Figure 6. The distribution of land types in the study area. Map taken out of the Ecological assessment by Boscia Ecological Consultants.

Land Capability and Land Use

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Camel Thorn Trading to provide an ecological assessment in order to highlight the ecological characteristics of the proposed prospecting area and to determine the possible impact of prospecting on the diversity and ecological status of the application area Land capability and Land use was described and included in this report as part of the ecological study (Complete study appended as Appendix 4 to the report).

Current and historic land use

The major land use in the area is agriculture. According to AGIS, the land capability of the study site is moderate on the plains and low to very low on the mountains. Irrigation suitability is good on the plains, but poor on the mountains. The region is demarcated for sheep farming, with the grazing capacity on site being 32 ha/LSU.

Apart from the proposed prospecting activities, the prospecting right application area is mainly utilised as natural pastures for livestock grazing. Disturbances from past asbestos mining activities and cultivation practices are evident, and existing infrastructure include homesteads and farm buildings, farm dams, and roads.

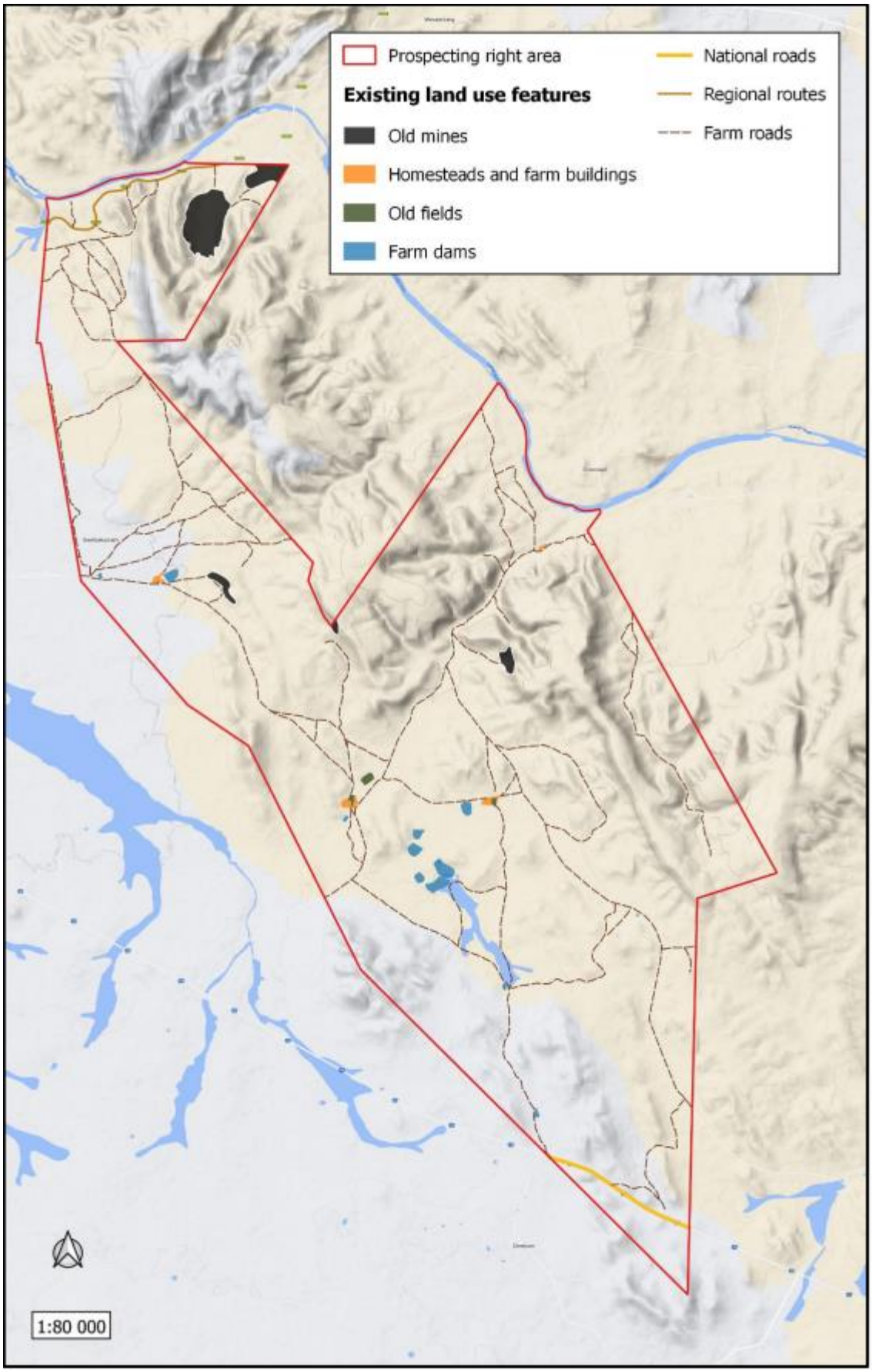


Figure 7. Evidence of existing infrastructure and past disturbances in the study area.

Surface Water:

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Camel Thorn Trading to provide an ecological assessment in order to highlight the ecological characteristics of the proposed prospecting area and to determine the possible impact of prospecting on the diversity and ecological status of the application area surface water was described and included in this report as part of the ecological study (Complete study appended as Appendix 4 to the report).

The Rietfontein and Nauga study area falls within the Boegoeberg quaternary catchments D72B and D72C of the Lower Orange Water Management Area (Figure 8). These quaternary catchments have been allocated a Present Ecological State (PES) of 'Largely Natural' (B) by Smook et al. (2002) and information regarding their mean annual rainfall, evaporation potential and runoff is provided in Table 2.

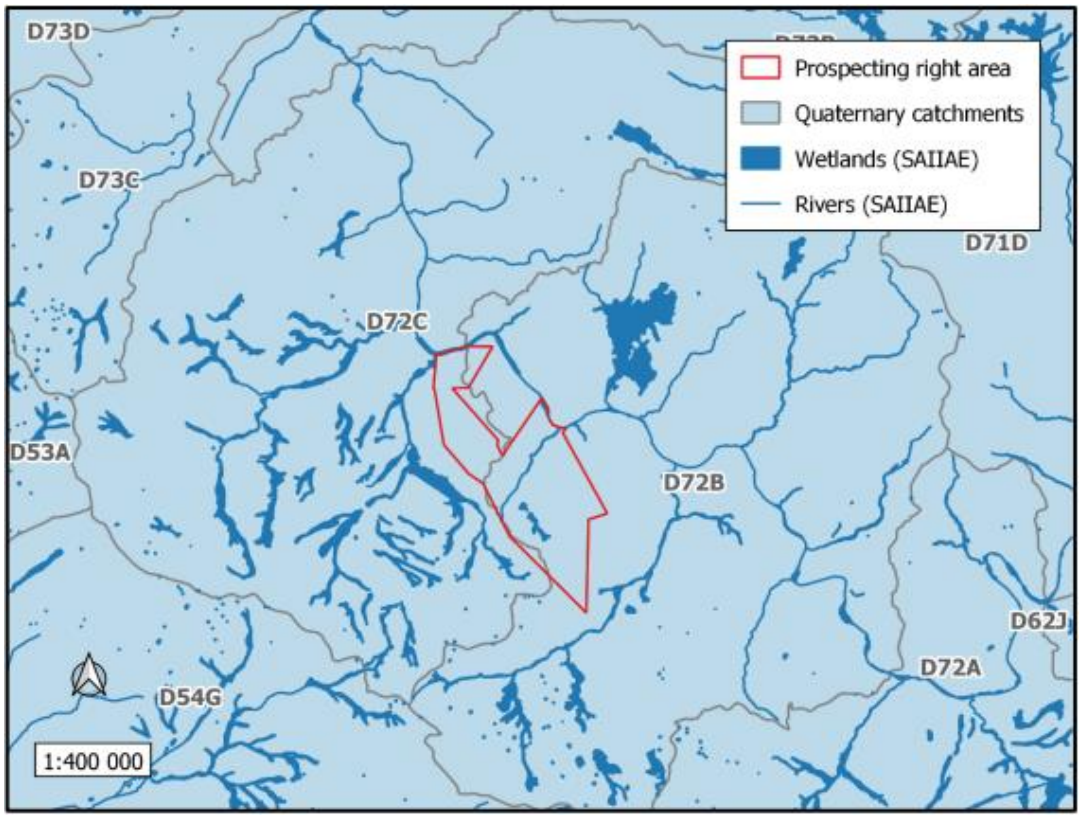


Figure 8. The locality of the proposed prospecting area in relation to the Boegoeberg quaternary catchments of the Lower Orange Water Management Area.

Table 2. Catchment characteristics for the Boegoeberg quaternary catchments in which the study area fall, as presented by Smook et al. (2002).

Quaternary catchment	Catchment Area (km^2)	Mean Annual Rainfall (mm)	Mean Annual Evaporation (mm)	Mean Annual Runoff (10^6 m^3)
D72B	2 569	215	2 475	12.7
D72C	2 776	200	2 475	10.76

According to the South African Inventory of Inland Aquatic Ecosystems (SAIIAE), the study area falls within the Bushmanland Bioregion, where 4.2 % of the land area is covered by inland wetlands, including depressions, floodplains, seeps and valley-bottom wetland types (Van Deventer et al. 2019). The spatial extent according to their present ecological status per wetland is depicted in Table 3. Depressional wetlands are most abundant in this bioregion, with the majority being severely modified. Most of the remaining wetland types in this Bioregion are also moderately- to severely modified.

No natural wetlands occur on Rietfontein and Nauga, but the Orange River, an order-6 river, with its associated wetlands and riparian zone, lines the prospecting right border along two sections, i.e. 3.3 km in the north and for 4.5 km in the north-east. An unnamed order-1 river flows in a south-north direction through the centre of the study area before it feeds into the Orange River. An extensive network of drainage lines also occurs across the site (Figure 9).

Table 3. Percentage of inland wetland spatial extent according to the present ecological status per wetland type of the Bushmanland Bioregion.

Wetland type	Total Extent (%)	% Natural or near-natural (A/B)	% Moderately modified (C)	% Heavily to severely/critically modified (D/E/F)
Depression	74.9	16.0	33.6	50.4
Floodplains	10.3	1.9	29.4	68.7
Seeps	0.8	38.0	18.7	43.2
Valley-bottom	13.9	1.5	62.6	35.9

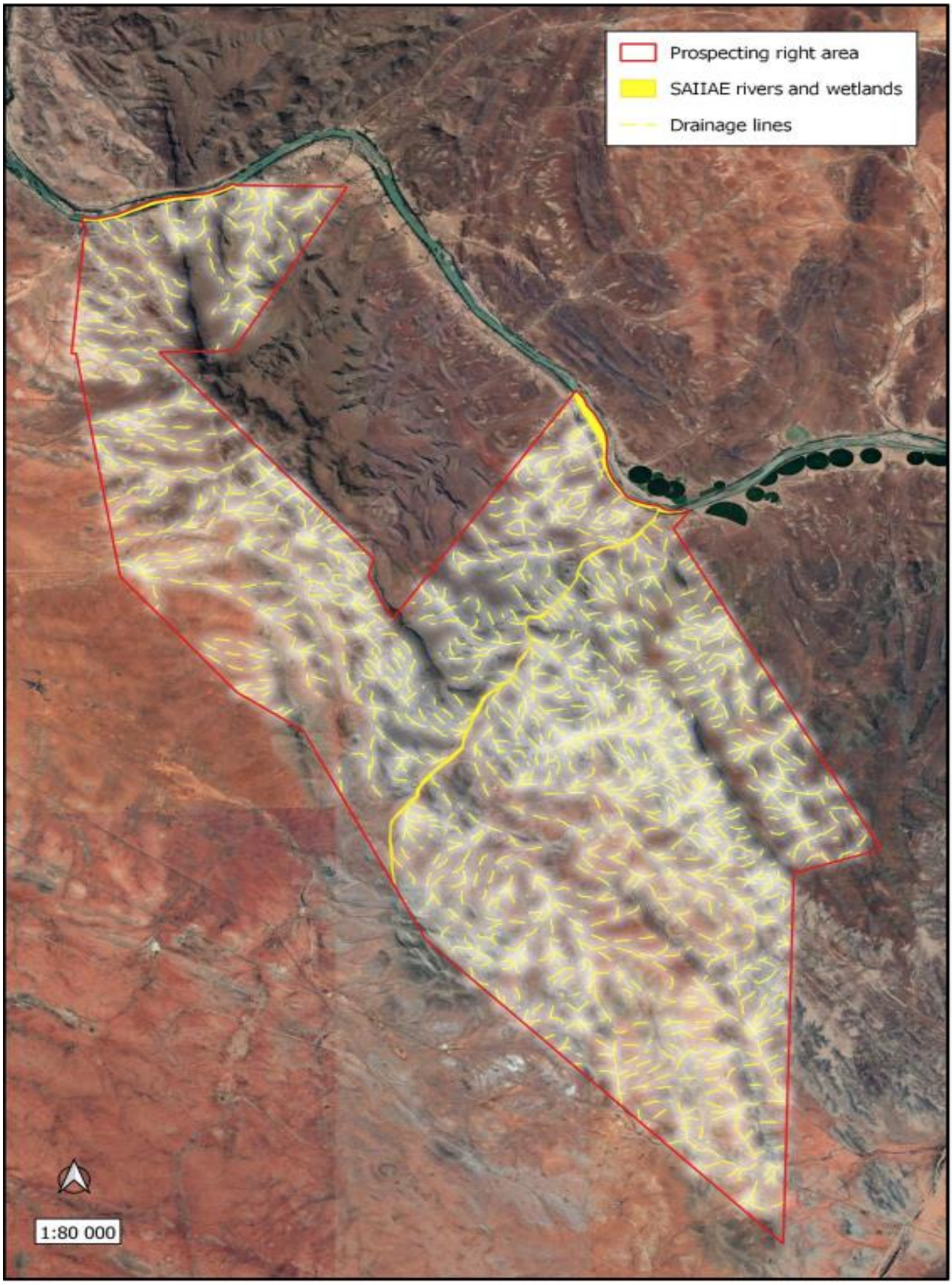


Figure 9. The location of SAIIAE wetlands and drainage lines on the proposed prospecting right area.

Ground Water:

Depth of water-table(s):

Groundwater flow would follow the topography and the surface drainage direction from the higher areas towards the lower areas in towards the Orange River.

Ground-water zone:

The prospecting and drilling does not affect the quality of the ground water in any manner.

Air Quality and Noise:

With reference to the Scheduled Processes under the Second Schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), no scheduled process relates to any proposed prospecting activity.

The current source of air pollution in the area stems from mining operations along the Orange River and from vehicles travelling on the gravel roads of the area. Farming activities, such as ploughing of irrigation fields, may generate dust during certain periods of the year.

The general air quality on the area is expected to be good.

The potential source of air pollution on the farms will be nuisance dust generated by the movement of vehicles on the access roads for the drilling rig. Gas emissions from the vehicles will be negligible and within legal limits. Generated dust can be visible from the secondary gravel roads and to local farm residents. Any potential fall-out dust will impact those who reside on the farm, although the small scale of the prospecting (12 holes) will not create huge amounts of dust.

Noise on site will be generated by the drilling equipment as well as vehicles. Although these activities do generate noise, the overall impact can be described as negligible. The most susceptible receptors of noise will be the local farm residents.

Fauna:

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Camel Thorn Trading to provide an ecological assessment in order to highlight the ecological characteristics of the proposed prospecting area and to determine the possible impact of prospecting on the diversity and ecological status of the application area fauna was described and included in this report as part of the ecological study (The complete study is appended to this report as **Appendix 4).**

Faunal communities

According to Section 3(a) and 4(a) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009, no person may, without a permit by any means hunt, kill, poison, capture, disturb, or injure any protected (Schedule 2) or specially protected (Schedule 1) wild animals. Furthermore, Section 12 (1) of NCNCA states that no person may, on a land of which he or she is not the owner, hunt a wild animal without the written permission from the landowner. According to the act "wild animal" means a live vertebrate or invertebrate animal, and the egg or spawn of such animal. The complex geology and many landscape features on Rietfontein and Nauga provide diverse habitat opportunities to faunal communities. Animals likely to be found in the study area are discussed in their respective faunal groups below.

Mammals

As many as 59 terrestrial mammals and seven bat species have been recorded in the region, of which eight are listed either in the IUCN or the Mammal Red List of South Africa, Lesotho and Swaziland. Virtually all mammals of the study area are protected; either according to Schedule 1, 2 or 3 of NCNCA. Those that are specially protected are also indicated in Table 8 of the ecological study.

Honey Badger, Ground Pangolin, Aardwolf, African Wild Cat, Cape Fox, Bat-eared Fox, and Striped Polecat have a high chance of occurring across the site, given their wide habitat tolerances. Pangolins, however, are seldomly encountered due to their inconspicuous nature. Similarly, Black-footed Cat and South African Hedgehog also have a high chance of occurring on site based on their association with open, arid habitat. Aardvark has a high likelihood to be found on site and is expected to be common on the sandy plains.

The Dent's Horseshoe Bat is expected to be common due to their preference for savanna habitat and rocky outcrops. The Cape Clawless Otter is expected to be restricted to the Orange River.

The African Straw-coloured Fruit-bat, although having a wide habitat tolerance, requires fruit trees and therefore has a moderate chance to be found on site. The Brown Hyaena has a low potential to be found on site mainly since farm fences are restricting their occurrences across their natural distribution range. The Littledale's whistling rat is also not expected to occur on site based on their restricted distribution.

Problem animals (Schedule 4) with a high likelihood to occur on site include Vervet Monkey, Chacma Baboon, Black-backed Jackal and Caracal.

Reptiles

The Rietfontein and Nauga prospecting area lies within the distribution range of at least 52 reptile species, of which none are of international or national conservation concern.

One species is endemic to South Africa, i.e. Acontias gracilicauda (Thin-tailed Legless Skink). It is fossorial, usually occupying moderately mesic soils in open or partly wooded habitats and is expected to be found on the sandy plains.

Most other reptiles are protected either according to Schedule 1, 2 or 3 of NCNCA. Specially protected species include Karusasaurus polyzonus (Southern Karusa Lizard) and Chamaeleo dilepis dilepis (Namaqua Chamaeleon). The Karusa Lizard is a rock-dwelling species inhabiting rocky outcrops and could potentially occur along the rocky mountains and hills. The Common Flap-neck Chameleon is typically found high up in bushes or trees and could therefore potentially occur across the site. The drainage lines and ephemeral river could potentially provide a special habitat for the Marsh Terrapin.

Amphibians

Thirteen amphibian species are known from the region. The Orange River and ephemeral river, along with their associated pools represents suitable habitat for water-dependent species. The farm dams and ephemeral drainage lines are also expected to be important during wet periods for breeding. Those frog species that are fairly independent of water (i.e. Bushveld Rain Frog, Boettger's Caco) are expected to take refuge under rocks and logs, soil cracks, sandy substrates, leaf litter and abandoned mounds of termites.

The Giant Bull Frog (Pyxicephalus adspersus) is listed as Near Threatened and is protected according to Schedule 1 of the NCNCA. They prefer seasonal shallow grassy pans, vleis and other rain-filled depressions in open flat areas of grassland or savanna, but mainly remain buried up to 1 m underground until conditions become favourable. The site lies within their known distribution, but no ideal habitat for them occurs on site.

All other amphibians of the study area are protected according to Schedule 2 of NCNCA. Raucous Toad (Amietophrynus rangeri) and Southern Pygmy Toad (Poyntonophrynus vertebralis) are endemic to South Africa and primarily occur in terrestrial habitats, but use temporary waterbodies (pans, roadside pools, dams, quarries) filled after rains to breed, and could potentially occur on site during the rainy season.

Avifauna

The study site does not fall within or near (< 100 km) any of the Important Bird Areas (IBA) defined by Birdlife South Africa. A total number of 247 bird species have been recorded from the region. As many as 23 listed bird species are known from the region, all of which are classified as Vulnerable, Near Threatened, Endangered or Critically Endangered. Furthermore, all birds are protected either according to Schedule 1, 2 or 3 of NCNCA. Those that are specially protected (Schedule 1) are also listed in Table 9 of the ecological study.

Plants, from grass tufts to shrubs and trees, as well as rocky substrates provide important micro-habitats to birds and therefore the study area is expected to host

a diverse avifauna community. The most common red listed species expected to occur on site include those associated with rocky and open savanna habitat. Verreaux's Eagle (Vulnerable), nests in rocky habitats and on cliffs, but might be found on the plains when hunting. Tawny Eagle (Vulnerable and Endangered), Martial Eagle (Endangered), Lanner Falcon (Vulnerable), Kori Bustard (Near Threatened) and Ludwig's Bustard (Endangered) prefer open savanna vegetation and are expected to be most common on the plains.

Fish

In addition to those regulations in the NCNCA pertaining to wild animals, Section 32 and 33 of the NCNCA states that no person may, without a permit angle and not immediately release, catch, import, export, transport, keep, possess, breed, or trade in a specimen of a specially protected (Schedule 1) or protected (Schedule 2) fish.

Eleven fish species are expected to be found in the Orange River and are listed in Table 10 of the ecological study, along with their conservation status and sensitivity to physico-chemical and no-flow conditions. The Largemouth Yellowfish is endemic to the Orange-Senqu and Vaal River systems in the Orange-Senqu River Basin. It is also listed as Near Threatened (IUCN 2015) due to the continuous decline in water quality in most rivers and streams in its geographic range, the destruction of suitable spawning beds due to erosion, as well as their slow growth rate, late maturing and low fecundity.

The remaining species are all listed as least concern. However, they are all protected either according to Schedule 1 or 2 of the NCNCA. Specially protected species include Rock Catfish, Vaal-orange Smallmouth Yellowfish and Moggel.

Invertebrates

Invertebrates dominate inland habitats and play a significant role in the overall function of the ecosystem (Kremen et al. 1993, Weisser and Siemann 2004). In general, they are widely distributed and extremely diverse, which makes it almost impossible to list all species that may possibly occur on site without a dedicated study. Invertebrates have also not been surveyed as comprehensively as plants and mammals and therefore current available data on their distribution is much scarcer. Nevertheless, key morphospecies and species of conservation concern are discussed here, as well as the major habitats which delimit possible invertebrate communities on site.

Eight invertebrate species of the Northern Cape appear on the IUCN Red Data list of threatened species and are listed in Table 11 of the ecological study. However, none of these species' distribution ranges overlap with that of the study area. In addition, species that are specially protected according to Schedule 1 of the NCNCA include all Velvet worms as well as some baboon spider species, Stag Beetles and the Flightless Dung Beetle. None of these taxa have been formally recorded in the study region either. All Rock- Creeping- and Burrowing Scorpions

are protected according to Schedule 2 of the NCNCA, along with several beetles, butterflies, and moths, all of which have a high likelihood to be found on site.

Two major habitats delimit possible invertebrate communities in the study area:

- Terrestrial vegetation classified as Karoo (Picker et al. 2004) includes all the terrestrial vegetation communities on site and represent unique species assemblages, with an aboveaverage representation of beetles, grasshoppers, flies, wasps, and lacewings. Those protected butterflies and scorpions discussed above is expected to be associated with this habitat.

- Perennial Orange River includes a large diversity of aquatic macroinvertebrates, such as flatworms, earthworms, leeches, freshwater crabs, mussels and prawn, basket clams, freshwater bivalve- and pulmonate snails, bladder snails, pond snails, prong-gilled mayflies, small squaregill mayflies, jewel damselflies, narrowwinged damselflies, clubtail dragonflies, emerald dragonflies, skimmers dragonflies, grass moths, giant water bugs, water boatmen, water striders, water treaders, marsh treaders, creeping water bugs, water mites, sponges, water scorpions, backswimmers, pygmy backswimmers, riffle bugs, long-horned caddisflies, microcaddisflies, net-spinning caddisflies, diving beetles, riffle beetles, whirligig beetles, water scavenger beetles, long-toed water beetles, minute moss beetles, biting midges, meniscus midges, mosquitoes, house flies, black flies, horse flies, crane flies and nematoceran flies.

NATURAL VEGETATION

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Camel Thorn Trading to provide an ecological assessment in order to highlight the ecological characteristics of the proposed prospecting area and to determine the possible impact of prospecting on the diversity and ecological status of the application area flora was described and included in this report as part of the ecological study (The complete report is appended as Appendix 4 to the report).

Broad-scale vegetation patterns

The study area falls within the Nama Karoo Biome (Mucina and Rutherford 2006). According to the vegetation map of Mucina and Rutherford (2012), the site is represented by two broad-scale vegetation units, i.e. Bushmanland Arid Grassland and Lower Gariep Broken Veld. This vegetation map however does not reflect the true character of the site, because it has not been mapped at a very fine scale. A field investigation and subsequent vegetation classification is needed to provide a more accurate description of the plant communities and habitats on site.

The study area falls within the Nama Karoo and Azonal Vegetation Biomes (Mucina and Rutherford 2006). According to the vegetation map of Mucina and Rutherford (2012), the site is represented by two broad-scale vegetation units from the Upper

Karoo and Alluvial Vegetation Bioregions, i.e. Northern Upper Karoo and Upper Gariep Alluvial Vegetation.

Bushmanland Arid Grassland is restricted to the Northern Cape. It spans from Aggeneys in the west to Prieska in the east, with its boundaries being defined by the edges of the Bushmanland Basin in the south, desert vegetation near Upington in the north and the edges of the Namaqualand hills in the west. Altitude varies from 600 to 1 200 m. The topography includes extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland, dominated by Stipagrostis spp. In places low shrubs of Salsola change the vegetation structure. In years of abundant rainfall rich display of annual herbs can be expected. A third of the geology of this unit comprises recent (Quaternary) alluvium and calcrete. Superficial deposits of the Kalahari Group are also present in the east. The extensive Palaeozoic diamictites of the Dwyka Group also outcrop in the area, along with gneisses and metasediments of Mokolian age. The soils are primarily red-yellow apedal soils, freely drained, with a high base status and < 300 mm deep. However, about a fifth of the area comprises soils deeper than 300 mm. The land types include mainly Ag and Ae. The unit is classified as least threatened with very little being transformed. Small portions are conserved within the Augrabies Falls National Park and Goegap Nature Reserve. Endemic plant species include Dinteranthus pole-evansii, Larryleachia dinteri, L. marlothii, Ruschia kenhardtensis, Lotononis oligocephala and Nemesia maxii.

Lower Gariep Broken Veld is restricted to the Northern Cape Province. It comprises Hardeveld along the Orange River from Onseepkans in the west, to Prieska in the east. The unit varies in altitude from 400 to 1 200 m. The topography includes hills and mountains, slightly irregular plains with sparse vegetation dominated by shrubs and dwarf shrubs. Scattered Aloidendron dichotomum individuals grow on the slopes of koppies, while Senegalia mellifera is typically found on the sandy soils of foot slopes. The geology of this unit includes Banded iron formation and amphibolites of the Asbestos Hills Subgroup, carbonates and cherts of the Campbell Group, Metamorphic rocks in the form of quartzites and gneisses of the Korannaland Subgroup as well as Riemvasmaak gneiss. The Uitdraai Formation and metamorphosed sediments and outcrops of the Namaqualand Metamorphic Complex are also found. The soils are typically shallow and skeletal, with Mispah and Glenrosa soil forms being dominant. The land types include mainly Ib and Ic, but Fb is also found. The unit is classified as least threatened and only a very small part has been transformed. Erosion risk is regarded as low, very low and moderate. Approximately 4 % is conserved within the Augrabies Falls National Park and Ruschia pungens is the only endemic plant species that is known from this unit.

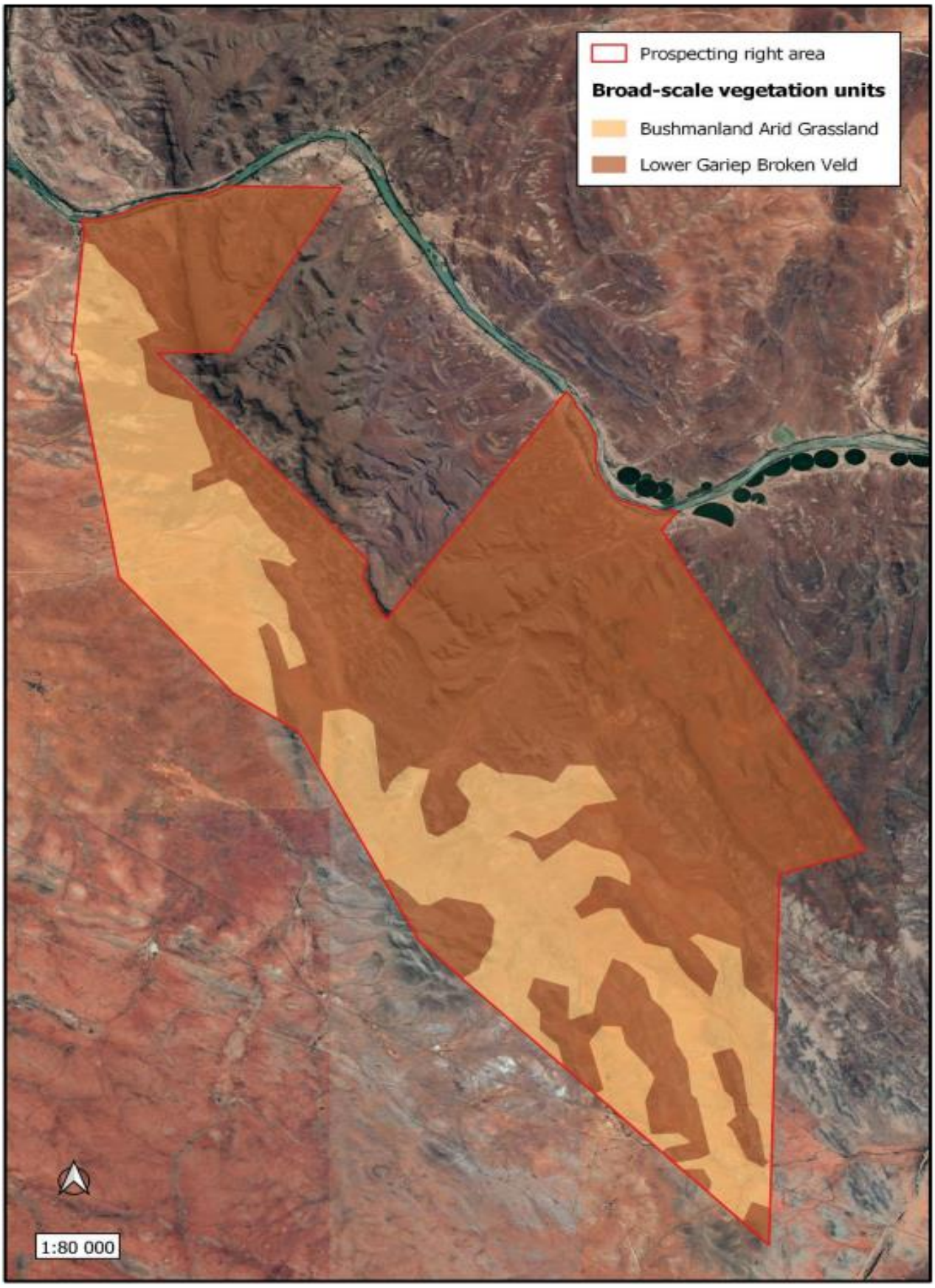


Figure 10. The broad-scale vegetation units (Mucina and Rutherford 2012) present in the study area.

Population of sensitive, threatened, and protected plant species

The SANBI Red List provides information on the national conservation status of South Africa's indigenous plants, which are protected under the National Environmental: Biodiversity Act (Act No. 10 of 2004) (NEMBA), while the National Forests Act (No. 84 of 1998) (NFA) and the Northern Cape Nature Conservation Act (Act No. 9 of 2009) (NCNCA) restricts activities regarding sensitive plant species. Section 15 of the NFA prevents any person to cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister. Section 49 (1) and 50 (1) of the NCNCA states that no person may, without a permit pick, transport, possess, or trade in a specimen of a specially protected (Schedule 1) or protected (Schedule 2) plants. Furthermore, Section 51(2) states that no person may, without a permit, pick an indigenous plant (Schedule 3) in such manner that it constitutes large-scale harvesting.

Most species from the region are classified as least concern; a category which includes widespread and abundant taxa. However, seven species are red listed:

Aloidendron dichotomum (Vulnerable (VU) is predicted to decline by 36 - 73 % in its range in the next 100 years, with main threats including climate change, harvesting, and trampling by livestock.They are found on north-facing rocky slopes, but also occur on any slopes and sandy flats and has a high likelihood to be found on the mountainous terrain on site.

Dinteranthus pole-evansii (VU) is potentially threatened by overgrazing and habitat degradation, with a population of fewer than 1 000 mature individuals occurring at two locations in the region. It prefers well-drained, sandy soils associated with quartz stones and pebbles and therefore has a high likelihood to be found along the quartz outcrops in the south-eastern half of the study area.

Hoodia officinalis subsp. officinalis (Near Threatened (NT)) occurs as small subpopulations and is known from less than 15 locations. This species is threatened by harvesting as it is regularly misidentified as Hoodia gordonii. It is associated with the Desert-, Nama Karoo-, and Succulent Karoo Biomes where individuals occur inside bushes in flat or gently sloping areas. It is expected to occur on the plains of the study area.

Tridentea virescens (Rare) is a widespread species that occurs as sporadic small subpopulations of up to six plants. No threats are known to impact this species. It prefers stony ground, or hard loam in floodplains and therefore only has a moderate potential to occur on site.

Acanthopsis hoffmannseggiana (Data Deficient – Taxonomically Problematic (DDT)) is a widespread and variable species that possibly contains several taxa, some of which may be of conservation concern. More study is needed to find reliable distinguishing characters to separate individual taxa. It prefers sandy plains, stony hillsides, and ridges, usually associated with weathered

quartzite and granite, but also occurs on limestone, usually at elevations between 650 and 1 000 m. It therefore has a high potential to occur in the study area.

Salsola tuberculata (DDT). The entire Salsola genus needs taxonomic revision because its species are poorly defined and difficult to separate. Therefore, based on currently available data, the risk of extinction of this species cannot be assessed. Its specific habitat requirements are not known.

Cullen biflora (DDT) was historically recorded near Douglas in the Northern Cape and although there are few collections of this species in South African herbaria, their identifications are not certain as the genus remains taxonomically unresolved. Without a clear understanding of the validity of this species, its distribution range and habitat requirements, an assessment of its risk of extinction cannot be done. No habitat description exists for this species.

Species previously recorded in the region that are protected in terms of the National Forest Act include Boscia albitrunca and Vachellia haematoxylon. To damage or remove any protected trees (seedlings to adults) during a prospecting operation, an application must be submitted to the Northern Cape Department of Agriculture, Forestry and Fisheries (DAFF) and a licence obtained from DAFF at least three months prior to such activities.

In addition to these, specially protected species (Schedule 1) and protected species (Schedule 2) of the NCNCA known from the study region are also listed in Table 4 of the ecological study. Furthermore, according to Section 51(2) of NCNCA, a permit is required from the Northern Cape, Department of Environment and Nature Conservation (DENC) for any large-scale clearance of all indigenous (Schedule 3) vegetation, before such activities commence.

Weeds and invader plant species

Weeds and invasive species are controlled in terms of the National Environmental Management: Biodiversity (NEMBA) Act 10 of 2004, the Conservation of Agricultural Resources (CARA) Act 43 of 1993, as well as the NCNCA (Schedule 6). These are species that do not naturally occur in each area and exhibit tendencies to invade that area, and others; at the cost of locally indigenous species. To govern the control of such species, NEMBA and CARA have divided weeds and invader species into categories.

Indicators of bush encroachment

Bush encroacher species are controlled in terms of Regulation 16 of CARA; where land users of an area in which natural vegetation occurs and that contains communities of encroacher indicator plants are required to follow sound practices to prevent the deterioration of natural resources and to combat bush encroachment where it occurs. Declared indicators of bush encroachment in the Northern Cape, recorded in the region, are listed in Table 7 of the ecological study.

Critical biodiversity areas and broad-scale processes

The proposed prospecting site falls within critical biodiversity areas (Figure 11), as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape. The Orange River and its riparian- and buffer zones are classified as Critical Biodiversity Area One, while the mountainous terrain is classified as Ecological Support Areas (Figure 11). The remaining areas are classified as Other Natural Areas, and no Protected Areas occur in or near the study area.

The Mining and Biodiversity Guidelines (DENC et al. 2013) also recognises the buffer along the Orange River to have Highest Biodiversity Importance (Figure 12), which constitute a high risk for mining. The mountainous area in the south-east is recognised as having Moderate Biodiversity Importance (Figure 12), which constitute a moderate risk for mining. The remainder of the site is not considered to have any biodiversity importance. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the impacts of mining to support mainstreaming of biodiversity issues in decision making in the mining sector.

Furthermore, according to the National Web based Environmental Screening Tool the study area is considered to have sensitive environmental features (Figure 13). This tool is a geographically based web-enabled application which allows a proponent intending to apply for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), to screen their proposed site for any environmental sensitivity. According to the screening tool, large areas on Rietfontein and Nauga is of very high sensitivity based on the Terrestrial Biodiversity Theme, which is a direct function of the Critical Biodiversity Areas according to the Northern Cape Critical Biodiversity Areas Map. The Orange River and ephemeral river are also of very high sensitivity based on the Aquatic Biodiversity Theme due to their status as rivers. The remaining areas earmarked to have very high sensitivity based on the Aquatic Biodiversity Theme, is due to freshwater ecosystem priority area quinary catchments that these areas fall in. The study area is of high and medium sensitivity based on the Animal Species Theme. The high sensitivity for the plains in the north-west is based on suitable habitat it provides for Lanner Falcon and Martial Eagle, while the mountainous areas in the north provide suitable habitat for Verreaux's Eagle. The high sensitivity of the plains in the south-east is based on suitable habitat opportunity for Ludwig’s Bustard.

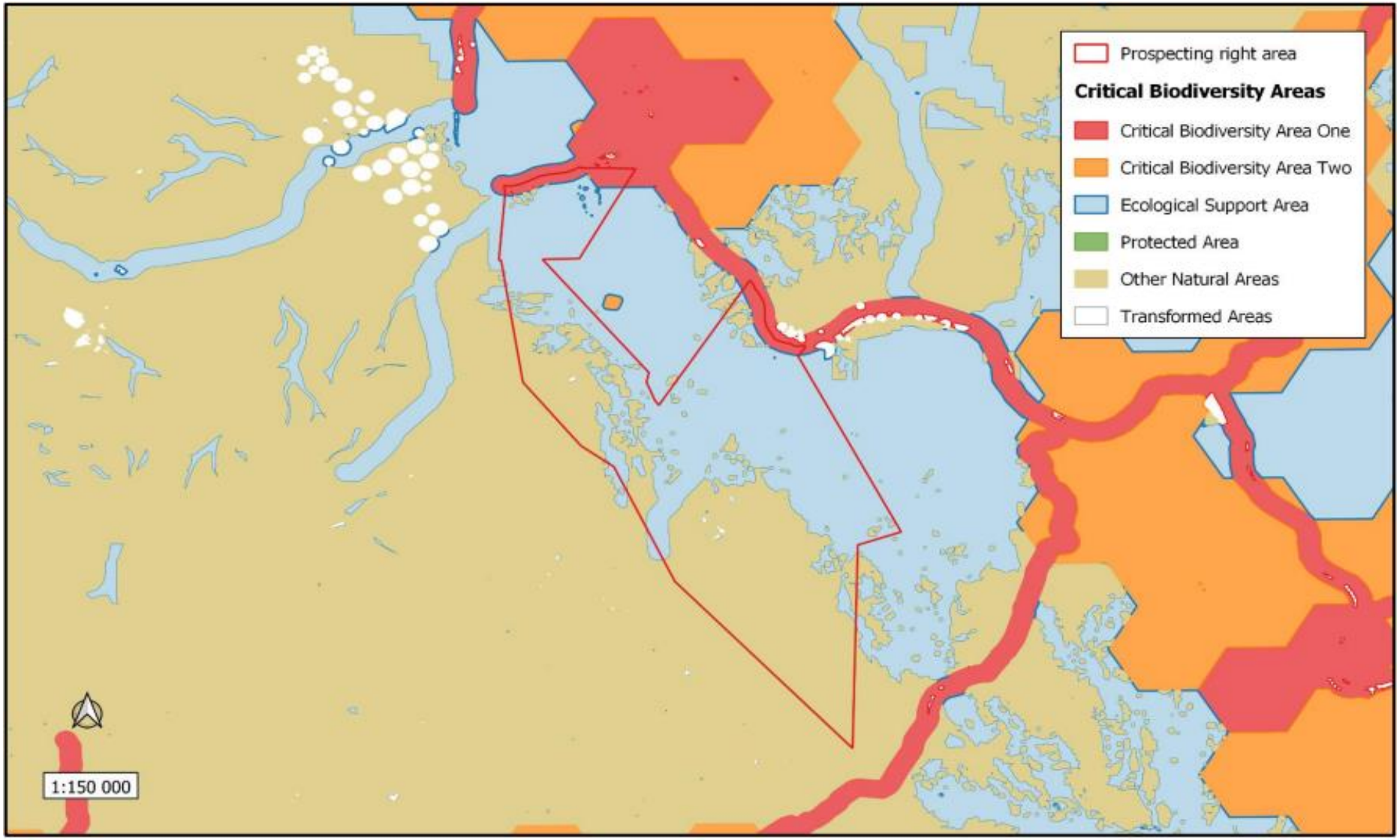


Figure 11. The study area in relation to the Northern Cape Critical Biodiversity Areas.

Figure 12. The study area in relation to the Mining and Biodiversity Guidelines.

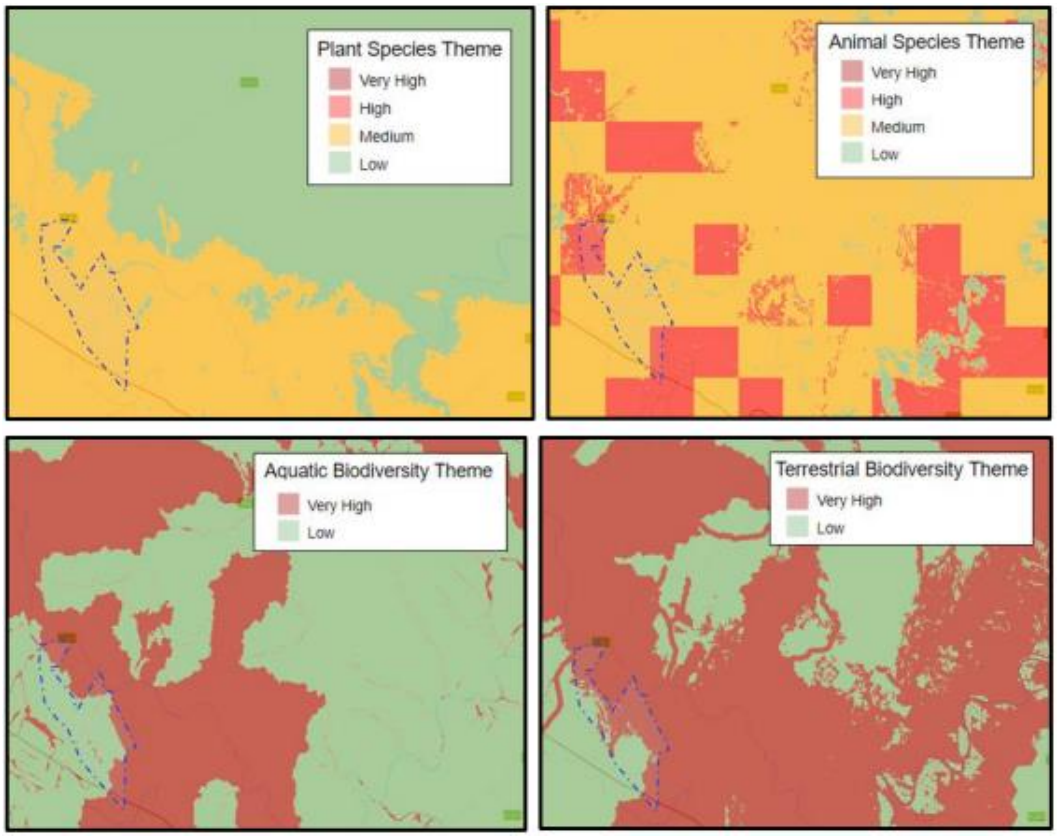


Figure 13. Environmental sensitivities in the study area, according to the National Web based Environmental Screening Tool.

A very small section in the centre of the site is of high sensitivity based on suitable habitat for Black-footed cat. The medium sensitivity in the central parts of the site is attributed to suitable habitat it provides for Tawny Eagle, Verreaux's Eagle and Ludwig's Bustard. The dams have also been earmarked to have medium sensitivity based on suitable habitat opportunity for Caspian Tern, but it is not foreseen that this species will occur on site. They are mainly estuarine species and only occasionally breed inland on small, low islets in saline pans and large dams. Most of the study area is of medium sensitivity based on the Plant Species Theme, since the site provides suitable habitat for Dinteranthus pole-evansii, Tridentea virescens and Aloidendron dichotomum.

According to the Pixley ka Seme Spatial Development Framework, all rivers and wetlands (ephemeral and perennial), including a generic buffer of 100m, are regarded as ecological corridors and sensitive. Their mandate is to conserve existing ecological corridors and rehabilitate any remnants of corridors.

Rietfontein and Nauga also falls along the south-western boundary of the Griqualand West Centre (GWC) of Endemism core (Frisby et al. 2019) (Figure 14). A centre of plant endemism is an area with high concentrations of plant species with very restricted distributions, known as endemics (Van Wyk and Smith 2001). Relatively small disturbances in a centre of endemism may easily pose a serious

threat to its many range-restricted species. Endemics are specifically vulnerable due to their restricted distribution ranges.

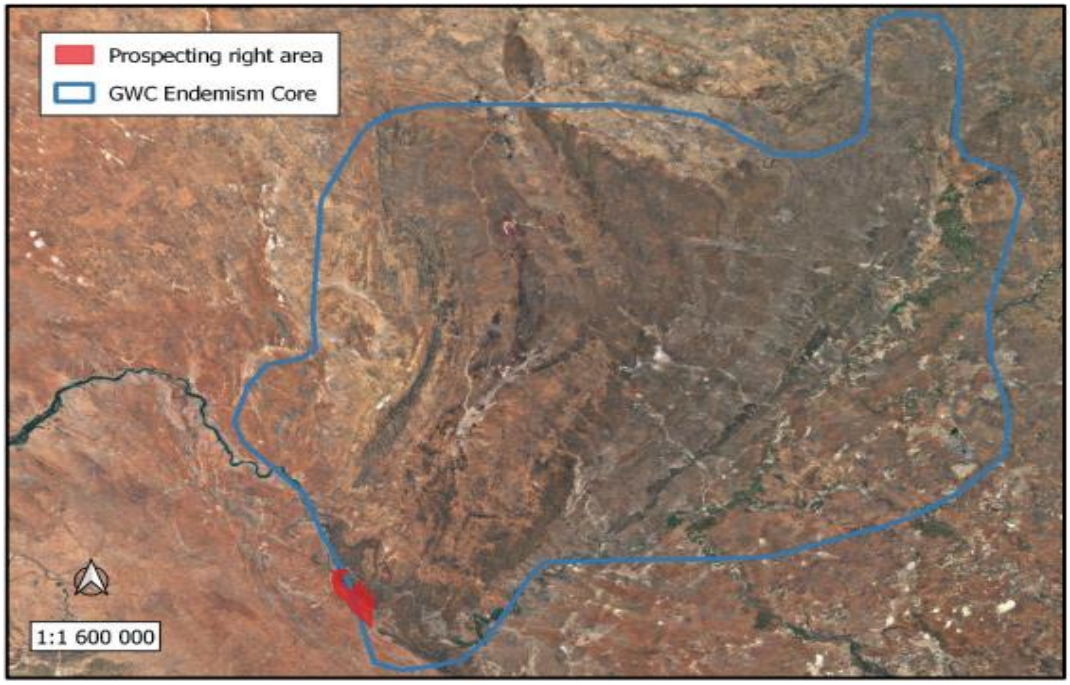


Figure 14. Rietfontein and Nauga in relation to the Griqualand West Centre of Endemism (Frisby et al. 2019)

Finally, the study area falls within a region where one of South Africa's largest economically most important asbestos deposits were mined (Figure 15), which increases the operation's cumulative impacts.

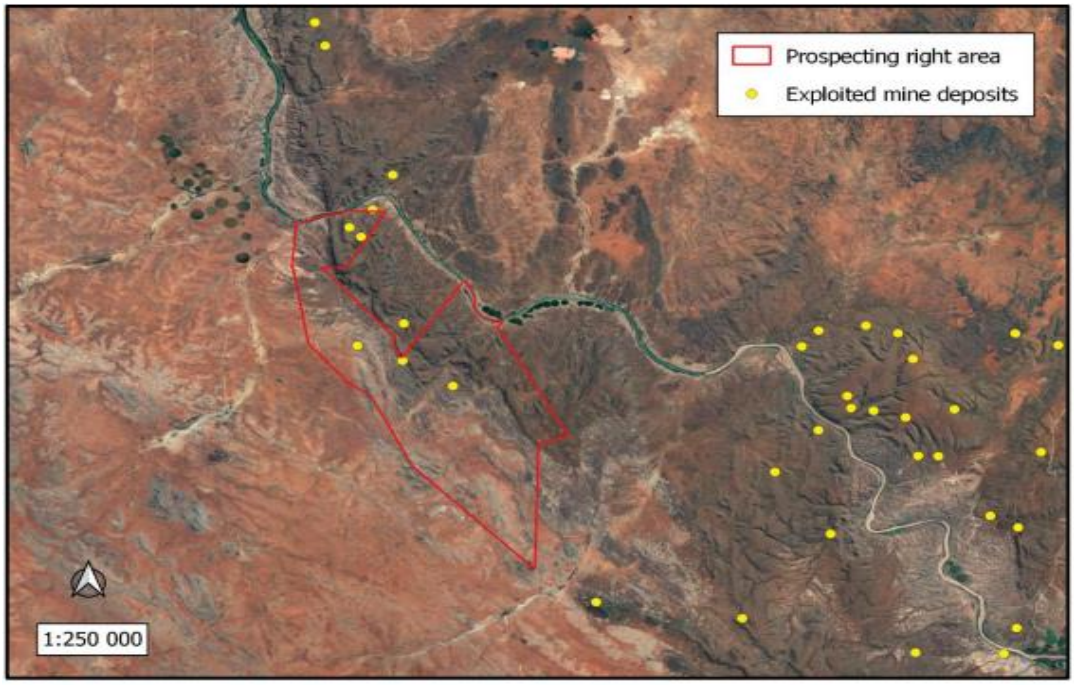


Figure 15. The extent of transformation through historic mining in the study region.

Site sensitivity

The ecological sensitivity map for Rietfontein and Nauga is illustrated in Figure 16. The Orange River, ephemeral river and drainage lines, along with their riparian buffers, are of very high sensitivity due to their vital ecological and hydrological functionality and significance. All watercourses are unique habitats protected in terms of the National Water Act (Act No 36 of 1998). These highly sensitive areas should be considered as no-go areas.

Most of the pristine terrestrial habitat is of high sensitivity, mainly based on the potential occurrence of red listed plant species, and the suitable habitat for numerous red listed faunal species, as discussed in this report. These areas are not regarded as no-go areas, but activities should proceed with caution as it may not be possible to mitigate all impacts.

Areas transformed by historic mining and agricultural activities are of medium sensitivity. These are transformed habitats where the impacts are likely to be largely local and the risk of secondary impact such as erosion is low. Activities within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.

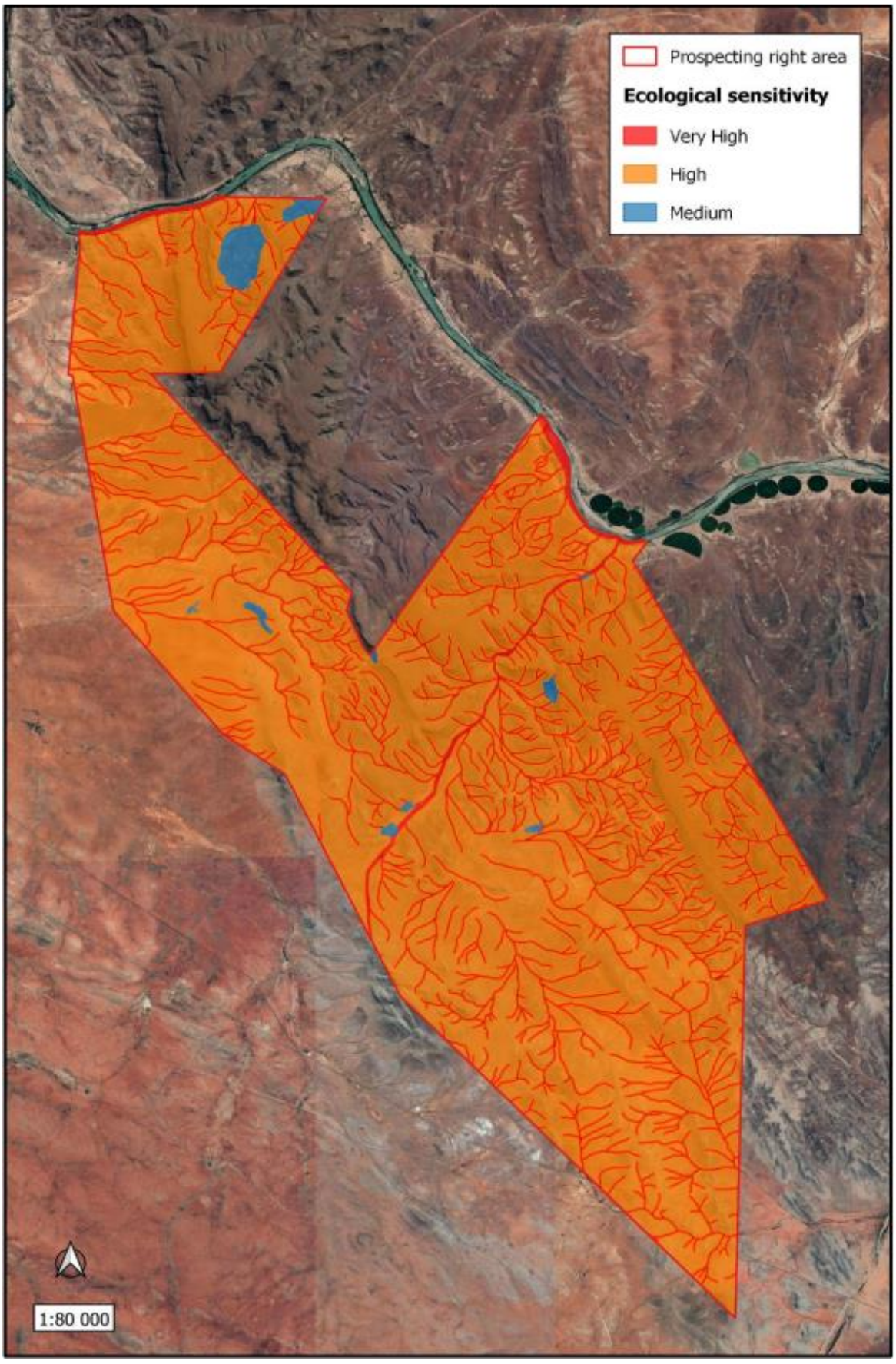


Figure 16. A sensitivity map for the prospecting area.

Historical and Palaeontology

Dr. Edward Matenga from ASHA has been appointed by Camel Thorn Trading to provide an historical impact assessment in order to highlight the historical sensitivity of the proposed prospecting area and to determine the possible impact of prospecting on the historical status of the application area (Appendix 5).

General observations

Stone Age material is widely distributed on the plains, ridges and valleys of the upper Karroo area north and south of the Orange-Vaal basin. The material comprises scrapers, blades, cores, and flakes typologically dating to the Middle Stone Age/Late Stone Age period. Early Stone Age material has been encountered in places with occasional occurrences of hand-axes and cleavers. Significantly, in these studies, Later Stone Age material has been recorded in the vicinity of pans and along ephemeral streams. A few places were identified as stone tool quarries or manufacturing sites. The scattered distribution pattern seems to suggest general hunter-gatherer activity in the region called Bushmanland. Rarely have the findings warranted further action such as professional excavations or the issue of a destruction permit from SAHRA. Findings from the twelve studies which have been cited in this report, fit within this picture of the archaeological sensitivity of the broader area. Our conclusion is that on the properties under study, we are not likely to encounter a fundamental deviation from the above scenario.

Findings from Portion 9 of the Farm Rietfontein 11

In 2019 this author carried out a ground survey on Portion 9 of the Farm Rietfontein 11 which is in the footprint of the proposed prospecting. The findings of the survey are instructive and are therefore described in detail in this report:

The Stone Age

Twelve (12) sites were recorded on Portion 9 of Rietfontein 11 with varying densities of lithics. The assemblages comprise mainly scrapers, points and flakes while a few blades and cores also occur. They are spread along the base of the ridge along the eastern boundary of the property. No significant concentrations were found to suggest a settlement or regular activity.

The occurrence of a crude pear-shaped hand-axe on Portion of Rietfontein 11 is of particular interest as it seems to confirm the presence of Acheulean material in the area dating between 2 million- and 250 000-years BP (Site RFN04).

The Iron Age

No Iron Age relics were found on the property.

Early mining and commercial farming

On Portion 9 of Rietfontein 11, an asbestos ore crushing and loading site was recorded (the block of a heavy steel machine and structures of stonework and concrete) (Site RFN07). A small rectangular structure is built of dressed dolomite

blocks apparently locally sourced (Site RFN08a). These structures must be protected.

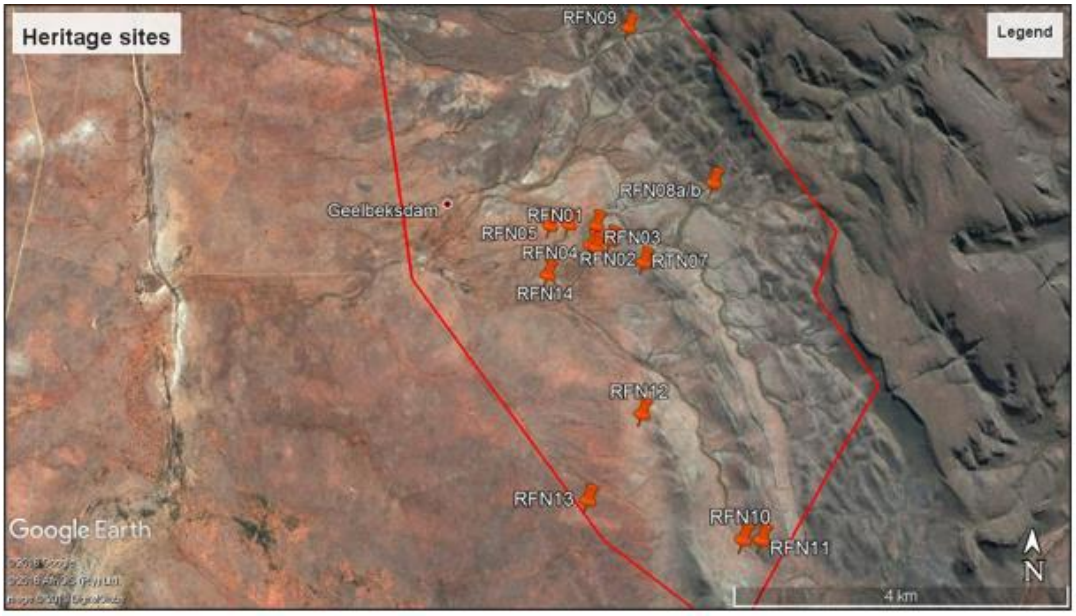


Figure 17. Location of heritage sites on Portion 9 Rietfontein 11.

Burial grounds

No graves or burial grounds were reported on Portion 9 of Rietfontein.

Other heritage resources that might occur in the footprint of the prospecting area

The following site types/objects have been encountered in the broader region and are therefore flagged:

- Rock engravings (petroglyphs) from the Middle Stone Age to Later Stone Age periods
- Rock Paintings from the Middle Stone Age to Later Stone Age periods
- Buildings and objects associated with modern commercial farming from the 19th century
- Graves, burial grounds and human bones.

Postulated heritage sensitivity of the study area

The ground survey on Portion 9 of Rietfontein 11 coupled with the desktop studies cited above provide a good theoretical foundation for extrapolating a likely scenarios on the rest of the prospecting area.

Chance Finds Procedure

A Chance Finds Procedure has been prepared to curate heritage resources that may be found during the prospecting activities.

Conclusion and Recommendations

Considering the findings of the desk assessment, the mine prospecting can go ahead. The study is mindful that some important discoveries may be made during prospecting. If this happens operations should be halted, and the provincial heritage

resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

Paleontological

Prof. Marion Bamford has been appointed by Camel Thorn Trading to provide an palaeontological impact assessment in order to highlight the palaeontological sensitivity of the proposed prospecting area and to determine the possible impact of prospecting on the palaeontological status of the application area (Appendix 6).

A Paleontological Impact Assessment was requested for the PR application. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed application and is presented herein.

Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 18. The site for prospecting is in the non-fossiliferous ancient granites, gneisses and schists. Sections also occur on the potentially fossiliferous Campbell Rand Group that could preserve trace fossils such as stromatolites. Most of the rocks are overlain by the Quaternary Gordonia Formation.

In some of the Campbell Rand Subgroup formations there are trace fossils, for example, giant stromatolitic domes overlain by microbial laminites with fenestrae and carbonate argillites, shales and siltstones make up the Monteville Formation (Beukes, 1987; Eriksson et al. 2006). The thickest stratum is the overlying Reivilo Formation that is made up of dolomite with giant stromatolitic domes, columnar stromatolites and fenestral facies (Beukes, 1980a). Possibly due to the lack of trace fossils, the Campbell Rand Subgroup has not been divided into formations in this region.

Stromatolites are the trace fossils that were formed by colonies of green algae and blue-green algae (Cyanobacteria) that grew in warm, shallow marine settings. These algae were responsible for releasing oxygen via the photosynthetic process where atmospheric carbon dioxide and water, using energy from the sun, are converted into carbon chains and compounds that are the building blocks of all living organisms. The released carbon dioxide initially was taken up by the abundant reducing minerals to form oxides, e.g. iron oxide. Eventually free oxygen was released into the atmosphere and some was converted into ozone by the bombardment of cosmic rays. The ozone is critical for the filtering out of harmful ultraviolet rays.

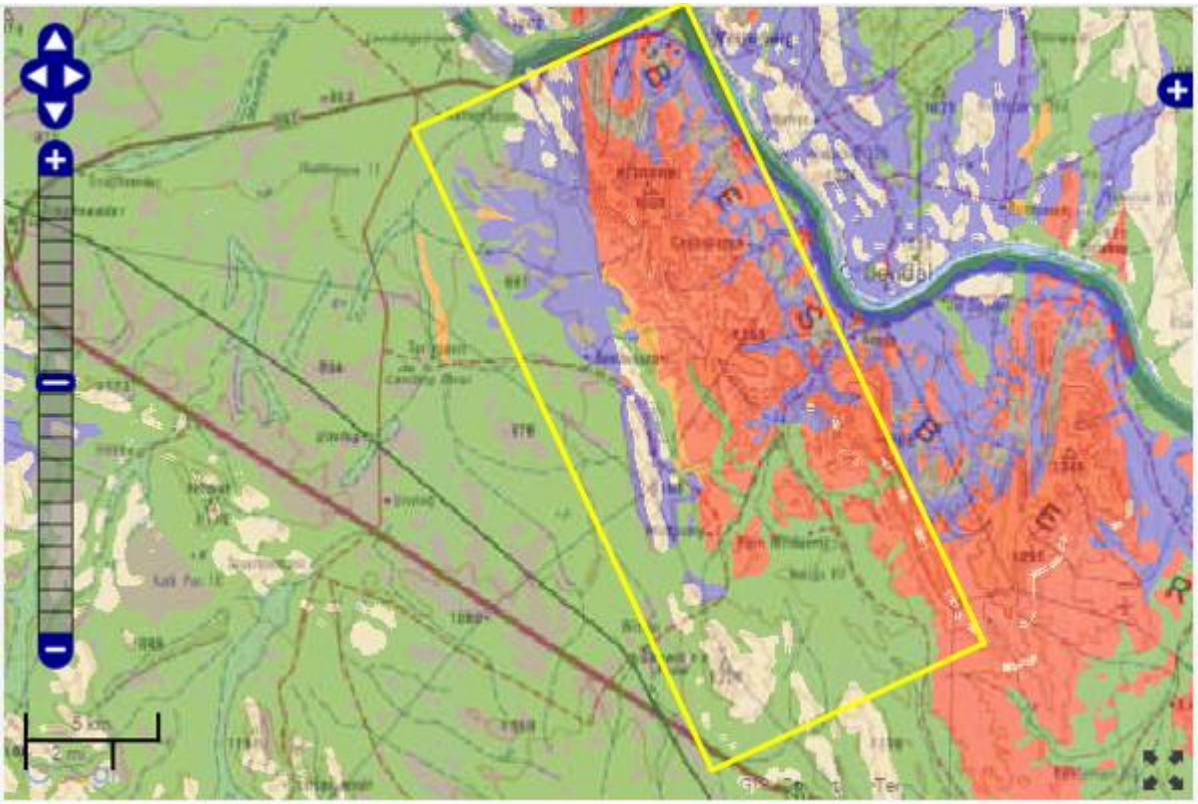


Figure 18. SAHRIS palaeosensitivity map for the site for the proposed PRA on Farms Rietfontein 11 and Nauga 17 (project 2) shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

Stromatolites are the layers upon layers of inorganic materials that were deposited during photosynthesis, namely calcium carbonate, magnesium carbonate, calcium sulphate and magnesium sulphate. These layers can be in the form of flat layers, domes or columns depending on the environment where they grew (Beukes, 1987). Some environments did not form stromatolites, just layers of limestone that later was converted to dolomite. The algae that formed the stromatolites are very rarely preserved, and they are microscopic so they can only be seen from thin sections studies under a petrographic microscope.

The Kuruman Formation banded iron formation is indicated as very highly sensitive but this is incorrect. Although the layers of iron were formed by the oxidation (free oxygen released by the photosynthetic activity of algae) and precipitation of iron, no algae were directly involved so there are no fossils or trace fossils in banded iron (Cowan, 1995; Havig et al., 2017).

KALAHARI GROUP

Aeolian sands and alluvium are fairly mobile and very porous so they not provide suitable conditions for preservation of organic matter (Cowan, 1995). Only in places where the sands have been waterlogged, such as palaeo-pans or palaeo-

springs, is there any chance of fossilisation. For example, roots can be encased in calcium-rich or silica-rich sands and crusts, known as rhizoliths or rhizocretions, can form around the roots, invertebrates or bones around the margin of a pond, pan or spring (Klappa, 1980; Cramer and Hawkins, 2009; Peters et al., 2022).

From the SAHRIS map above parts of the north and east area are indicated as very highly sensitive (red) for the outcrops of the Campbell Rand Subgroup while most of the south and west area is moderately fossiliferous for the Gordonia sands (green). The volcanic rocks are indicated a grey or white (zero to unknown sensitivity).

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either much too old and the wrong types to contain fossils or are not the target for prospecting. Furthermore, the material to be prospected is the volcanic rock and this does not preserve fossils. Since there is an extremely small chance that trace fossils from the Campbell Rand Subgroup may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only some contain trace fossil plants such as stromatolites. The sands of the Quaternary period would not preserve fossils but they might obscure fossils traps such as palaeo-pans or palaeo-dunes although none is visible in the satellite imagery.

Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the Gordonia Formation sands of the Quaternary. There is a very small chance that trace fossils such as stromatolites may occur in the dolomites of the Campbell Rand Subgroup so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once prospecting or mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, so as far as the palaeontology is concerned, the prospecting permit should be authorised as long as the dolomites are avoided. If prospecting is to take place in the dolomitic areas in the north, a site visit (phase 2) palaeontology impact assessment is advisable.

Chance Find Protocol

Monitoring Programme for Palaeontology – to commence once the excavations / drilling / mining activities begin.

- The following procedure is only required if fossils are seen on the surface and when drilling/excavations/mining commence.
- When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
- Photographs of similar fossils must be provided to the developer to assist in recognizing the trace fossils such as stromatolites in the dolomites or the Quaternary bones, rhizoliths, traces (for example see Figures 4-6). This information will be built into the EMP's training and awareness plan and procedures.
- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
- Trace fossils, fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished then no further monitoring is required.

SOCIO-ECONOMIC STRUCTURE OF THE REGION

Siyathemba Municipality is a Category B Municipality (NC077), established in 2001, in accordance with the demarcation process. The Municipality is located within the central eastern parts of the Northern Cape Province on the banks of the Orange River, and falls within the boundaries of the Pixley Ka Seme District. The nearest business centre is Kimberley, which is about 220km away.

Figure 19. Locality Map

Siyathemba Municipality was initially made up of three entities, namely, Prieska, Marydale and Niekerkshoop. After demarcation the area was extended to include not only the towns and surrounding suburbs of Marydale, Niekerkshoop and Prieska but also Copperton. Copperton is an old mining town that was sold to a private owner after the closing of the Mine. The town is currently on a long terms lease by the Request Trust. Some of the houses were initially demolished and after the lease agreement was signed with the Request Trust, an agreement was reached that the rest of the houses could be retained. An agreement was reached between the Lessee and Alkantpan (Armscore) for the delivery of water, sanitation, and electricity services. Armscore also maintained one of the main roads.

The municipal area encompasses a geographic area of approximately 8,200km², which implies that Siyathemba Municipality accounts for 8% of the total district surface area and approximately 3% of the provincial area. The Municipality is divided into 6 Wards.

In terms of Statistics SA the Statistical information is reported in 4 wards, this might lead to a bit of confusion in this document, but the Municipality does not have other official data to work from. The Municipality will however strive to always use the latest official statistics.

SOCIO-ECONOMIC CONDITIONS OF THE MUNICIPAL AREA

MUNICIPAL POPULATION

The local and regional population is illustrated in the table 4 below. From this Table, it is evident that the Siyathemba Municipality had a local population of just more than 21,000 people during 2010.

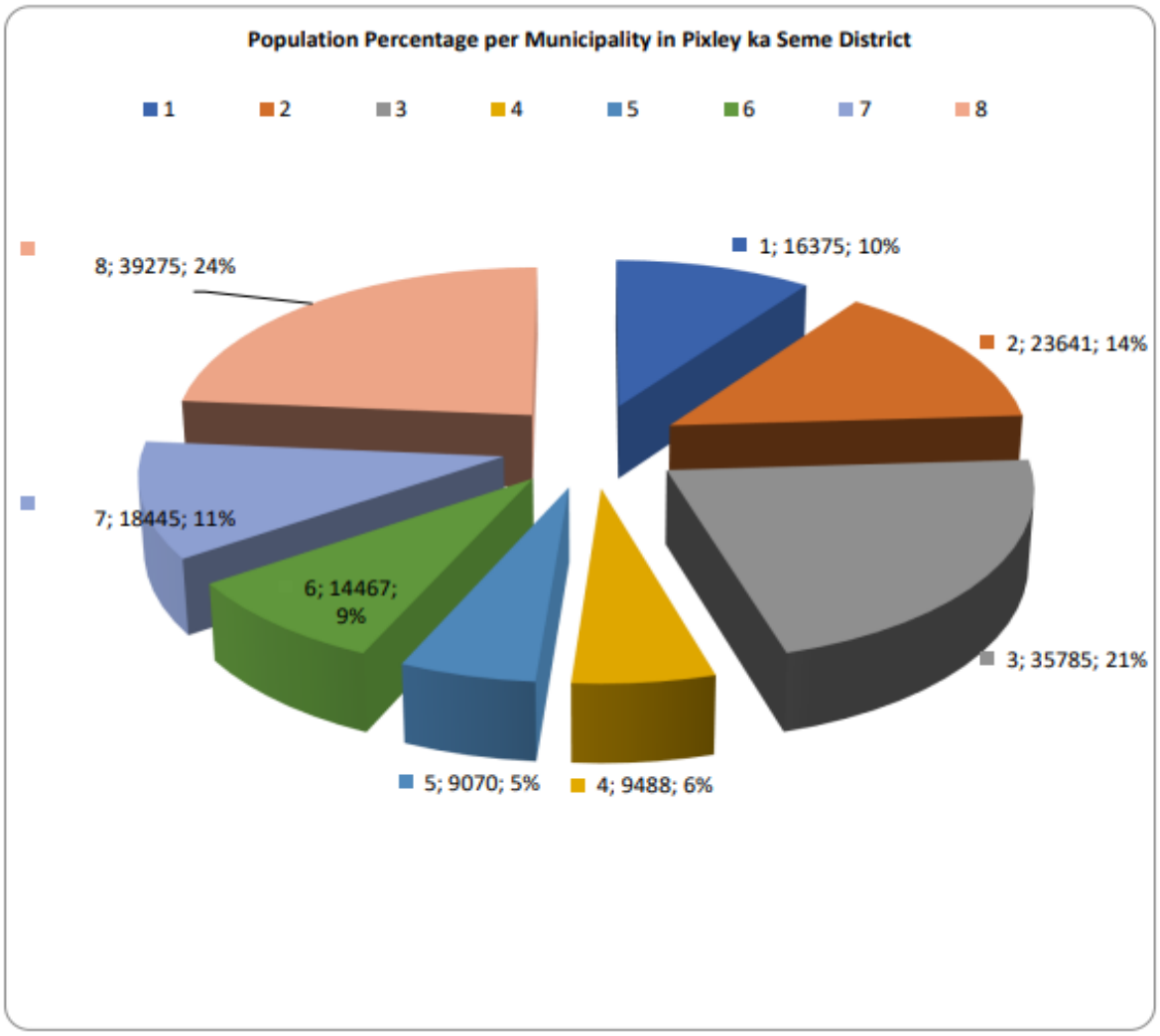
Table 4. Regional Population by Age

		Population		Age Structure					
				Less than 15		15- 64		65 plus	
		2001	2011	2001	2011	2001	2011	2001	2011
DC 07	Pixley ka Seme DM	166547	186351	32.6	31.6	61.5	62.4	5.9	6.1
NC 071	Ubuntu	16375	18601	33.2	33.3	61.1	61.1	5.7	5.6
NC 072	Umsobomvu	23641	28376	33.7	31.4	61	62.8	5.3	5.8
NC 073	Emthanjeni	35785	42356	31.6	31.7	62.4	62.5	6	5.8
NC 074	Kareeberg	9488	11673	32.6	29.4	59	62.5	8.4	8.1
NC 075	Renosterberg	9070	10978	32.9	32.8	60.6	61	6.5	6.2
NC 076	Thembelihle	14467	15701	32.1	30.9	61.9	62.8	5.9	6.4
NC 077	Siyathemba	18445	21591	33.7	30.8	60.4	63.2	5.9	6
NC 078	Siyancuma	39275	37076	32.3	32.2	62.1	62.2	5.6	6

Table 5: National vs Provincial vs Regional vs Local Population Statistics

	2004	2006	2008	2010	2011
South Africa	46,745,940	47,827,370	48,911,245	49,991,472	-
Northern Cape	1,088,672	1,089,227	1,093,823	1,103,918	-
Pixley Ka Seme	190,396	185,334	180,082	179,507	186,351
Siyathemba	21,441	21,312	21,239	21,333	21,591

Figure 20: Population Percentage



In regional context, this means that the Siyathemba Municipality contributed 11.9% to the district population (i.e., the second largest Local Municipality in the District by population) and 1.9% to the population of the Northern Cape.

The most dominant population group is Coloured. This group represents 80% of the total population in the municipal area. The other groups are black (12%) and white (8%).

Afrikaans is the most widely spoken language (78%). There are an insignificant number of people which speaks other languages. A total of 824 people indicated that IsiNdebele is their first language and 91 people speak Setswana.

AGE AND GENDER COMPOSITION

The Age & Gender Profile of the local population is illustrated by Figure 21. With regards to this Profile, the following observations were made:

Figure 21: Age and Gender profile

Municipality	Black African		Coloured		Indian or Asian		White		Other	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Ubuntu	2073	1890	6288	6690	51	45	702	708	114	42
Umsobomvu	8532	9222	4161	4512	96	57	780	825	120	66
Emthanjeni	6879	7179	11865	12573	153	81	1653	1734	171	66
Kareeberg	348	210	4830	5106	27	27	510	555	39	18
Renosterberg	1758	1857	3072	3225	36	21	462	480	42	21
Thembelihle	1245	1143	5508	5601	69	12	1101	954	54	15
Siyathemba	2076	1974	7659	7863	66	45	891	936	69	9
Siyancuma	6147	6075	10581	10719	144	105	1395	1383	303	222

 There were slightly more females (51.4%) than males (48.6%) among the local population during 2010. It was, however, noted that the population became slightly less female dominant since 2000, when 52.4% of the population were female.

 The working age group (15 to 64) contributed 64.4% to the local population in 2010. This age group has increased proportionately (from 58.6% to 64.4%) in relation to the other age groups. Since 2000, this group increased by approximately 1,210 people.

 The working age population is slightly male dominant. Since 2000, male working age population increased by around 928 men in absolute terms whiles the number of women increased by about 282.

 The age dependency ratio declined from 0.7 in 2000 to 0.6 dependents (children & the elderly) in 2010 for every working age adult.

 Since 2000, the proportion of children under the age of 15 declined by 6.7%. This means that the age profile of the local population is becoming older. The number of children in the area also declined from around 14,700 during 2000 to just above 12,000 in 2010.

The population of Siyathemba declined from just over 21,370 people in 2000 to about 21,330 in 2010. This implies that the population contracted by 0.4% on average per annum. This growth rate is slightly lower in the Pixley Ka Seme District Municipality, which contracted 0.7% p.a.The decline of the Siyathemba population was mainly driven by lower fertility rates.

HIV/AIDS PREVALENCE

In the Draft LED Strategy for Siyathemba Municipality, reference is made to the HIV/AIDS prevalence in the area. It is indicated that data from the Actuarial Society of South Africa was used. During 2010, the HIV/AIDS prevalence rate of the Siyathemba population was 6.0% compared to the District rate of 6.5%. These rates compared well to the Northern Cape (7.6%) and South African (12.6%) averages in the same year.

WATER

Table 6 below gives a comparative indication of the status of water provisioning in the district as captured during the 2011 census.

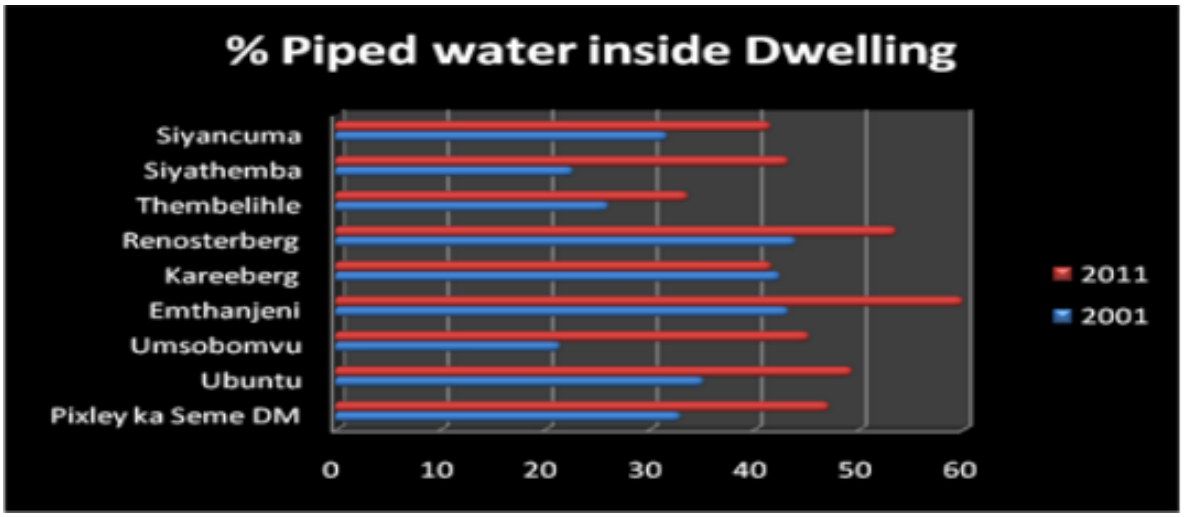
Table 6: Source of Water per Local Municipality

	Regional/local water scheme (operated by municipality or other water services provider)	Borehole	Spring	Rain water tank	Dam/pool /stagnant water	River/ stream	Water vendor	Water tanker	Other	Grand Total
Ubuntu	3477	1215	36	24	210	6	3	117	30	5118
Umsobomvu	6546	831	12	12	147	39	33	153	57	7830
Emthanjeni	9183	1068	15	21	33	3	33	51	36	10443
Kareeberg	2298	774	3	18	24	-	9	81	12	3219
Renosterberg	2394	450	6	3	69	48	-	15	9	2994
Thembelihle	3117	831	3	6	21	114	3	42	3	4140
Siyathemba	4539	762	-	3	66	336	6	75	30	5817
Siyancuma	6348	1677	72	18	135	780	48	408	93	9579
Grand Total	37902	7608	147	105	705	1326	135	942	270	49140

Source: Statistics South Africa 2011

Significant progress has been made regarding the provision of water, but backlogs still exist. 95% of the households in the district are provided with free basic water (FBW) which is above the provincial average of 87, 7%. Only 3% of households had NO access to piped water 46% had piped water inside dwelling by 2011. Piped Water inside Dwelling is about 47.00%. The table below indicates the provisioning of FBW for all municipalities in the district:

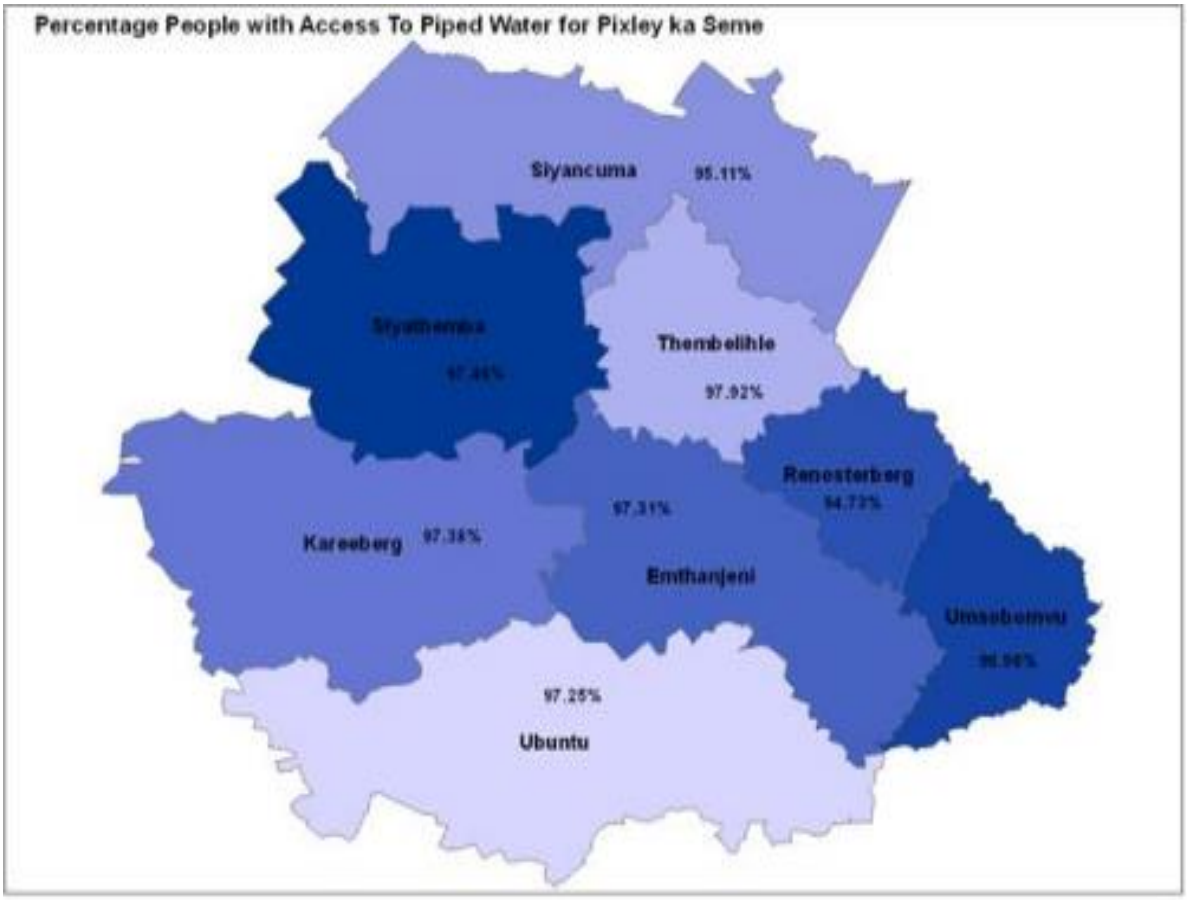
Figure 22: Piped Water inside Dwelling



Source: Statistics South Africa 2011 Census

	Piped (tap) water inside dwelling/institution	Piped (tap) water inside yard	Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling/institution	Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	No access to piped (tap) water	Grand Total
Ubuntu	2526	2217	282	36	9	3	48	5121
Umsobomvu	3531	3702	381	108	6	6	93	7827
Emthanjeni	6249	3741	243	108	21	6	78	10446
Kareeberg	1338	1521	225	93	9	3	33	3222
Renosterberg	1599	1233	81	51	6	6	21	2997
Thembelihle	1389	1815	471	291	63	99	15	4143
Siyathemba	2508	2958	264	21	3	3	60	5817
Siyancuma	3957	3354	1227	483	213	18	327	9579
Grand Total	23097	20541	3174	1191	330	144	675	49152

Table 7: Access to water by households Source: Statistics South Africa 2011



Source: Statistics South Africa 2011

Table 8: Backlogs March 2011

Municipality	Water	
	Formal	Informal
Emthanjeni	2	0
Ubuntu	0	0
Umsobomvu	2	0
Renosterberg	3	0
Kareeberg	0	0
Siyathemba	31	0
Siyancuma	66	667
Thembelihle	0	0
Total	104	667

SANITATION

Sewerage and sanitation are basic needs of communities which can pose serious health and hygiene risks for communities and the environment at large if not properly managed and monitored. According to the White Paper on Basic Household Sanitation, 2001, basic sanitation is defined as:

The minimum acceptable basic level of sanitation is:

 Appropriate health and hygiene awareness and behaviour

 A system for disposing of human excreta, household waste water and refuse, which is acceptable and affordable to the users, safe, hygienic and easily accessible and which does not have an unacceptable impact on the environmental and

 A toilet facility for each household"

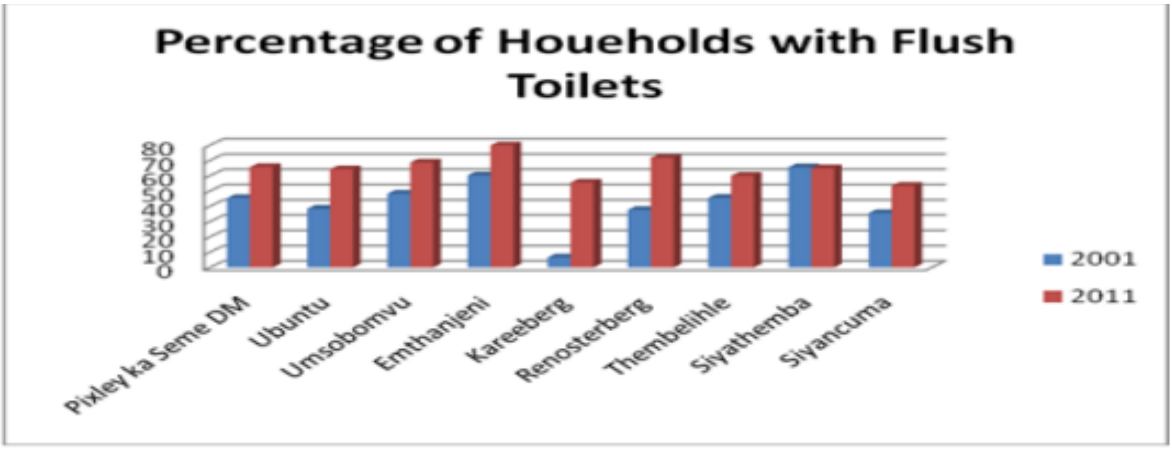
Table 9 below provides an indication of the types as well as those without sanitation in the district:

Table 9: Sanitation per Local Municipality

	Flush toilet (connected to sewerage system)	Flush toilet (with septic tank)	Chemical toilet	Pit toilet with ventilation (VIP)	Pit toilet without ventilation	Bucket toilet
Ubuntu	3300	513	33	180	111	402
Umsobomvu	5388	414	222	852	75	117
Emthanjeni	8319	576	24	336	141	627
Kareeberg	1794	414	6	453	141	96
Renosterberg	2145	342	3	189	51	57
Thembelihle	2484	225	18	456	483	9
Siyathemba	3786	369	6	681	297	213
Siyancuma	5115	651	24	777	618	1152
Total	32331	3504	336	3924	1917	2673

Source: Statistics South Africa 2011

FIGURE 23: Households with Flush Toilets



Source: Statistics South Africa 2011

The table and the Map above show that, Pixley Ka Seme has Flush Toilet Connected to Sewerage at 65.70% households. Emthanjeni being the highest with 85.06% and Thembelihle being the least with 64.41%. However, it must be noted that a project is currently in progress through funds from the Pixley Ka Seme District Municipality to replace buckets with the UDS system. The final 68 toilets have been finalised during this current financial year in Campbell.

Full water borne sanitation is currently being constructed in Schmidtsdrift and the sanitation system will be completed with the completion of the house structures.

Table 10: Sanitation Backlogs 2011

Municipality	Sanitation	
	Formal	Informal
Emthanjeni	67	0
Ubuntu	1	0
Umsobomvu	2	205
Renosterberg	32	330
Kareeberg	0	126
Siyathemba	341	129
Siyancuma	2	872
Thembelihle	0	0
Total	445	1662

REFUSE REMOVAL

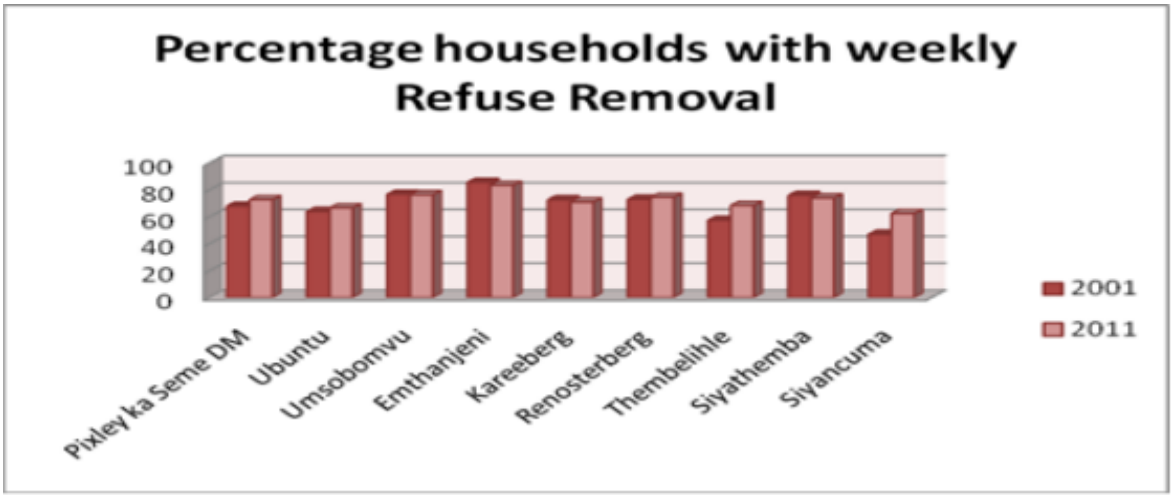
Weekly Refuse Removal in PKSD is about 72.60%. The number of households that are not provided with a refuse removal service in each municipality is indicated in the table below

Table 11: Refuse removal according to Census 2011

	Removed by local authority/private company at least once a week	Removed by local authority/private company less often	Communal refuse dump	Own refuse dump	No rubbish disposal	Other	Grand Total
Ubuntu	3417	39	108	1191	309	60	5124
Umsobomvu	5982	273	174	1245	132	24	7830
Emthanjeni	8709	216	90	1038	141	249	10443
Kareeberg	2283	15	15	762	111	33	3219
Renosterberg	2226	48	48	582	81	9	2994
Thembelihle	2832	33	189	564	483	39	4140
Siyathemba	4305	60	144	1062	234	15	5820
Siyancuma	5964	111	111	2568	741	84	9579
Grand Total	35718	795	879	9012	2232	513	49149

Source: Statistics South Africa 2011

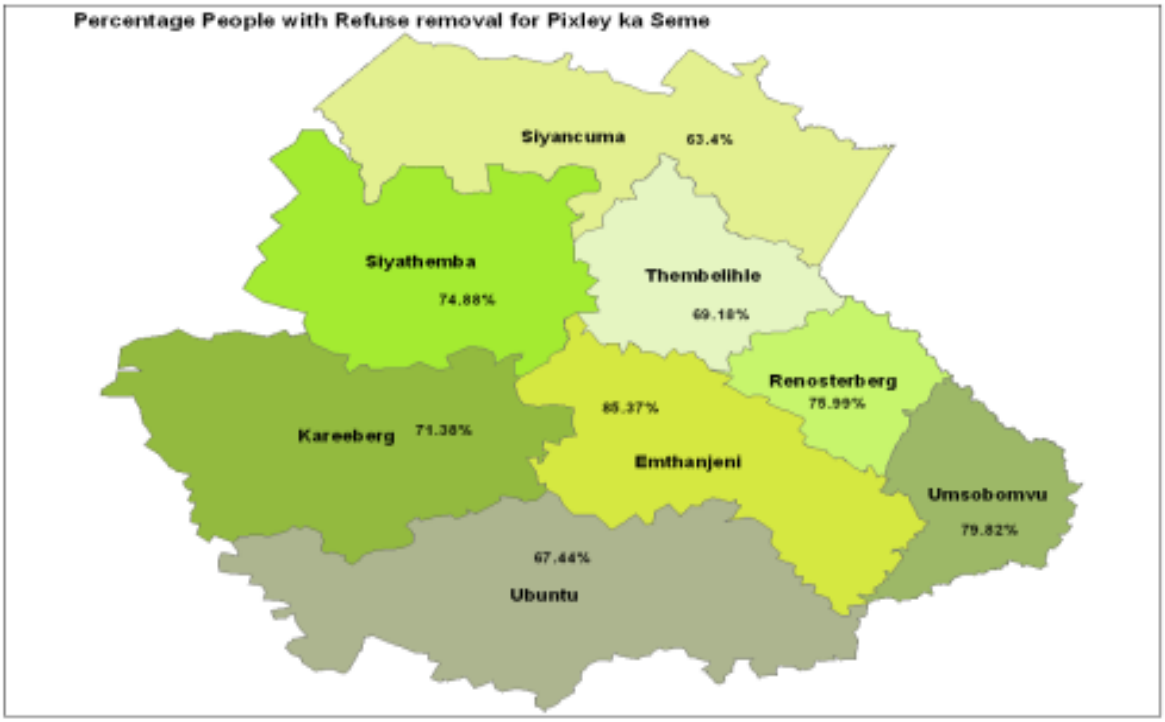
FIGURE 24: Households with Weekly Refuse Removal



Source: Statistics South Africa 2011

On refuse removal, the District has a backlog of 11 279 households. The local municipalities with the most backlogs (households that rely on their own refuse dumps or do no rubbish disposals at all) are Renosterberg, Thembelihle and Kareeberg. In Siyancuma, 3 299 out of 9 506 have refuse removal backlogs (the highest backlogs in all the local municipalities). In Ubuntu, 1 416 out of 4 161 have backlogs and in Thembelihle 1 216 out of 3 592 households have refuse removal backlogs.

FIGURE 25: Pixley ka Seme Refuse Removal



Source: Statistics South Africa 2011

ELECTRICITY

The proportion of households using electricity for lighting has increased from 57% in 1996 to 84% in 2011. South Africa aims to ensure that by 2030 at least 90% of people have access to grid electricity. Increase in both demand and tariffs may slow down this last effort.

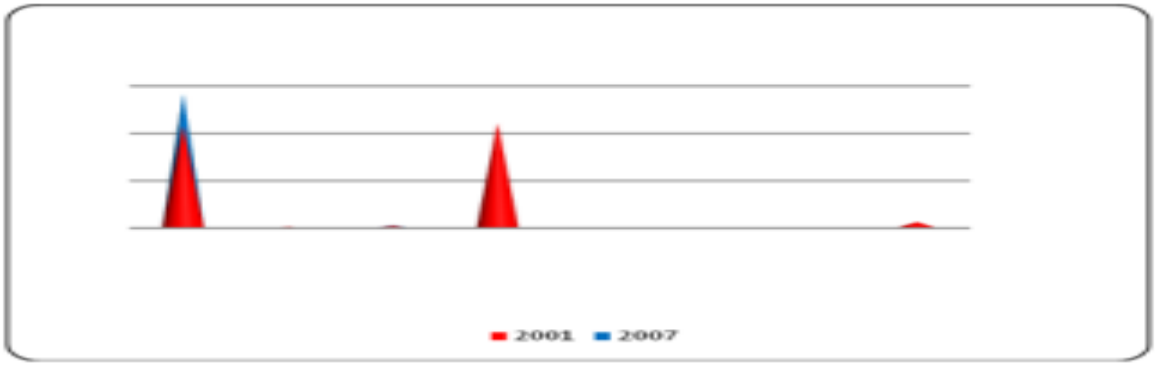
The table below gives a comparative indication of the access to the source of energy in the district as captured during the 2011 censuses. Households using electricity as a source of energy for cooking increased from 47,5% in 1993 to 73,9% in Census 2011.

Table 12: Energy for heating per Local Municipality

	Electricity	Gas	Paraffin	Wood	Coal	Animal dung	Solar
Ubuntu	3180	111	219	1356	81	3	18
Umsobomvu	2709	216	2721	1182	297	12	15
Emthanjeni	6921	258	1026	1131	402	36	42
Kareeberg	1617	141	63	1062	114	3	24
Renosterberg	1998	45	183	531	6	-	9
Thembelihle	1818	120	96	1362	9	-	24
Siyathemba	3057	69	51	2298	18	-	18
Siyancuma	5112	126	57	3480	93	3	21
Total	26412	1086	4416	12402	1020	57	171

Source: Statistics South Africa 2011

Figure 26: Energy for Heating



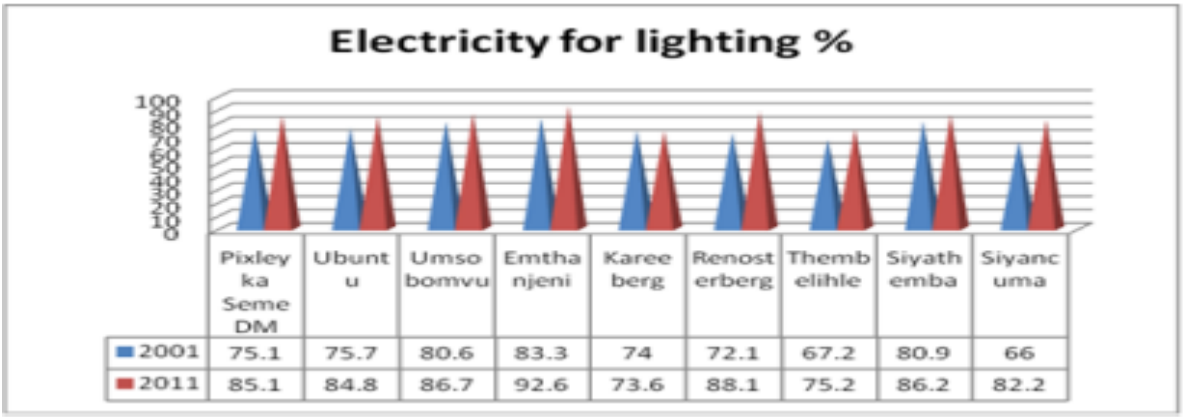
Although relatively expensive, paraffin and gas are used on a limited scale for cooking and heating. Animal dung also features on a limited scale as energy/fuel source for cooking and heating in some rural areas.

Table 13: Energy for lighting per Local Municipality

	Electricity	Gas	Paraffin	Candles (not a valid option)	Solar
Ubuntu	4350	18	33	561	138
Umsobomvu	6801	15	135	855	15
Emthanjeni	9684	18	54	609	63
Kareeberg	2370	9	39	564	231
Renosterberg	2637	6	24	297	24
Thembelihle	3111	9	99	861	45
Siyathemba	5025	9	42	639	102
Siyancuma	7872	6	36	1551	75
Total	41850	90	462	5937	693

Source: Statistics South Africa 2011 Census

Figure 27: Electricity for Lighting



The combination of low rainfall, relatively high population densities and the fact that most of the indigenous vegetation in the area is slow growing, have already resulted in over-utilization of this renewable natural resource in certain places.

What is of major concern in this respect is wood harvesting and usage in the rural areas.

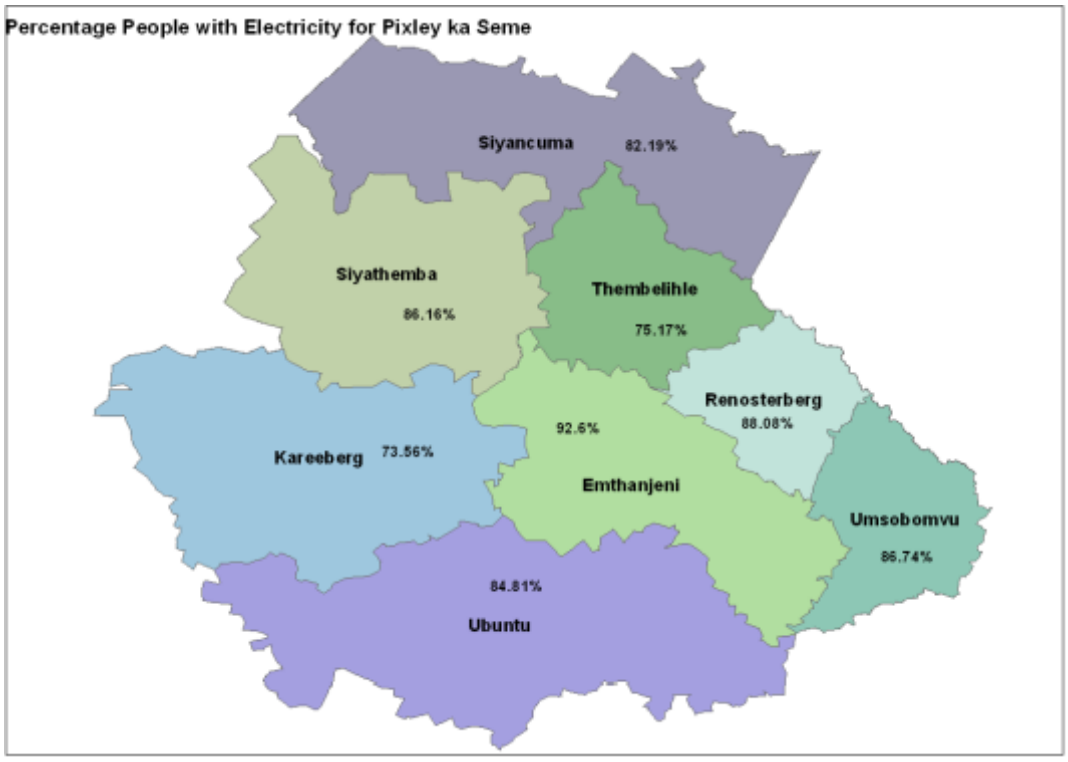
Table 14: Energy for lighting per Local Municipality

	Electricity	Gas	Paraffin	Wood	Coal	Animal dung	Solar
Ubuntu	3927	228	171	744	24	3	18
Umsobomvu	6174	348	828	393	42	21	12
Emthanjeni	9105	420	240	603	27	18	9
Kareeberg	2103	300	63	696	21	-	24
Renosterberg	2469	102	132	261	6	-	9
Thembelihle	2613	684	375	435	3	-	9
Siyathemba	4788	255	51	699	6	3	15
Siyancuma	7182	471	207	1671	15	-	9
Total	38361	2808	2067	5502	144	45	105

Source: Statistics South Africa 2011 Census

There has been an increase in the use of electricity as an energy source and a decrease in the use of paraffin, gas and candles as a source of energy/lighting. Siyancuma, Emthanjeni and Ubuntu have the highest number of backlogs, representing approximately 59,5% of the backlogs in the district.

FIGURE 28: Percentage People with Electricity in PKSDM



All the recent information indicates that much of the district households 83% households have access to electricity for lighting and cooking purposes. As much

as the existing situation is encouraging, it is however very important to note that some households (17%) are still using candles and paraffin as alternative power sources for meeting their power needs.

HOUSING

All local municipalities are composed of various residential components varying from formal housing units to informal dwelling units as indicated in the table above. Within the District, 82,8% of people live in formal housing, 10,8% in informal housing and only 2% in traditional houses. Households in the whole PKSD is about 49 193 in respect to the Census 2011, where the average Household Size is about 3.70%, female headed households is about 36.90%, formal dwellings at 86.30% and the housing owned is at 52%.

Table 15: Enumeration Area type by Local Municipality

	Formal residential	Informal residential	Traditional residential	Farms	Parks and recreation	Collective living quarters	Industrial	Small holdings	Vacant	Commercial
Ubuntu	13926	339	-	3729	-	-	444	-	54	105
Umsobomvu	23361	1890	-	2451	45	264	222	-	96	45
Emthanjeni	39306	-	-	2499	9	3	6	483	39	9
Kareeberg	9450	-	-	2118	-	-	102	-	3	-
Renosterberg	8934	801	-	1173	-	-	-	57	15	-
Thembelihle	13989	-	-	1626	-	12	-	-	75	-
Siyathemba	18555	-	-	2763	-	-	24	162	90	-
Siyancuma	26061	2697	-	7125	-	-	486	594	114	-

Source: Statistics South Africa 2011 Census

TELEPHONES

According to the table below most households in the district, approximately 66.2% do not have telephones at their homes although many of them have expressed need for the service. The existing situation results in many households still depending on public phones and other means of telecommunication. The public telephones according to Telkom authorities are vandalised frequently.

The situation calls for a need to protect these facilities as they will be of help to the residents who depend on them.

It is perhaps interesting to note, as the table indicates, that only in Emthanjeni Municipal Area that a substantial number of the households have telephones at their homes and Cell phones.

Table 16: Household access to Telephone

CELL PHONE ACCESS								
	Ubuntu	Umsobomvu	Emthanjeni	Kareeberg	Renosterberg	Thembelihle	Siyathemba	Siyancuma
Yes	3651	5775	8103	2211	2169	2991	4239	7296
No	1479	2064	2352	1011	825	1152	1593	2280
TELEPHONE ACCES								
Yes	708	849	1434	504	453	585	708	1026
No	4422	6993	9024	2718	2541	3555	5124	8550

EDUCATION

Obtaining some form of income generating employment has become increasingly difficult in recent years. This is accentuated by the lack of education with the poorly educated being the ones that experience the highest levels of poverty.

There has been an 8,3% increase in the number of learners that have accessed education between 1996 and 2001. There has been a 27,1% increase in the number of learners that have matriculated.

Approximately 3% of persons in the Pixley ka Seme district have an educational qualification higher than a matriculation certificate. Of these, approximately one third have a tertiary qualification. The percentage of the population in the formal education system is 66,5% whilst 19,7% of the population received no formal schooling. Table 17 below is a comparison between Census 2001 and 2011 regarding the number of persons between the ages of 5-24 that attend school:

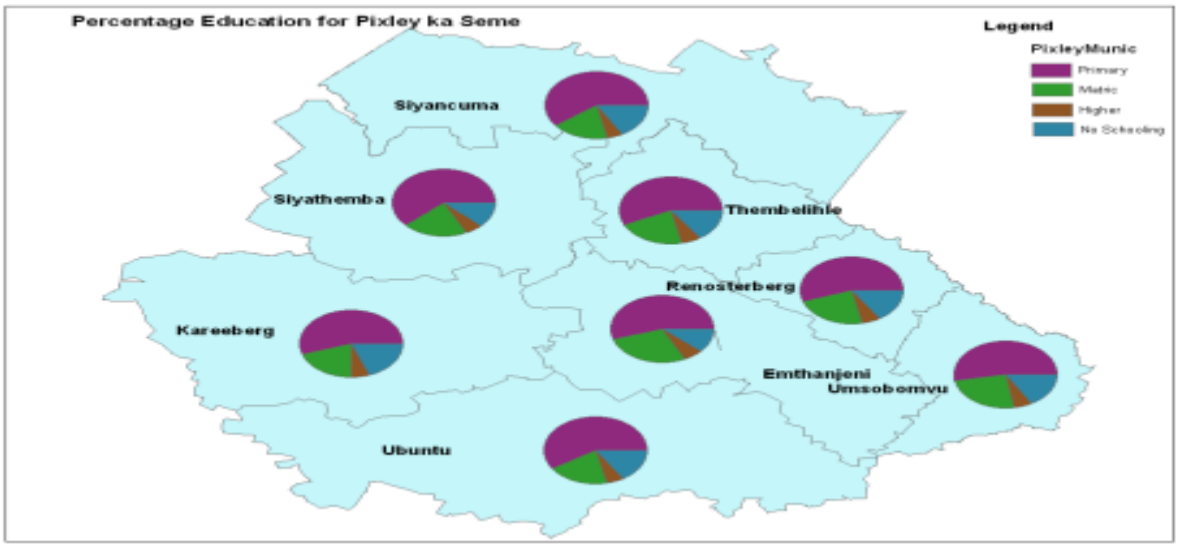
Table 17: Level of Education per Local Municipality

	NC071: Ubuntu	NC072: Umsobomvu	NC073: Emthanjeni	NC074: Kareeberg	NC075: Renosterberg	NC076: Thembelihle	NC077: Siyathemba	NC078: Siyancuma	Grand Total
Grade 12 / Std 10 / Form 5	2100	4050	6396	1314	1506	1926	2433	3861	23586
NTC I / N1/ NIC/ V Level 2	6	18	42	3	6	3	9	18	105
NTC II / N2/ NIC/ V Level 3	6	15	33	6	15	9	12	12	108
NTC III /N3/ NIC/ V Level 4	9	15	54	9	12	9	9	30	147
N4 / NTC 4	6	15	39	9	12	27	18	21	147
N5 /NTC 5	12	12	36	6	6	6	9	36	123
N6 / NTC 6	12	9	51	12	9	21	18	30	162
Certificate with less than Grade 12 / Std 10	3	24	30	6	9	12	6	21	111
Diploma with less than Grade 12 / Std 10	15	24	51	18	15	15	12	24	174
Certificate with Grade 12 / Std 10	66	87	141	36	69	54	84	138	675
Diploma with Grade 12 / Std 10	138	243	381	114	102	90	135	195	1398
Higher Diploma	210	297	363	93	78	153	195	315	1704
Post Higher Diploma Masters; Doctoral Diploma	18	36	30	15	12	27	24	30	192
Bachelors Degree	75	177	261	51	63	114	90	165	996
Bachelors Degree and Post graduate Diploma	42	66	84	18	27	45	27	60	369
Honours degree	30	48	99	15	30	42	48	99	411
Higher Degree Masters / PhD	24	27	69	18	6	18	27	33	222
Grand Total	2772	5163	8160	1743	1977	2571	3156	5088	30630

Source: Stats SA Census 2011

Persons having no schooling never enjoyed formal education, primary education. Implying illiteracy in most cases, these persons are limited to perform manual labour and cannot adequately participate in society.

FIGURE 29: Percentage of People with Education in PKSDM

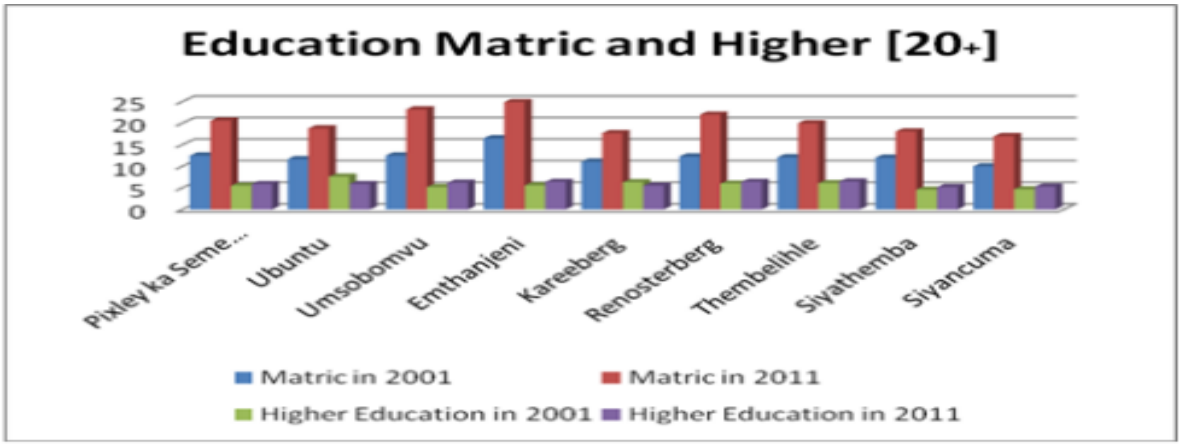


Source: Stats SA Census 2011

Over the last 15 years the rates of no-schooling have been halved across the country. The percentage of persons 20 years and older who have no schooling decreased from 19,1% in 1996 to 8,7% in 2011.

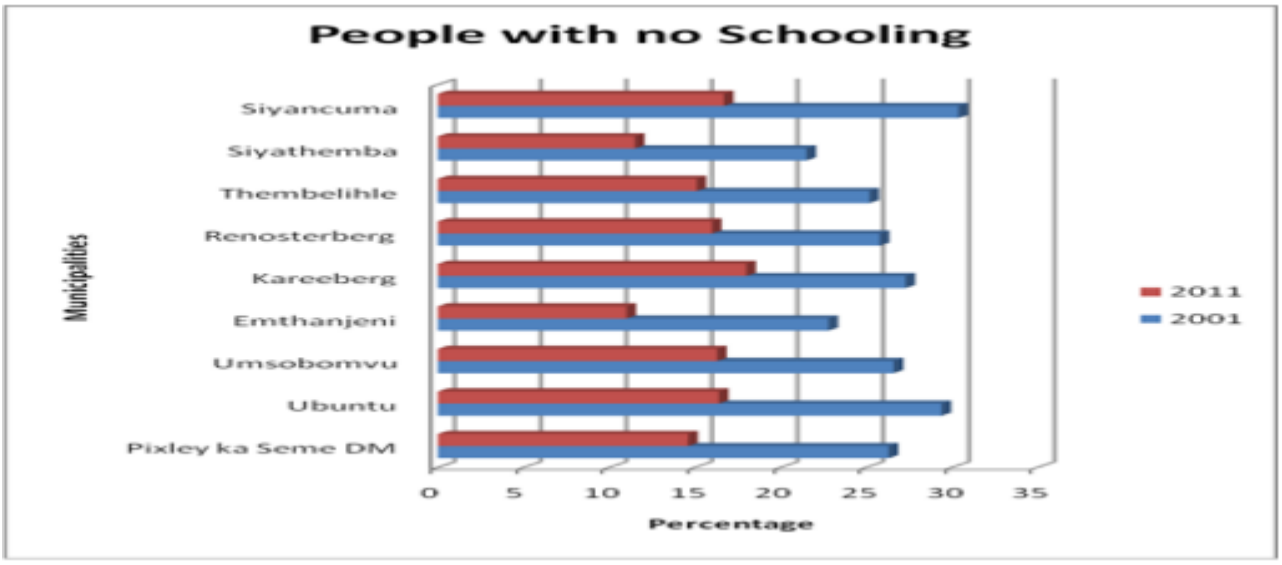
This almost halved since 2001 when 19% aged 20+ had no schooling Northern Cape, went from around 22% to around 11%. Whereas in PKS Education (aged 20 +) No Schooling is 14.60%, Higher Education is 6.10% and Matric 20.50%. The literacy efforts for adults and the increasing influx of 20 years old with proper levels of education are expected to drive these proportions further down in the years to come.

FIGURE 30: Education- Matric and Higher



Source: Stats SA 2001 and 2011

FIGURE 31: No Schooling



Source: Stats SA 2001 and 2011

Table 18: Schooling per Local Municipality

	% NO SCHOOLING	% HIGHER EDUCATION
Ubuntu	10.68	3.72
Umsobomvu	10.68	3.95
Emthanjeni	7.24	3.87
Kareeberg	12.49	3.57
Renosterberg	10.53	3.96
Thembelihle	10.05	3.93
Siyathemba	7.74	3.32
Siyancuma	11.00	3.21

Source: Stats SA 2011

The table above presents the level of education of PKS Municipality's labour force, the statistics for the Northern Cape Province and South Africa are included for comparison. The level of primary schooling is overall higher than the primary level of schooling for South Africa. Secondary education completed is overall lower than both the province and national level of education. The tertiary levels of education are the lowest, with just above 3%.

UNEMPLOYMENT AND LABOUR

UNEMPLOYMENT

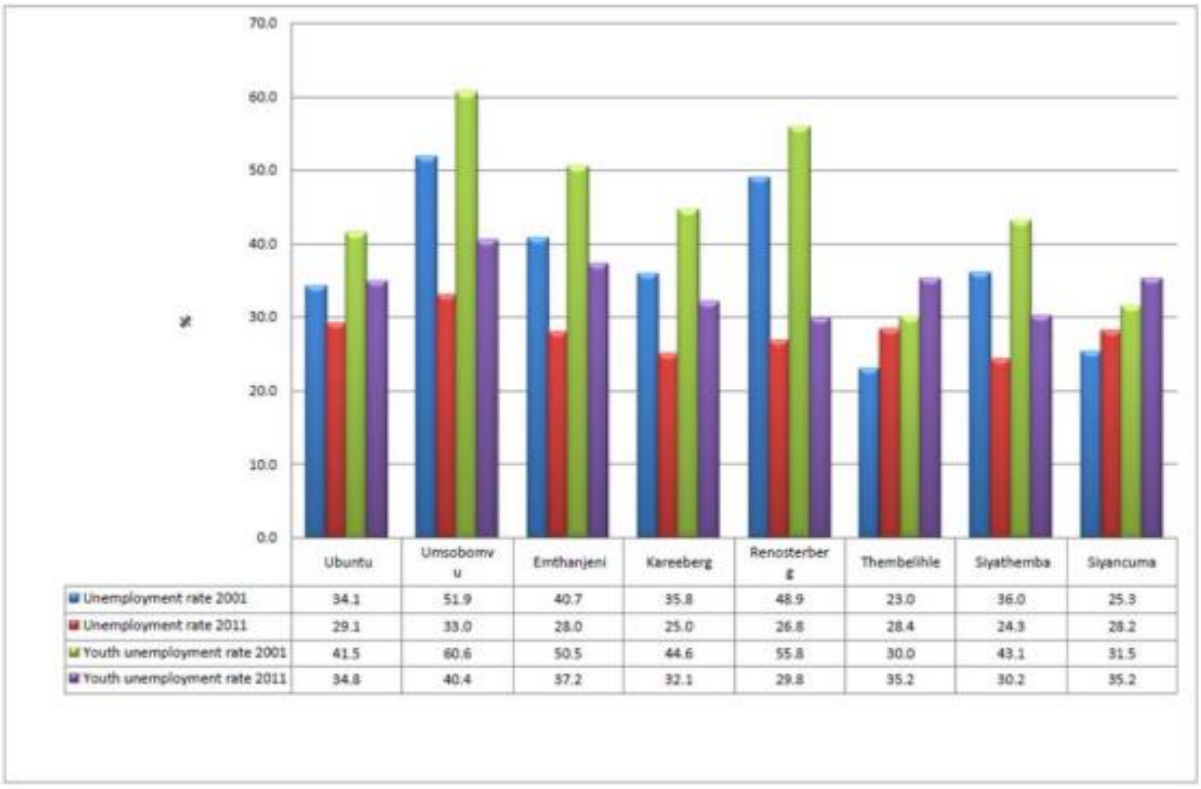
There has been a decrease in the number of people employed and a concomitant increase in the number of unemployed in the district between these the 2001 and 2011 censuses. This is directly related to the number of businesses that has closed in the region during the period reflected and indicates the need for a retention or

wholesale and retail strategy regarding these businesses. Unemployment reaching approximately 28.3% 2011 and Youth unemployment reaching 35.4% in 2011 as per Stats SA 2011 Census.

Table 19: Employment Status per Local Municipality

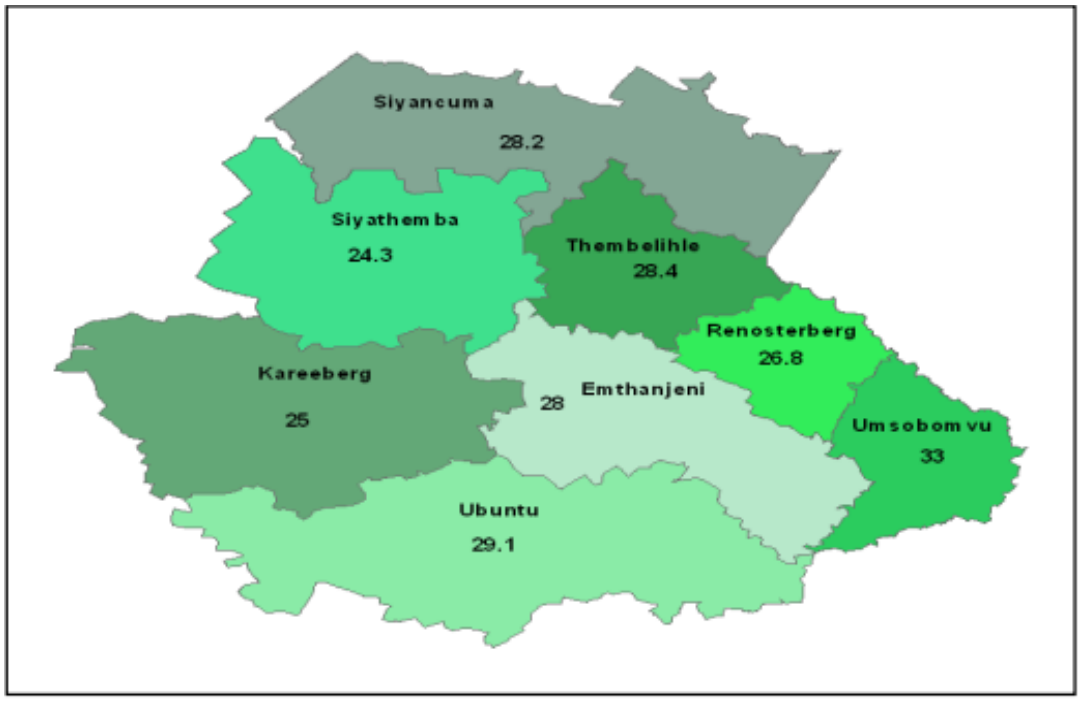
	Employed	Total%	Unemployed	Total%	Discouraged work-seeker	Total%	Other not economically active
Ubuntu	5028	27	2064	11	507	3	3774
Umsobomvu	6117	22	3018	11	1188	4	7491
Emthanjeni	9864	23	3831	9	1203	3	11559
Kareeberg	2856	24	951	8	456	4	3030
Renosterberg	2616	24	957	9	324	3	2796
Thembelihle	3861	25	1533	10	687	4	3777
Siyathemba	5370	25	1728	8	765	4	5787
Siyancuma	7947	21	3120	8	1422	4	10575
Total	43659	192	17202	75	6552	30	48789

FIGURE 32: Employment



Source: Statistics South Africa 2011 Census

FIGURE 33: Municipalities in PKSDM



Source: Statistics South Africa 2011 Census

The municipalities that have the largest percentage of unemployed people are residing in Umsobomvu and Renosterberg with unemployment rates of 30,2% and 31,5% respectively. The municipalities that have the most people in the unemployed trap are Emthanjeni, Siyancuma, Umsobomvu and Siyathemba. These account for 20 153 (70,8%) of the unemployed in the district. Interventions in these municipalities would render the unemployment rate in the district to 7,2% provided the unemployed 20 153 are employed in these areas.

LABOUR PARTICIPATION RATE

The labour participation rate in the district is 50,43%. This indicates the labour force as a percentage of the population in the age group 15-64 years of age.

LABOUR DEPENDENCY RATIO

The total number of persons supported by every person in the labour force, excluding him or herself is indicated by the labour dependency ratio. In the case of the Pixley ka Seme district this ratio is 1, 81 with working individuals in the Siyathemba, Siyancuma and Thembelihle municipalities having to support approximately 2 persons. The lowest ratio in the district is to be found in the DMA area, at 0, 81.

LABOUR YOUTH DEPENDENCY RATIO

Indicates the total number of youths, aged 0-14, supported by every person in the labour force, excluding him or her. The ratio in the Pixley Ka Seme district is 0, 09. This indicates that working individuals support approximately one youth in the age group 0-14.

LABOUR AGED DEPENDENCY RATIO

The labour aged dependency ratio indicates the total number of aged persons, older than 65, supported by every person in the labour force, excluding him or herself. The ratio for the district is 0,85.

LABOUR ABSORPTION CAPACITY

The labour absorption capacity is the ability of the formal sector of the economy to absorb the supply of labour in the region. Approximately 25% of the economically active population of the district is unemployed. The municipalities that have the largest percentage of unemployed in the district is Umsobomvu and Renosterberg with unemployment rates of 30% and 31% respectively. The table 18 below indicates the above ratios in each municipality in the district:

Table 20: Labour Ratio

Local Municipality	Labour Participation Rate	Labour dependency ratio	Labour youth dependency ratio	Labour aged dependency ratio
Emthanjeni	49,70	1,81	12,05	84,53
Kareeberg	54,80	1,65	13,91	79,13
Renosterberg	56,94	1,52	18.66	84,97
Siyancuma	45,81	2,09	-1,83	83,53
Siyathemba	48,19	1,99	0,36	83,92
Thembelihle	46,93	1,95	3,10	83,68
Ubuntu	54,39	1,64	13,09	86,03
Umsobomvu	51,94	1,73	8,19	86,81
	5043	**1,81**	**8,80**	**84,65**

Table 21: Below indicates the population by municipality living below the minimum living levels in the district.

Local Municipality	Population	Population below MLL	% below MLL
Emthanjeni	35 438	18,418	51.97
Kareeberg	9 356	5,433	58.07
Renosterberg	9 091	5,616	61.77
Siyancuma	35 894	22,559	62.85
Siyathemba	17 497	9,374	53.58
Thembelihle	13,716	3,843	28.02
Ubuntu	16,480	10,787	65.46
Umsobomvu	23,747	20,400	85.91
Total	**164,412**	**98,064**	**59.65**

An average of 60% of the population in the district lives below the minimum living level (MLL).The highest percentage is found in the Umsobomvu municipal area, at 85 %, and the lowest at 28% in the Thembelihle municipal area. This represents 17,3% of the provincial population living below the MLL. The average monthly (individual) income for the district is approximately R740 which is less than the stipend received as a grant from social services departments.

ECONOMIC CHARACTERISTICS OF DISTRICT

REGIONAL GROSS DOMESTIC PRODUCT

The district contribution to the provincial GDPR has consistently been the lowest over recent years with its contribution declining from 10,6% to 9,6% between 2003 and 2004. The economy is predominantly primary sector focused with manufacturing and tourism also contributing to the district economy.

The economic sectors that contribute the most to the GDPR of Pixley ka Seme are Agriculture, Mining, Tourism and Manufacturing. Table 22 below represents the percentage contribution per economic sector by the district to the gross domestic product of the province for 2003 and 2004.

Table 22: Percentage GDPR of District Municipalities per economic sector for 2003 and 2004

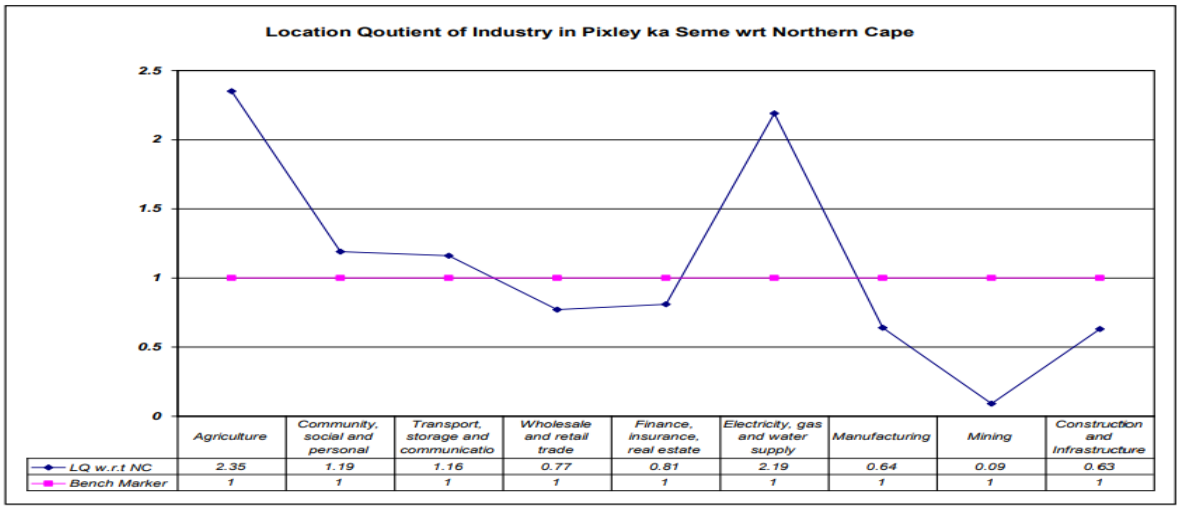
% OF GDPR										
	Primary		Secondary		Tertiary		Taxes - Subsidies		Total GDPR	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Namakwa	4,3	3,8	0,5	0,4	7,3	7,0	0,7	0,8	12,8	**12,1**
PKSDM	3,1	2,7	1,0	0,9	5,8	5,2	0,8	0,8	10,6	**9,6**
Siyanda	3,8	3,3	1,3	1,3	8.0	7,7	1,1	1,2	14,2	**13,5**
Frances Baard	6,8	6,2	3,2	3,1	26,1	28,6	2,5	2,0	38,6	**40,7**
Kgalagadi	16,7	16,5	1,4	1,3	4,9	5,5	0,7	0,8	23,8	**24,1**
NC GDPR	**34,7**	**32,6**	**7,3**	**7,1**	**52,1**	**54,0**	**5,8**	**5,6**	**100,0**	**100,0**

Pixley Ka Seme's total percentage contribution in 2003 was 10,6% and declined to 9,64% in 2004. The district contribution to the GDP has consistently been the lowest over recent years with its contribution declining. It is evident that the tertiary sector contributes the greatest percentage to the GDP of the Northern Cape, followed by the primary sector and then the secondary sector.

The Pixley Ka Seme district displays a similar characteristic as the province with respect to its sectoral contributions to GDPR; the economic sectors that contribute the most to the GDPR of Pixley Ka Seme are Agriculture, Mining, Tourism and Manufacturing, with its secondary sector contribution being the least. The manufacturing sector is part of the secondary sector which indicates

that it has declined over the period of 2003 (0,97%) and in 2004 (0,92%). To transform and diversify the status of the districts economy will require a concerted effort to improve and create development opportunities within this sector.

FIGURE 34: Location Industry



LOCATION QUOTIENT

A comparative advantage indicates a relatively more competitive production function for a product or service in specific economy than the aggregate economy. This economy therefore renders this service more efficiently. The location quotient is an indication of the comparative advantage of an economy in terms of its production and employment. A location quotient greater than 1 indicates a comparative advantage regarding the sector in one location with respect to another.

The analysis below indicates the location quotient of the Pixley ka Seme District with respect to the Northern Cape Province. The table and graph below indicates the location quotients of sectors in the district municipality with respect to the Northern Cape.

Table 23: Location Quotients of Economic Sectors

	Kareeberg	Emthanjeni	DMA	Renosterberg	Siyancuma	Siyathemba	Thembelihle	Ubuntu	Umsobomvu
Agriculture	1,18	0,31	1,62	0,54	1,11	1,46	1,47	1,59	0,82
Mining	0,08	0,05	0,45	0,00	4,28	0,09	0,02	0,21	0,00
Manufacturing	0,41	0,71	1,28	0,13	1,92	0,76	1,99	0,91	0,18
Electricity, gas and water supply	0,17	0,60	0,36	11,42	0,08	1,14	0,23	0,00	0,97
Construction	0,52	1,25	0,85	0,58	0,99	1,69	0,48	0,55	1,00
Wholesale and retail trade	1,12	1,05	1,20	0,56	1,02	0,94	1,17	0,79	1,13
Transport, storage and communication	0,52	1,76	0,53	0,33	0,84	0,83	1,33	0,75	0,51
Finance, insurance, real estate	1,06	1,79	0,94	0,46	0,78	0,71	0,61	0,72	0,67
Community, social and personal services	1,18	1,37	0,58	0,54	0,82	0,72	0,56	0,85	1,55

Sectors in the economy of Pixley Ka Seme that have a location quotient larger than 1 are agriculture (2,35); community, social and personal services (1,19); transport, storage and communication (1,16); electricity, gas and water supply (2,19). These indicate sectors that show potential for additional development in this does not imply that sectors, that do not feature here, should not be pursued since there may be latent potential in these sectors that could be exploited.

Other sectors in the district that have a distinct comparative advantage with respect to the Northern Cape and South Africa are:

- Electricity, Gas and Water supply
- Community, social and personal services
- Transport, storage, and communication

The municipalities in the district that have comparative advantages with respect to the sector Electricity, Gas and Water supply are Renosterberg and Siyathemba with location quotients of 11,42 and 1,14 respectively. This resounding comparative advantage in the sector for the Renosterberg municipality is due to the presence of the Van Der Kloof Dam in the municipality. It is the only sector in which Renosterberg has a comparative advantage with respect to other municipalities in the district.

Kareeberg, Emthanjeni and Umsobomvu have location quotients, with respect to other municipalities in the district, of 1,18; 1,37 and 1,55 respectively in the Community, social and personal services sector. In the transport, storage and communication sector, Emthanjeni and Thembelihle have location quotients of 1,76 and 1,33 respectively, indicating a comparative advantage in this sector with respect to other municipalities in the district.

The sectors that contribute significantly to the Northern Cape GDPR is highlighted in the table above with agriculture having the highest LQ, Electricity, gas and water supply second highest LQ etc. The agricultural sector has the potential for growth with a number of comparative and competitive advantages for the Northern Cape and Pixley Ka Seme in particular.

TRESS INDICATORS

The level of diversification or concentration of a region's economy is measured by a tress index. A tress index of zero represents a totally diversified economy whilst the higher the index, the more concentrated or vulnerable the region's economy is to exogenous variables e.g. adverse climatic conditions and commodity price fluctuations.

The economy of the Pixley Ka Seme district has a tress index of 56,18 indicating a reliance of the Pixley Ka Seme economy on the agriculture, transport and services sector. This tress index indicates that the economy is not diversified but is largely dependent on the agriculture and is vulnerable to exogenous variables such as adverse climatic conditions, commodity price fluctuations. We need to look at ways of diversifying the economy.

(b) Description of the current land uses

Current and historic land use

The major land use in the area is agriculture. According to AGIS, the land capability of the study site is moderate on the plains and low to very low on the mountains. Irrigation suitability is good on the plains, but poor on the mountains. The region is demarcated for sheep farming, with the grazing capacity on site being 32 ha/LSU. Apart from the proposed prospecting activities, the prospecting right application area is mainly utilised as natural pastures for livestock grazing.

Disturbances from past asbestos mining activities and cultivation practices are evident, and existing infrastructure include homesteads and farm buildings, farm dams, and roads.

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

Two broad-scale terrestrial habitats comprising several micro-habitats, the Orange River, an ephemeral river, and numerous drainage lines occur in the Rietfontein and Nauga prospecting area. Of these, the Orange River, ephemeral river and drainage lines and their riparian buffer zones are the most sensitive to prospecting based on their vital ecological functioning on a catchment scale. The terrestrial habitats potentially host several red listed flora and fauna species and are therefore considered to be of high sensitivity. Impacts associated with the proposed prospecting operation are primarily however expected to be low due to the nature of the proposed activities (only 12 drill holes). The most profound impacts are expected to be related to the loss of red listed species, alteration of watercourses and the cumulative loss of intact habitat and biodiversity on a landscape level.

Disturbances from past asbestos mining activities and cultivation practices are evident, and existing infrastructure include homesteads and farm buildings, farm dams, and roads.

(d) Environmental and current land use map

(Show all environmental, and current land use features)

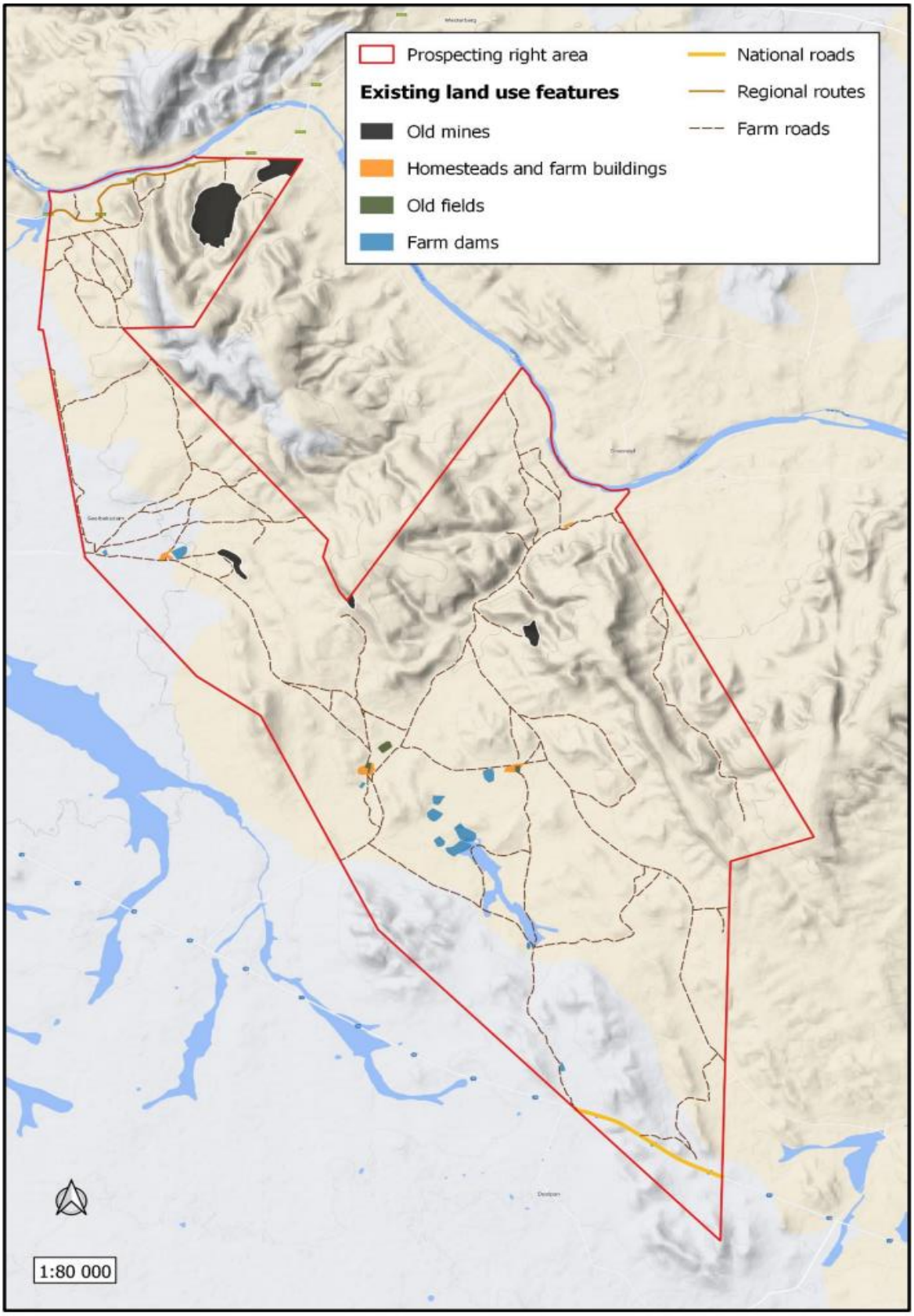


Figure 35. Environmental and current land use features

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

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

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
PHYSICAL						
Geology and Mineral Resource	Sterilisation of mineral resources	Very low	Possible for life of operation	Residual	On-site	• Ensure that optimal use is made of the available mineral resource or the search for a mineral resource.
Topography	Changes to surface topography Drilling of 12 holes During clearing of an area for drilling and the construction of roads, as well as natural events.	Low-Medium	Possible for life of operation	Residual	On-site	• Topsoil needs to be removed and stored separately, if the creation of roads, drill grids or drill pads will result in the eradication of vegetation and the top soil layer. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired.

						• Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.
Soils	**Soil Erosion** During clearing of an area for drilling and the construction of roads, as well as natural events. Vegetation will be stripped for construction of new roads and drill grids and these areas will be bare and highly susceptible to erosion. Any topsoil can be eroded by wind, rain and flooding. Exposed sediments in the watercourses can be	Low	Low likelihood, infrequently	Decommissioning	Low On site	• Bare ground exposure should be always minimised regarding surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • No new roads or drill grids should be developed over watercourses, including drainage lines. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation

	carried away during runoff causing downstream sediment deposition.					should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Loss of soil fertility During clearing of an area for drilling and the construction of roads. Topsoil contains living organisms that naturally regulate the ecological functioning of a habitat. Therefore, any disturbances to the intact soil profile can result in soil sterilisation which will directly affect vegetation communities. Apart from the direct disturbances caused by the prospecting activities, loss of soil fertility can also occur through soil compaction by heavy	Low	Possible, temporarily	Residual	On-site	• Topsoil needs to be removed and stored separately during prospecting and the construction of roads. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.

	machinery and vehicles.					• For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Soil character and quality During clearing of an area for drilling and the construction of roads. Topsoil contains living organisms and seed banks that provide ecological resilience against disturbances, and any disturbances to the intact soil profile	Low	Possible, temporarily	Residual	Low On site	• Topsoil needs to be removed and stored separately during prospecting and the construction of roads. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired.

	will change its ability to sustain natural ecological functioning. Vehicles and prospecting equipment may potentially leak hazardous fluids on the soil surface, which will cause soil pollution. Apart from the direct disturbances caused by the prospecting activities, soil compaction by drill pads, heavy machinery and vehicles will cause a decrease in large pores, and subsequently the water infiltration rate into soil.					• Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • Vehicles and machinery should be regularly serviced and maintained. • Refuelling and vehicle maintenance must take place

						in well demarcated areas and over suitable drip trays to prevent soil pollution. • Drip trays must be available on site and installed under all stationary vehicles. • Spill kits to clean up accidental spills from any accidental spillages must be well-marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up. • Any soil or area that is contaminated must be cleaned immediately by removing the soil and disposing it as hazardous waste in the correct manner.
Land Capability	Loss of land capability through topsoil removal, disturbances and loss of fertility.	Low	Possible, temporarily	Residual	Low Local	• Employ appropriate rehabilitation strategies to restore land capability.
Land use	Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation	Low	Possible, temporarily	Residual	Low Local	• Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
Ground Water Quantity	Hydrocarbon Spills	Low-Medium	Possible	Construction	Low Local	• Staff at the drilling operation and fuelling of drill should be

	Hydrocarbon spills from drilling operation and fuel storage may contaminate the groundwater resource locally					sufficiently trained in hydrocarbon spill response. • Each area where hydrocarbons are stored or likely to spill should be equipped with sufficient spill response kits and personnel, contaminated soil should be disposed of correctly at a suitable location.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Surface Water	**Alteration destruction of watercourses** During construction of roads and drill grids. During prospecting activities there is a possibility that the watercourses on site (Orange River, ephemeral river and drainage lines) might be altered or indirectly affected. This includes direct prospecting within the watercourses as well as development of roads within their channels, riparian areas, buffer zones or	Low – Medium	Possible infrequent	Permanent	Low Regional	• All activities associated with the prospecting operation must be planned to avoid any disturbances to the watercourses and their buffer zones. • No new roads should be created across a watercourse and no prospecting should take place in them. If this is unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected watercourses.

	catchments. Such activities can completely change the hydrologic regime or habitat conditions of the watercourses, which will not only compromise their ecological functioning, but also have downstream effects.					
	Siltation of surface water During clearing of an area for the construction of roads and drill grids; topsoil placement. Vegetation will be stripped in preparation for the prospecting areas and associated infrastructure. These bare areas will be very susceptible to water erosion without plants to stabilise the soil, creating potential sediment source	Low - Medium	Possible, infrequent	Residual	Regional	• Bare ground exposure should always be minimised in terms of the surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased. • No new roads or prospecting areas should be developed over watercourses. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers.

	zones. Similarly, any topsoil stored along drainage paths create additional sediment source zones. High runoff events could potentially cause the drainage lines and rivers to be filled with silt from prospecting areas if the sediment source zones lie along the drainage paths towards these watercourses. This may lead to a change in hydrologic regime or character of the watercourses.					• Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring and to identify potential sediment source zones; followed by appropriate remedial actions.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Indigenous Flora	**Loss of indigenous vegetation** During clearing of an area for drilling and the construction of roads. The Rietfontein and Nauga prospecting activities are expected to destroy only a very small area	Low	Certain, temporarily	Residual	On-site	• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Implement effective avoidance measures to limit any activities in the highly sensitive areas, by applying the no-go principles. • Ensure measures for the adherence to a maximum

	of natural vegetation. It is expected that the ecological functioning and biodiversity will not take too long to fully recover. Vehicle traffic and prospecting activities generate lots of dust which can reduce the growth success and seed dispersal of many small plant species in the adjacent pristine areas, but considering the nature of the proposed drilling programme, this impact is expected to be negligible.					speed limit of 40 km/h to minimise dust fallout and associated effects on plants in the adjacent pristine areas. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas, where necessary. • Apply for permits to authorise the large-scale clearance of indigenous plants from DENC at least three months before such activities will commence.
	Loss of Red data and/or protected floral species Removal of listed or protected plant species during the construction of roads and drill pads. Intentional removal of listed or protected plant species for non-mine related purposes, e.g. illegal	Low - Medium	Possible, infrequent	Residual	On-site	• The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities by means of a search-and-rescue operation. • It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into

	medicinal trade, cultural beliefs or firewood collection.					the design layout and left in situ. However, if it is unavoidable to remove such individuals, then the relevant permits from DAFF and/or DENC should be applied for at least three months before such activities will commence. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of all the rescued plants. • A management plan should be implemented to ensure proper establishment of ex situ individuals and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all related disturbance and must ensure that all contractors and workers undergo environmental induction prior to commencing with work on

						site. Environmental inductions should occur in the appropriate languages for the workers. • All those working on site must be educated about the conservation importance of the flora occurring on site as well as the legislation relating to protected species. • Employ regulatory measures to ensure that no illegal harvesting takes place.
	Introduction or spread of alien vegetation During clearing of an area for the drilling and construction of roads. Several weeds and invasive species have been recorded in the study region. Any anthropogenic disturbances to natural vegetation, especially the clearance of large areas of land, provide opportunities for	Low	Low likelihood, temporarily	Decommissioning	On site	• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Mechanical methods of control should be implemented pro-actively as soon as invasive species start to emerge. • Regular follow-up monitoring of invasive control areas needs to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

	invasive plants to increase. This is due to their opportunistic nature of dispersal and establishing in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the affected site, because they spread easily to neighbouring habitats where they outcompete indigenous species. Invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity as well as reduction in the ecological value and land use potential. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural					

	vegetation in the long term. The nature of the proposed prospecting activities does not generally carry a high risk for the proliferation of alien species and with proper mitigation, any potential impacts can be substantially reduced.					
	Encouragement of bush encroachment During clearing of an area for drilling and the construction of roads, improper rehabilitation practises. The extent of bush encroaching species on site cannot be determined through a desktop study. Bush encroachment is a natural phenomenon characterised by the excessive expansion of certain indigenous shrub species at the	Low	Low likelihood, temporarily	Decommissioning	On-site	• Mechanical methods of control should be implemented pro-actively when encroaching species form dense stands. • Regular follow-up monitoring of encroached control areas needs to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

	expense of other indigenous plant species. Overgrazing is generally one of the main causes of bush encroachment, but any surface disturbances where the grassland matrix is removed can lead to the expansion of encroaching shrubs and trees. When the areas surrounding the shrubs area cleared, it causes an open niche for these competitive species to establish and outcompete the surrounding plants, eventually forming dense and impenetrable stands. This lowers the potential for future land use and decreases biodiversity. The nature of the proposed prospecting activities does not generally carry a high risk for					

	encouraging bush encroachment.					
Fauna	**Loss, damage, and fragmentation of natural habitats** During clearing of an area for the construction of roads and drill pads. Fragmentation of habitats typically leads to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This can be in the form of small-scale fragmentation for reptiles, amphibians, and invertebrates, to more large-scale fragmentation that hinder dispersal of birds and plants. It also includes the degradation of aquatic habitats, like the ephemeral drainage channels and Orange River, which has	Low	Certain, temporarily	Residual	Local	• All activities associated with the prospecting operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave demarcated area except those authorised to do so. • Pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors. • No new roads should be created across a watercourse. • No drilling should take place in the ephemeral drainage channels or rivers. • If watercourse disturbances are unavoidable, a water use license or general authorization to alter the beds and banks of these

	landscape-level connectivity. Fragmentation of habitats usually results in a subsequent loss of genetic variability between meta-populations occurring within the region. Pockets of fragmented natural habitats hinder the growth and development of populations. The nature of the proposed prospecting activities is not expected to result in the significant loss of connectivity and fragmentation of natural terrestrial habitats and is only possible on a local scale. However, it could have regional scale effects if any of the watercourses are severely impacted through improper construction of roads.					watercourses should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected terrestrial and aquatic habitats.

	Disturbance, displacement and killing of fauna Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities; intentional killing of fauna. The transformation of natural habitats will result in the loss of micro habitats, affecting individual species and ecological processes. This will result in the displacement of faunal species that depend on such habitats, e.g. birds that nest in trees or animals residing in holes in the ground or among rocks. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small	Low	Possible, infrequent	Decommissioning	On-site	• Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint. • The extent of the prospecting activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised. • Areas surrounding the earmarked site, not part of the demarcated area, should be considered as a no-go zone. • No prospecting should take place in the drainage lines or rivers and no new roads should be created across these watercourses. If unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • If any of the protected wildlife species are directly threatened by habitat destruction or displacement during the prospecting

	mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls due to religion, superstition, personal beliefs or fears will negatively affect their local populations.					operation, then the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits. • Everyone on site must undergo environmental induction for awareness on not capturing or harming species that are often persecuted out of superstition or fear and to be educated about the conservation importance of the fauna occurring on site. • Reptiles, amphibians, mammals, special invertebrates or active bird nests exposed during the clearing operations should be captured for later release or translocation by a qualified expert. • Employ measures that ensure adherence to a speed limit of 40 km/h as well as driving mindfully to lower risks of animals being killed on the roads or elsewhere on site.
Compromise of Broadscale	**Cumulative** Clearing of vegetation and disturbance	Low-Medium	Possible infrequent	Residual	Regional	• Implement best practise principles to minimise the footprint of transformation, by

Ecological Processes	during the construction of roads and prospecting activities; alterations to watercourse habitat characteristics. Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The habitats on site are vulnerable to cumulative disturbances, due to the moderate extent of transformation through historic mining activities on site. Fragmentation of these habitats through loss of keystone species will destroy connectivity					keeping to existing roads and earmarked areas where possible. • Apply for the relevant permits from DENC and DAFF. • No new roads should be created across a watercourse and no prospecting should take place in them. If this is unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected habitats. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction.

	of vital ecological corridors and it will disrupt the food web, which might have cascading effects on a landscape level over the long-term. The nature of the proposed prospecting operation however lowers the risk of causing significant impacts.					• Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas, where necessary.
Air Quality	Sources of atmospheric emission associated with the prospecting operation are likely to include fugitive dust from drilling operations and vehicle entrainment of road dust.	Low	Certain	Decommissioning	Low Local	• Effective soil management; identification of the required control efficiencies in order to maintain dust generation within acceptable levels. • The implementation of continuous dust fall monitoring as part of the project's air quality management plan. Monitoring should be undertaken throughout the life of the mine to provide air quality trends and indicate compliance with NAAQSs.
SOCIAL SURROUNDINGS						
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Noise Impacts	Clearing of drilling areas, stripping of stockpiling of topsoil	Low	Definite	Permanent	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's

	Noise increase at the boundary of the mine footprint					specifications on acceptable noise levels
	Construction of Roads	Low	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels
	Additional traffic to and from the mine	Low	Possible	Operational to closure	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels. Noise survey to be carried out to monitor the noise levels during these activities.
Visual impacts	Potential visual impact of drill rig on the area	Low	Certain	Construction, Operation and Decommissioning	On-site	The design of the proposed prospecting development will determine the visual impact. As the visual impact would be low only 12 holes will be drilled on a very large area.
	Potential Visual Impact on the surrounding land users/ residents	Low	Possible	Construction, Operation and Decommissioning	Medium Local Site	The design of the proposed prospecting development will determine the visual impact. As the visual impact would be low only 12 holes will be drilled on a very large area.
Traffic	Potential negative impacts on traffic safety and deterioration of the	Very Low	Low likelihood	Operational	Low Local	Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules.

	existing road networks.					
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Socio-Economic	**Population Impacts** Employment Opportunities and skills Inequities	Medium Positive	Probable	Start-up and Construction	Medium Positive Local	• Training of potential future employees, contract workers and/or community members should focus on prospecting related skills which would furthermore equip trainees/beneficiaries with the necessary portable skills to find employment at the available employment sectors within the study area. Multi-skilling is thus not necessarily the preferred training and skills development method. • Training courses should be accredited and certificates obtained should be acceptable by other related industries.
	Safety and Security Risks	Low Negative	Highly Probable	Construction	Low Negative Local	• A Fire/Emergency Management Plan should be developed and implemented at the outset of the construction phase. • Open fires for cooking and related purposes should not be allowed on site. • Appropriate firefighting equipment should be on site

						and construction workers should be appropriately trained for fire fighting. • Speed limits on the local roads surrounding the construction sites should be enforced. • Speeding of construction vehicles must be strictly monitored • Local procurement and job creation should receive preference.
	Health Impacts	Low Negative	Highly probable	Construction	On-site	• Maximise the employment of locals where possible • First aid supplies should be available at various points at the construction site • Continue and extend the current HIV/AIDS awareness and support programmes, with specific focus on those in and nearby the construction site
Interested and Affected Parties	Loss of trust and a good standing relationship between the IAP's and the prospecting company.	Low to medium	Possible	Construction, Operational and Decommissioning	Low Local	Ensure continuous and transparent communication with IAP's

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

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

The different environmental components on which the project can/may have an impact are: -

a) Geology
b) Topography
c) Soil
d) Land Capability
e) Land Use
f) Vegetation (Flora)
g) Wild Life (Fauna)
h) Surface Water
i) Ground Water
j) Air Quality
k) Noise
l) Archaeological and Cultural Sites
m) Sensitive Landscapes
n) Visual Aspects
o) Socio-economic Structure
p) Interested and Affected Parties

1) <u>Impact Assessment</u>

Before the impact assessment could be done the different project, activities were identified.

2) <u>Activities</u>

a) Access Roads for drilling;
b) Drilling;
c) Ablution facilities

3) <u>Environment Impact Assessment Summary</u>

Environment likely to be affected by the prospecting operation.

Please see Map Figure 1 for the location of the prospecting operation.

Environment impact assessment summary

The criteria used to assess the significance of the impacts are shown in the table 24 below/overleaf. The limits were defined in relation to prospecting characteristics. Those for probability, intensity/severity and significance are subjective, based on rule-of-thumb and experience. Natural and existing mitigation measures were considered. These natural mitigation measures were defined as natural conditions, conditions inherent in the project design and existing management measures, which alleviate impacts. The significance of the impacts was calculated by using the following formula:

(Severity + Extent + Duration) x Probability weighting

For the impact assessment, the different project activities and associated infrastructure were identified and considered in order to identify and analyse the various possible impacts.

Table 24. Significance of impacts is defined as follows.

SIGNIFICANCE				
Colour Code	**Significance rating**	**Rating**	**Negative Impact**	**Positive Impact**
	Very low	3 -16	Acceptable/Not serious	Marginally Positive
	Low	17 - 22	Acceptable/Not serious	Marginally Positive
	Medium-Low	23 -33	Acceptable/Not desirable	Moderately Positive
	Medium	34 - 48	Generally undesirable	Beneficial
	Medium-High	49 - 56	Generally unacceptable	Important
	High	57 - 70	Not Acceptable	Important
	Very High	90 - 102	Totally unacceptable	Critically Important

Significance of impacts is defined as follows:

Very Low -Impact would be negligible. Almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple.

Low -Impact would have little real effect. Mitigation and/or remedial activity would be either easily achieved or little would be required or both.

Medium Low- Impact would be real but not substantial within the bounds of those which

could occur. Mitigation and/or remedial activity would be both feasible and fairly easily possible.

Medium - Impact would be real but not substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be feasible and possible.

Medium High- Impact would be real but could be substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be both feasible and possible but may be difficult and or costly.

High - Impacts of substantial order. Mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these.

Before any assessment can made the following evaluation, criteria need to be described.

Table 25. Explanation of probability of impact occurrence

Weight	Probability of Impact Occurrence	Explanation of Probability
1	Improbable	<20% sure of particular fact or likelihood of impact occurring
2	Low Probability Possible	20 – 39% sure of particular fact or likelihood of impact occurring
3	Probable /Likely	40 – 65% sure of particular fact or likelihood of impact occurring
4	Highly Probable /Likely	66 – 85% sure of particular fact or likelihood of impact occurring
5	Definite	86% - 100% sure of particular fact or likelihood of impact occurring

Table 26. Explanation of extent of impact

Weight	Extent of Impact	Explanation of Extent
1	Footprint	Direct and Indirect impacts limited to the activity, such as footprint occurring within the total site area of impact only.
2	Surrounding Area Site	Direct and Indirect impacts affecting environmental elements within 2 km of site
3	Local Municipality Local	Direct and Indirect impacts affecting environmental elements within the Siyanthemba Municipal area
4	Regional/District Regional	Direct and Indirect impacts affecting environmental elements within District (Prieska District)
5	Provincial	Direct and Indirect impacts affecting environmental elements in the Northern Cape Province

Table 27. Explanation of DURATION of impact

Weight	Duration of Impact	Explanation of Duration
1	Temporary (Very Short)	Less than 1 year
2	Short term	1 to 5 years
3	Medium term	6 to 15 years
4	Long term (Life of project)	16 to 50 years
5	Very Long term	Longer than 50 years
6	Permanent	Permanent

Table 28. Explanation of SEVERITY of the impact

Weight	Impact Severity	Explanation of Severity
1	No Impact	There will be no impact at all – not even a very low impact on the system or any of its parts.
2	Very Low	Impact would be negligible. In the cast of negative impacts, almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple. In the case of positive impacts alternative means would almost all likely to be better, if one or a number of ways, then this means of achieving the benefit.
3	Low	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and/or remedial activity would be either easily achieved or little would be required or both. In the case of positive impacts alternative means for achieving this benefit would be easier, cheaper, more effective, less time-consuming, or some combination of these.
4	Moderately Severe	Impact would be real but not substantial within the bounds of those which could occur. In the case of negative impacts, mitigation and/or remedial activity would be both feasible and fairly easily possible. In the case of positive impacts other means other means of covering these benefits would be about equal in cost and effort.
5	High Severance	Impacts of substantial order. In the case of negative impacts, mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these. In the case of positive impacts other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
6	Very High Severity	Of the highest order possible within the bounds of impacts which could occur, in the case of negative impacts, there would be no possible mitigation and/or remedial activity to offset the impact at the spatial or time scale for which was predicted. In the case of

		positive impacts there is no real alternative to achieving the benefit.

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

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

Camel Thorn Group (Pty) Ltd is proposing the prospecting of ferrous and base metals (Zn, Pb, Fe, Mn, Cu, Ni) on Portion 3 (a portion of Portion 2 - Asbestos Hills) and Portion 13 (a portion of Portion 9) of the Farm Rietfontein 11, as well as the Remaining Extent, Portion 1, Remaining Extent of Portion 2 (Nauga A), Portion 3 (a portion of Portion 2 - Nauga east) and Portion 4 of the Farm Nauga 17.

There will only be non invasive and 12 drilling holes that will be invasive on the total area of ±17 000 ha.

This is the area with possible ferrous and base metals and therefor there is no other area to drill for this minerals.

Socio-economic
Source of the impact
The prospecting operation can create various job opportunities for local people. The prospector can also destroy the land capability and land use while mining.

Description of the impact
Loss of potential for the area;
influx of workers to the area increases health risks and loitering (resulting in lack of security and safety);
negative impact of employment loss during closure.

Socio-economic upliftment will take place due to the creation of employment opportunities as well as economic support to the surrounding business community.

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

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

- *Air Quality:*
  Level of risk: Low
  Mitigation measures

To limit the creation of nuisance, dust the following management guidelines will be followed: -

- Avoidance of unnecessary removal of vegetation;
- Routine spraying of unpaved site areas and roads with water;
- Re-vegetation of rehabilitated areas to take place as soon as possible.

❖ *Fauna and Flora:*
Level of risk: Medium
Mitigation measures

- Indigenous vegetation to be used for landscaping to minimize watering requirements.
- If any endangered species are found on the prospecting area they will be relocated. If this is not possible potential changes in the habitat of endangered species will be monitored.
- The above programme will also focus on species that depend on specific host plants or on specific symbiotic relationships, with specific reference to possible impacts on such related to emissions from the prospecting area.
- If monitoring shows that endangered species are being negatively affected to the degree that they are at risk of die-off, measures will be put in place to safeguard their continued existence.
- Any area that is rehabilitated or decommissioned will be seeded with a seed mixture reflecting the natural vegetation as is currently found. If this not found to be feasible during rehabilitation a general seed mixture of the area will be used.
- Management will also take responsibility to control declared invader or exotic species on the prospecting area. The following control methods will be used: -
  - "The plants will be uprooted, felled or cut-off and can be destroyed completely."
  - "The plants will be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such a herbicide."
- The end objective of the re-vegetation program will be to achieve a stable self-sustaining habitat unit.
- Vegetation on flat surfaces will be established using the dry lands technique requiring no irrigation.
- Valid permits from Northern Cape Nature Conservation will be obtained before any protected plant species are removed.
- Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a firebreak will be cleared around the perimeter of the prospecting area.
- Any form of poaching by workers of the prospecting area will result in the maximum form of punishment as allowed for by common law. Any form of snares or traps on the site will be removed.

- If any endangered species are encountered the Department of Nature Conservation will be contacted.

❖ *Noise:*

Level of risk: Low

Mitigation measures

- As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.
- The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.
- The applicant will comply with the measures for good practice with regard to management of noise related impacts during construction and operation.
- The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant and that which may migrate outside the plant area.
- When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.
- Hearing protection will be available for all employees where attenuation cannot be implemented.
- If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.

❖ *Mechanical Equipment:*

Level of risk:Low

Mitigation measures

- All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act.
- All vehicles in operation will be equipped with a silencer on their exhaust system.
- Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.

❖ *Soil:*

Level of risk: Low to Medium

Mitigation measures

- In all places of development, the first 300mm of loose or weathered material found will be classified as a growth medium.
- The growth medium/topsoil will be used during the rehabilitation of any impacted areas, after sloping in order to re-establish the same land capability.

- If any soil is contaminated during the prospecting operations, it will either be treated on site or be removed together with the contaminant and placed in acceptable containers to be removed with the industrial waste to a recognised facility or company.
- Erosion control in the form of re-vegetation and contouring of slopes will be implemented on disturbed areas in and around the site.
- Topsoil will be kept separate from overburden and will not be used for building or maintenance of access roads.
- The stored topsoil will be adequately protected from being blown away or being eroded.

ix) Motivation where no alternative sites were considered

The option to explore the possibility for prospecting is in itself an alternative temporary land use. The applicant is not interested in any other alternative land use over this land aside for iron, manganese, copper, lead, zink and nickel ore exploration, or any other activity, or any other method used other than prospecting for iron, manganese, copper, lead, zink and nickel ore in the conventional way (drilling), which is the most cost effective.

x) Statement motivating the alternative development location within the overall site (Provide a statement motivating the final site layout that is proposed)
Please see (ix) above.

There can be many more positive impacts if Camel Thorn Trading are granted permission to continue prospecting over this area. The option to prospect the site can have many positive impacts, in that 5 - 15 households will benefit from the income generated and thus improving their living standards. The area within which the proposed prospecting area is located is within a rural area that is known for big economic growth, because of its location. A prospecting right within this area will however further benefit the local economy because of the mines monthly expenditure that will contribute towards different service providers locally and nationally. Prospecting will also not adversely impend the landowner's use of its land since only 12 holes will be drilled on the total area.

i) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity (Including (i) a description of all environmental issues and risks that are identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures)

There is not alternative development location for the site and therefore the initial site locality is considered to be the final site locality. The impact assessment provided in section g(v) is therefore sufficient and the process undertaken to identify impacts is the same as in section g(vi).

j) Assessment of each identified potentially significant impact and risk

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

In this section, the potential impacts and associated risk factors that may be generated by the proposed prospecting operation on Rietfontein and Nauga are identified. In order to ensure that the impacts identified are broadly applicable and inclusive, all the likely or potential impacts that may be associated with the prospecting activities are listed.

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. construction, commissioning, operational, Decommissioning, closure, post closure)	SIGNIFICANCE IF NOT MITIGATED	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	SIGNIFICANCE IF MITIGATED
Ablution Facilities Chemical Toilet	Soil contamination Possible. Groundwater Contamination. Odours.	Soil Groundwater	Construction Commissioning Operational Decommissioning Closure	Low	Maintenance of sewage facilities on a regular basis.	Very Low
Clean & Dirty water systems:	Surface disturbance Soil contamination Surface water contamination Groundwater contamination	Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Low	Maintenance of berms. Oil traps used in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.	Low
Fuel Storage facility (Diesel car) if necessary	Groundwater contamination Soil contamination	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintenance of diesel car for leaks Groundwater quality monitoring. Drip tray at re-fuelling point.	Low

					Immediately clean hydrocarbon spill.	
Prospecting area.	Dust Noise Removal and Disturbance of Vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Air quality Fauna Flora Groundwater Noise Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Low- Medium	Access control Dust control and monitoring Groundwater quality monitoring Noise control and monitoring Continuous rehabilitation Stormwater run-off control Immediately clean hydrocarbon spill Drip trays Erosion control	Low
Roads (tracks for the drill rig):	Dust Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna	Air quality Fauna Flora Groundwater Noise Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Low	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment	Low

	Soil contamination Surface disturbance				Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion. All construction and maintenance activities should be conducted in such a way that minimal damage is caused to the drainage features onsite.	

k) Summary of specialist reports

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

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS HTAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
ECOLOGICAL ASSESSMENT REPORT Camel Thorn Group (Pty) Ltd Portion 3 (a portion of Portion 2 - Asbestos Hills) and Portion 13 (a portion of Portion 9) of the Farm Rietfontein 11 Remaining Extent, Portion 1, Remaining Extent of Portion 2 (Nauga A), Portion 3 (a portion of Portion 2 - Nauga east) and Portion 4 of the Farm Nauga 17 District of Prieska Northern Cape Province By Boscia Ecological Consulting (Dr. Betsie Milne) **APPENDIX 4 to the report**	**CONCLUSION, RECOMMENDATIONS AND OPINION REGARDING AUTHORISATION** Two broad-scale terrestrial habitats comprising several micro-habitats, the Orange River, an ephemeral river, and numerous drainage lines occur in the Rietfontein and Nauga prospecting area. Of these, the Orange River, ephemeral river and drainage lines and their riparian buffer zones are the most sensitive to prospecting based on their vital ecological functioning on a catchment scale. The terrestrial habitats potentially host a number of red listed flora and fauna species and are therefore considered to be of high sensitivity. Impacts associated	X	e) Policy and Legislative Context g) Motivation for the overall preferred site, activities and technology alternative h) Full description of the process followed to reach the proposed preferred alternatives within the site iv) The Environmental attributes associated with the development footprint alternatives (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects) vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts j) Assessment of each identified potentially significant impact and risk l) Environmental impact statement

	with the proposed prospecting operation are primarily however expected to be low due to the nature of the proposed activities. The most profound impacts are expected to be related to the loss of red listed species, alteration of watercourses and the cumulative loss of intact habitat and biodiversity on a landscape level. Permit applications need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any removal of protected species. Similarly, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to the protected trees. If any of the watercourses will be impacted, then a general authorisation or water use license should be obtained from Department of Water and Sanitation, prior to such activities. The destruction of the natural plant species and habitats is expected to be negligible due to the nature of the proposed prospecting operation, but the significance of the impacts will ultimately be		

	affected by the success of the mitigation measures implemented during the operation. In my opinion, authorisation for the proposed operation can be granted. However, the applicant should still commit to the strict adherence of effective avoidance, management, mitigation, and rehabilitation measures.		
PHASE I HERITAGE IMPACT ASSESSMENT (INCLUDING PALAEONTOLOGICAL DESKTOP ASSESSMENT) FOR A PROSPECTING RIGHT APPLICATION Prepared by Edward Matenga (PhD Archaeology &Heritage, MPhil, Archaeology; Uppsala/Sweden) 3 November 2020 **Appendix 5 to the Report**	CONCLUSION AND RECOMMENDATIONS In light of the findings of the desk assessment, the mine prospecting can go ahead. The study is mindful that some important discoveries may be made during prospecting. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.	X	e) Policy and Legislative Context g) Motivation for the overall preferred site, activities and technology alternative h) Full description of the process followed to reach the proposed preferred alternatives within the site iv) The Environmental attributes associated with the development footprint alternatives (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects) vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts k) Summary of specialist reports l) Environmental impact statement (i) Summary of the key findings of the environmental impact assessment;

			t) Specific information required by the competent Authority i) Compliance with the provisions of sections 24 (4)(a) and (b) read with section 24 (3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998), the EIA Report must include the:- (2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act
PALAEONTOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED PROSPECTING RIGHTS APPLICATION ON Palaeontological Impact Assessment for the proposed Prospecting and Mining Right Application by Camel Thorn Group (Pty) Ltd for 2 - Farms Rietfontein 11 and Nauga 17, Northern Cape Province Desktop Study (Phase 1) Prof Marion Bamford Palaeobotanist P Bag 652, WITS 2050 Johannesburg, South Africa Marion.bamford@wits.ac.za **Appendix 6 to the report**	**Recommendation** Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the Gordonia Formation sands of the Quaternary. There is a very small chance that trace fossils such as stromatolites may occur in the dolomites of the Campbell Rand Subgroup so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once prospecting or mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, so as far as the palaeontology is concerned, the prospecting permit should be		e) Policy and Legislative Context g) Motivation for the overall preferred site, activities and technology alternative h) Full description of the process followed to reach the proposed preferred alternatives within the site iv)The Environmental attributes associated with the development footprint alternatives (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects) vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts k) Summary of specialist reports l) Environmental impact statement (i) Summary of the key findings of the environmental impact assessment; t) Specific information required by the competent Authority

	authorised as long as the dolomites are avoided. If prospecting is to take place in the dolomitic areas in the north, a site visit (phase 2) palaeontology impact assessment is advisable.		i) Compliance with the provisions of sections 24 (4)(a) and (b) read with section 24 (3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998), the EIA Report must include the:- (2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act

Attach copies of the Specialist Reports as appendices

l) Environmental impact statement

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

The prospecting operation is definitely going to have an impact on the environment. The main impacts relate to topography, geology, soil, vegetation, land use and land capability.

The application is for drilling to establish if there are potential viable resources of iron, manganese, copper, lead, zink and nickel ore to mine. This will be done over a 5-year period.

Two broad-scale terrestrial habitats comprising several micro-habitats, the Orange River, an ephemeral river, and numerous drainage lines occur in the Rietfontein and Nauga prospecting area. Of these, the Orange River, ephemeral river and drainage lines and their riparian buffer zones are the most sensitive to prospecting based on their vital ecological functioning on a catchment scale. The terrestrial habitats potentially host several red listed flora and fauna species and are therefore considered to be of high sensitivity. Impacts associated with the proposed prospecting operation are primarily however expected to be low due to the nature of the proposed activities. The most profound impacts are expected to be related to the loss of red listed species, alteration of watercourses and the cumulative loss of intact habitat and biodiversity on a landscape level.

Permit applications need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any removal of protected species. Similarly, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to the protected trees. If any of the watercourses will be impacted, then a general authorisation or water use license should be obtained from Department of Water and Sanitation, prior to such activities.

The destruction of the natural plant species and habitats is expected to be negligible due to the nature of the proposed prospecting operation, but the significance of the impacts will ultimately be affected by the success of the mitigation measures implemented during the operation. In my opinion, authorisation for the proposed operation can be granted. However, the applicant should still commit to the strict adherence of effective avoidance, management, mitigation, and rehabilitation measures.

Other environmental impacts relate to day-to-day prospecting and could easily be managed with sound housekeeping rules such as dust and noise.

There are two buffers that must be implemented the first is the 100m away from any fixed infrastructure like the gravel roads and the farm infrastructures in terms of Mine Health and Safety Act, 1996) Regulations relating to surveying, mapping and mine

plans. These regulations states that a mine must take reasonable measures to ensure that –

- No prospecting operations are carried out within a horizontal distance of 100 (one hundred) metres from reserve land, buildings, roads, railways, dams, waste dumps, or any other structure whatsoever including such structures beyond the prospecting boundaries, or any surface, which it may be necessary to protect in order to prevent any significant risk, unless a lesser distance has been determined safe by risk assessment and all restrictions and conditions in terms of the risk assessment are complied with.

- There is a 15.5m building and tree restriction on either side of the 132kV power lines which must be adhered to in all future developments and or construction. Eskom's rights are protected by Wayleave.

  Also ecological buffers must be kept from all the natural drainage lines (at least 100m).

  According to the Pixley ka Seme Spatial Development Framework, all rivers, and wetlands (ephemeral and perennial), including a generic buffer of 100m, are regarded as ecological corridors and sensitive. Their mandate is to conserve existing ecological corridors and rehabilitate any remnants of corridors. (Taken out of the ecological study by Boscia Ecological appendix 4).

(ii) Final Site Map;

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

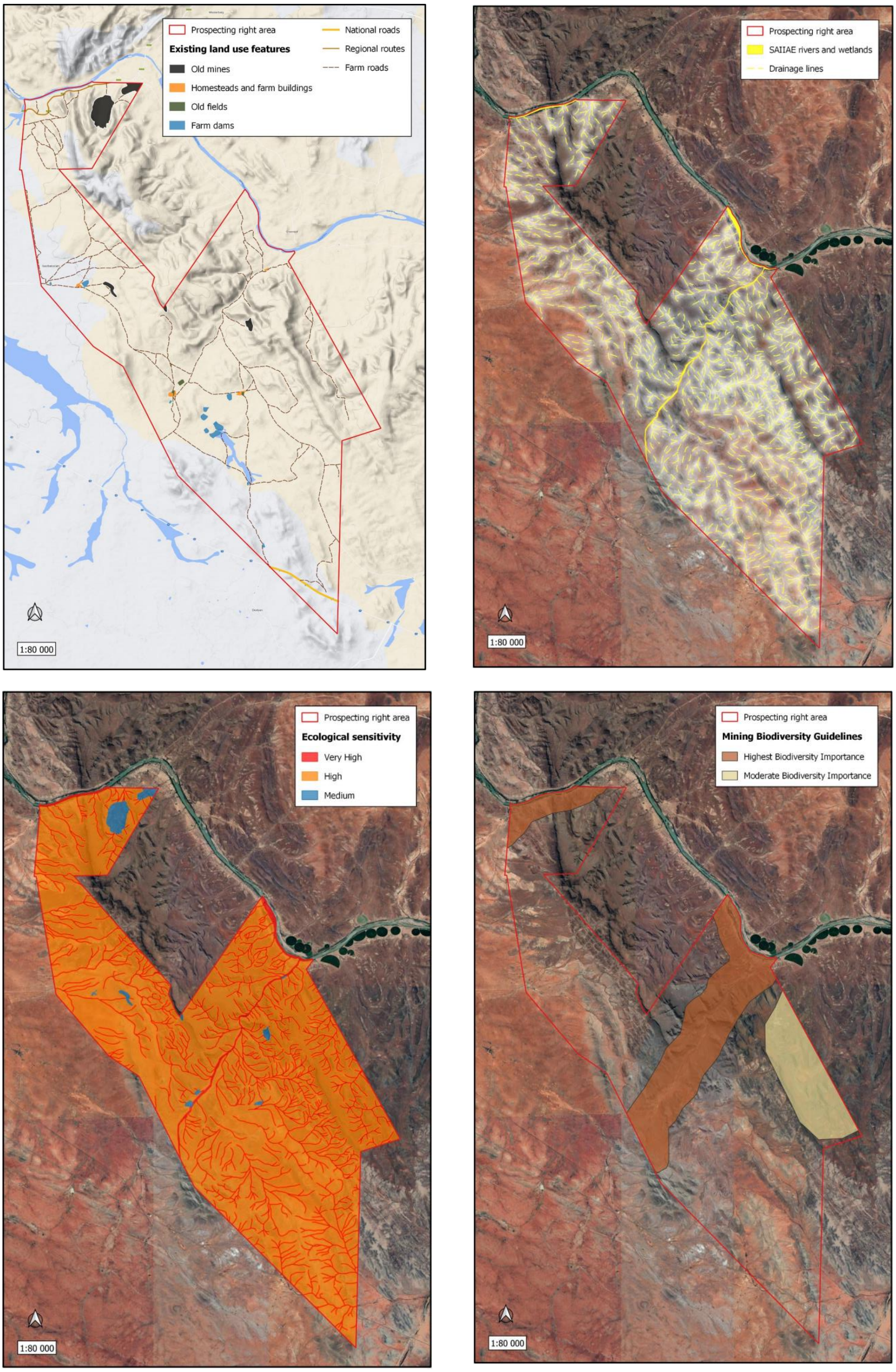


Figure 36. Final Site maps.

(iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;

The proposed prospecting operation will be done in such a way that farming (grazing) will still be possible on the rest of the farm. If drilling is done the loss of land use will temporary as the site will be rehabilitated in such a way that it allows the establishment of a grass cover again. The rest of the farm will still be able to be used for grazing purposes.

Two broad-scale terrestrial habitats comprising several micro-habitats, the Orange River, an ephemeral river, and numerous drainage lines occur in the Rietfontein and Nauga prospecting area.Of these, the Orange River, ephemeral river and drainage lines and their riparian buffer zones are the most sensitive to prospecting based on their vital ecological functioning on a catchment scale. The terrestrial habitats potentially host a number of red listed flora and fauna species and are therefore considered to be of high sensitivity. Impacts associated with the proposed prospecting operation are primarily however expected to be low due to the nature of the proposed activities. The most profound impacts are expected to be related to the loss of red listed species, alteration of watercourses and the cumulative loss of intact habitat and biodiversity on a landscape level.

Permit applications need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any removal of protected species. Similarly, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to the protected trees. If any of the watercourses will be impacted, then a general authorisation or water use license should be obtained from Department of Water and Sanitation, prior to such activities.

The destruction of the natural plant species and habitats is expected to be negligible due to the nature of the proposed prospecting operation, but the significance of the impacts will ultimately be affected by the success of the mitigation measures implemented during the operation. In my opinion, authorisation for the proposed operation can be granted. However, the applicant should still commit to the strict adherence of effective avoidance, management, mitigation, and rehabilitation measures.

Although this is only a prospecting operation it will provide jobs when drilling is reached. This will also add to the increased economic activity and area surrounding the farm.

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

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as conditions of authorisation.

The main closure objective of Camel Thorn Trading. planned prospecting operation is to restore the site to its current land capability in a sustainable manner.

- To prevent the sterilization of any reserves.
- The prospecting operation also has the objective to establish a stable and self-sustainable vegetation cover if necessary.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability of the prospecting operation.
- To limit and manage the visual impact of the prospecting operation.
- To safeguard the safety and health of humans and animals on the prospecting operation.
- The last closure objective is that the prospecting operation is closed efficiently, cost effectively and in accordance with government policy.

Rehabilitation Plan

Infrastructure Areas:

On completion of the prospecting operation, the various surfaces, including the access road, the ablution facilities, will finally be rehabilitated as follows:-

- All remaining material on the surface will be removed to the original topsoil level. This material will then be backfilled into the depressions. Any compacted area will then be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.
- All infrastructures, equipment, ablution facilities and other items used during the operational period will be removed from the site.
- On completion of operations, all buildings, structures or objects on the office site will be dealt with in accordance with Regulation 44 of the Minerals and Petroleum Resources Development Act, 2002, which states:-

  1. *Regulation 44: When a prospecting right, mining right, retention permit or mining permit lapses, is cancelled or is abandoned or when any prospecting or mining operation comes to an end, the holder of such right or permit may not demolish or remove any building, structure or object –*
  - *(a) which may not be demolished or removed in terms of any other law;*
  - *(b) which has been identified in writing by the Minister for purposes of this section; or*
  - *(c) which is to be retained in terms of an agreement between the holder and the owner or occupier of the land, which agreement has been approved by the Minister in writing.*

  2. *The provision of subsection (1) does not apply to bona fide mining equipment, which may be removed.*

Topsoil:

- Disposal Facilities:-
  Waste material of all description inclusive of receptacles, scrap, rubble and tyres will be removed entirely from the prospecting area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- Ongoing Seepage, Control of Rain Water:-
  No monitoring of ground or surface water will take place, except is so requested by the DWS – Kimberley.
- Long Term Stability and Safety:-
  It will be the objective of mine management to ensure the long term stability of all rehabilitated areas including the backfilled drill holes / depressions. This will be done by the monitoring of all areas until a closure certificate has been issued.
- Final rehabilitation in respect of erosion and dust control:-
  Self-sustaining vegetation will result in the control of erosion and dust and no further rehabilitation is planned.

Final Rehabilitation Roads:-

- After rehabilitation has been completed, all roads will be ripped or ploughed, fertilized and seeded, providing the landowner does not want them to remain that way and with written approval from the Director: Mineral Development of the Department of Mineral Resources.

Submission of Information:-

- Reports on rehabilitation and monitoring will be submitted annually to the Department of Mineral Resources – Kimberley, as described in Regulation 55.

Maintenance (Aftercare):-

- Maintenance after closure will mainly concern the regular inspection and monitoring and/or completion of the re-vegetation programme.
- The aim of the Environmental Management Programme is for rehabilitation to be stable and self-sufficient, so that the least possible aftercare is required.
- The aim with the closure of the mine will be to create an acceptable post-mine environment and land-use. Therefore, all agreed commitments will be implemented by Mine Management.

After-effects Following Closure:-

- Acid Mine Drainage:-
  No potential for bad quality leachate or acid mine drainage development exists after mine closure.
- Long Term Impact on Ground Water:-
  No after effect on the groundwater yield or quality is expected.
- Long-term Stability of Rehabilitated Land:-

One of the main aims of any rehabilitated ground will be to obtain a self-sustaining and stable end result. Cleaning of all drill chip material concurrently and replacing of topsoil where available.

n) Aspects for inclusion as conditions of Authorisation

Any aspects which must be made conditions of the Environmental Authorisation

None other than the implementation of the EMPR.

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

(Which relate to the assessment and mitigation measure proposed)

None.

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

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

In my opinion, authorisation for the proposed operation should be granted. However, the applicant should still commit to the adherence of effective avoidance, management, mitigation and rehabilitation measures.

ii) Conditions that must be included in the authorisation.

None other than the implementation of the EMPR.

q) Period for which the Environmental Authorisation is required

It is required for 5 years with a renewal period of 3 years.

r) Undertaking

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basis Assessment Report and the Environmental Management Programme Report.

I hereby undertake to meet the requirements as provided at the end of the EMPr and is applicable to both the Basic Assessment Report and the Environmental Management Programme Report.

s) Financial Provision

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

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
Remark:							
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	18,42	1	1,2	-
					1	1,2	
2 (A)	Demolition of steel buildings and structures	m2	0	256,63	1	1,2	-
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	378,15	1	1,2	-
3	Rehabilitation of access roads	m2	15 000	5,00	1	1,2	90 000,00
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	445,73	1	1,2	-
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	243,13	1	1,2	-
5	Demolition of housing and/or administration facilities	m2	0	513,26	1	1,2	-
6	Opencast rehabilitation including final voids and ramps	ha	3,5	261 224,38	0,04	1,2	43 885,70
7	Sealing of shafts adits and inclines	m3	0	137,77	1	1,2	-
8 (A)	Rehabilitation of overburden and spoils	ha	0	179 372,28	1	1,2	-
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	223 404,93	1	1,2	-
					1	1,2	
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	648 873,81	1	1,2	-
					1	1,2	
9	Rehabilitation of subsided areas	ha	0	150 197,24	1	1,2	-
10	General surface rehabilitation	ha	0	142 093,10	1	1,2	-
11	River diversions	ha	0	142 093,10	1	1,2	-
12	Fencing	m	0	162,08	1	1,2	-
13	Water management	ha	0	54 027,79	1	1,2	-
14	2 to 3 years of maintenance and aftercare	ha	1	18 909,73	1	1,2	22 691,68
15 (A)	Specialist study	Sum	0			1,2	-
15 (B)	Specialist study	Sum	0			1,2	-
					Sub Total 1		156 577,37
1	Preliminary and General			9 394,64	weighting factor 2 1,05		9 864,37
2	Contingencies				15657,73718		15 657,74
					Subtotal 2		182 099,48
					VAT (15%)		27 314,92
					Grand Total		**209 414,41**

i) Explain how the aforesaid amount was derived

The quantum of the financial provision contemplated in Regulation 54 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) will be revised and adjusted accordingly annually, based on a survey assessment of the environmental liability of Camel Thorn Trading. Logging and surveys of drill holes are conducted by a registered surveyor and results are forwarded to the Environmental Manager who calculates the outstanding rehabilitation as per the agreed rate in the DMR Guideline. A bank guarantee is prepared for the amount and submitted to the DMR.

Financial provision for the rehabilitation or management of negative environmental impacts caused by the prospecting operation [as required by Section 41 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)] will be made in the form of a financial guarantee from a South African registered bank. This document will guarantee the financial provision relating to the Environmental Management Programme in a format as approved by the Director-General.

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

Camel Thorn Trading will fund the operation;

t) Specific information required by the competent Authority

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

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

Socio-economic upliftment will take place due to the creation of employment opportunities as well as economic support to the surrounding business community.

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act (Provide the results of investigation, assessment, evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(*i)*(vi) and (vii) of that Act, attach

the investigation report as **Appendix 5 & 6** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein)

Dr. Edward Matenga from ASHA has been appointed by Camel Thorn Trading to provide an historical impact assessment in order to highlight the historical sensitivity of the proposed prospecting area and to determine the possible impact of prospecting on the historical status of the application area (Appendix 5).

General observations

Stone Age material is widely distributed on the plains, ridges and valleys of the upper Karroo area north and south of the Orange-Vaal basin. The material comprises scrapers, blades, cores, and flakes typologically dating to the Middle Stone Age/Late Stone Age period. Early Stone Age material has been encountered in places with occasional occurrences of hand-axes and cleavers. Significantly, in these studies, Later Stone Age material has been recorded in the vicinity of pans and along ephemeral streams. A few places were identified as stone tool quarries or manufacturing sites. The scattered distribution pattern seems to suggest general hunter-gatherer activity in the region called Bushmanland. Rarely have the findings warranted further action such as professional excavations or the issue of a destruction permit from SAHRA. Findings from the twelve studies which have been cited in this report, fit within this picture of the archaeological sensitivity of the broader area. Our conclusion is that on the properties under study, we are not likely to encounter a fundamental deviation from the above scenario.

Findings from Portion 9 of the Farm Rietfontein 11

In 2019 this author carried out a ground survey on Portion 9 of the Farm Rietfontein 11 which is in the footprint of the proposed prospecting. The findings of the survey are instructive and are therefore described in detail in this report:

The Stone Age

Twelve (12) sites were recorded on Portion 9 of Rietfontein 11 with varying densities of lithics. The assemblages comprise mainly scrapers, points and flakes while a few blades and cores also occur. They are spread along the base of the ridge along the eastern boundary of the property. No significant concentrations were found to suggest a settlement or regular activity.

The occurrence of a crude pear-shaped hand-axe on Portion of Rietfontein 11 is of particular interest as it seems to confirm the presence of Acheulean material in the area dating between 2 million- and 250 000-years BP (Site RFN04).

The Iron Age

No Iron Age relics were found on the property.

Early mining and commercial farming
On Portion 9 of Rietfontein 11, an asbestos ore crushing and loading site was recorded (the block of a heavy steel machine and structures of stonework and concrete) (Site RFN07). A small rectangular structure is built of dressed dolomite blocks apparently locally sourced (Site RFN08a). These structures must be protected.

Burial grounds
No graves or burial grounds were reported on Portion 9 of Rietfontein.

Other heritage resources that might occur in the footprint of the prospecting area
The following site types/objects have been encountered in the broader region and are therefore flagged:

- Rock engravings (petroglyphs) from the Middle Stone Age to Later Stone Age periods
- Rock Paintings from the Middle Stone Age to Later Stone Age periods
- Buildings and objects associated with modern commercial farming from the 19th century
- Graves, burial grounds and human bones.

Postulated heritage sensitivity of the study area
The ground survey on Portion 9 of Rietfontein 11 coupled with the desktop studies cited above provide a good theoretical foundation for extrapolating a likely scenarios on the rest of the prospecting area.

Chance Finds Procedure
A Chance Finds Procedure has been prepared to curate heritage resources that may be found during the prospecting activities.

Conclusion and Recommendations
Considering the findings of the desk assessment, the mine prospecting can go ahead. The study is mindful that some important discoveries may be made during prospecting. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

Paleontological
Prof. Marion Bamford has been appointed by Camel Thorn Trading to provide an palaeontological impact assessment in order to highlight the palaeontological sensitivity of the proposed prospecting area and to determine the possible impact of prospecting on the palaeontological status of the application area (Appendix 6).

A Paleontological Impact Assessment was requested for the PR application. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed application and is presented herein.

Palaeontological context

The site for prospecting is in the non-fossiliferous ancient granites, gneisses and schists. Sections also occur on the potentially fossiliferous Campbell Rand Group that could preserve trace fossils such as stromatolites. Most of the rocks are overlain by the Quaternary Gordonia Formation.

In some of the Campbell Rand Subgroup formations there are trace fossils, for example, giant stromatolitic domes overlain by microbial laminites with fenestrae and carbonate argillites, shales and siltstones make up the Monteville Formation (Beukes, 1987; Eriksson et al. 2006). The thickest stratum is the overlying Reivilo Formation that is made up of dolomite with giant stromatolitic domes, columnar stromatolites and fenestral facies (Beukes, 1980a). Possibly due to the lack of trace fossils, the Campbell Rand Subgroup has not been divided into formations in this region.

Stromatolites are the trace fossils that were formed by colonies of green algae and blue-green algae (Cyanobacteria) that grew in warm, shallow marine settings. These algae were responsible for releasing oxygen via the photosynthetic process where atmospheric carbon dioxide and water, using energy from the sun, are converted into carbon chains and compounds that are the building blocks of all living organisms. The released carbon dioxide initially was taken up by the abundant reducing minerals to form oxides, e.g. iron oxide. Eventually free oxygen was released into the atmosphere and some was converted into ozone by the bombardment of cosmic rays. The ozone is critical for the filtering out of harmful ultraviolet rays.

Stromatolites are the layers upon layers of inorganic materials that were deposited during photosynthesis, namely calcium carbonate, magnesium carbonate, calcium sulphate and magnesium sulphate. These layers can be in the form of flat layers, domes or columns depending on the environment where they grew (Beukes, 1987). Some environments did not form stromatolites, just layers of limestone that later was converted to dolomite. The algae that formed the stromatolites are very rarely preserved, and they are microscopic so they can only be seen from thin sections studies under a petrographic microscope.

The Kuruman Formation banded iron formation is indicated as very highly sensitive but this is incorrect. Although the layers of iron were formed by the oxidation (free oxygen released by the photosynthetic activity of algae) and

precipitation of iron, no algae were directly involved so there are no fossils or trace fossils in banded iron (Cowan, 1995; Havig et al., 2017).

KALAHARI GROUP

Aeolian sands and alluvium are fairly mobile and very porous so they not provide suitable conditions for preservation of organic matter (Cowan, 1995). Only in places where the sands have been waterlogged, such as palaeo-pans or palaeo-springs, is there any chance of fossilisation. For example, roots can be encased in calcium-rich or silica-rich sands and crusts, known as rhizoliths or rhizocretions, can form around the roots, invertebrates or bones around the margin of a pond, pan or spring (Klappa, 1980; Cramer and Hawkins, 2009; Peters et al., 2022).

From the SAHRIS map above parts of the northern area are indicated as very highly sensitive (red) for the outcrops of the Campbell Rand Subgroup in the north while most of the area is moderately fossiliferous for the Gordonia sands (green). The volcanic rocks are indicated a grey or white (zero to unknown sensitivity).

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either much too old and the wrong types to contain fossils or are not the target for prospecting. Furthermore, the material to be prospected is the volcanic rock and this does not preserve fossils. Since there is an extremely small chance that trace fossils from the Campbell Rand Subgroup may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only some contain trace fossil plants such as stromatolites. The sands of the Quaternary period would not preserve fossils but they might obscure fossils traps such as palaeo-pans or palaeo-dunes although none is visible in the satellite imagery.

Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the Gordonia Formation sands of the Quaternary. There is a very small chance that trace fossils such as stromatolites may occur in the dolomites of the Campbell Rand Subgroup so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once prospecting or mining has commenced then they

should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, so as far as the palaeontology is concerned, the prospecting permit should be authorised as long as the dolomites are avoided. If prospecting is to take place in the dolomitic areas in the north, a site visit (phase 2) palaeontology impact assessment is advisable.

v) Other matters required in terms of sections 24(4)(a) and (b) of the Act

(the EAP managing the application, must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as **Appendix 5 & 6**)

There are no alternatives, as the application area applied for is the area identified with potential for an iron, manganese, copper, lead, zink and nickel ore prospecting operation.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft environmental management programme

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

I hereby confirm that the requirements for the provision of the details and expertise of the EAP are already included in PART A, section 1(a).

Confirmed (Mark with an X)	**X**

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

I hereby confirm that the requirements to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section 1(h).

Confirmed (Mark with an X)	**X**

c) Composite Map

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

The only buffers that must be implemented is the 100m away from any fixed infrastructure like roads and the farm infrastructure in terms of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) Regulations relating to surveying, mapping and mine plans. These regulations states that a mine must take reasonable measures to ensure that –

No prospecting activities are carried out within a horizontal distance of 100 (one hundred) metres from reserve land, buildings, roads, railways, dams, waste dumps, or any other structure whatsoever including such structures beyond the prospecting boundaries, or any surface, which it may be necessary to protect in order to prevent

any significant risk, unless a lesser distance has been determined safe by risk assessment and all restrictions and conditions determined in terms of the risk assessment are complied with.

There is a 15.5m building and tree restriction on either side of the 132kV power lines which must be adhered to in all future developments and or construction. Eskom's rights are protected by Wayleave.

Also ecological buffers must be kept from all the natural drainage lines. a suitable buffer of 100 meters from the edge of the riparian zones of the ephemeral river and tributaries has been determined

Please see Final Site Map.

d) Description of impact management objectives including management statements

i) Determination of closure objectives (ensure that the closure objectives are informed by the type of environment described)

- The main closure objective of Camel Thorn Trading planned prospecting operation is to restore the site to its current land capability in a sustainable manner.
- To prevent the sterilization of any reserves.
- To prevent the establishment of any permanent structures or features except where the owners have indicated that they would prefer structures to be left.
- The prospecting operation also has the objective to establish a stable and self-sustainable vegetation cover if necessary.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability of the prospecting operation.
- To limit and manage the visual impact of the prospecting operation.
- To safeguard the safety and health of humans and animals on the prospecting operation.
- The last closure objective is that the prospecting operation is closed efficiently, cost effectively and in accordance with government policy.

ii) Volumes and rate of water use required for the operation

The operation would require about 250 litres per day for drinking water. No water for the drilling is required.

iii) Has a water use licence been applied for?

No Water will be used for the drilling operation. Only a small amount of water will be used for drinking purposes of the workers.

iv) Impact to be mitigated in their respective phases

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

ACTIVITY AND PHASE	POTENTIAL IMPACT	SIZE AND SCALE	MITIGATION OR CONTROL MEASURE RELATED TO COMPLIANCE WITH STANDARDS
Roads Construction, operational and decommissioning	Air quality Nuisance dust will be created by the drilling machine.	On-site	• Minimise the footprint of transformation, by keeping to existing roads where possible. • Ensure measures for the adherence to the speed limit to minimise dust plumes. • Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.
	Fauna Clearing of vegetation and disturbance during the construction of roads and drill pads. **Habitat fragmentation** Prospecting activities could result in the loss of connectivity and fragmentation of natural habitat, which generally leads to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This impact will be most profound if characteristics of the natural	Local and regional	• All activities associated with the prospecting operation must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so. • Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no

	watercourses are altered. However, due to the low invasive nature of drilling activities this impact is not expected to be significant. Disturbance, displacement and killing of fauna Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities. The transformation of natural habitats will result in the loss of micro habitats, affecting individual species and ecological processes. This will result in the displacement of faunal species that depend on such habitats, e.g. birds that nest in trees or animals residing in holes in the ground. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect the local populations. **Broadscale ecological processes** Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to drainage line characteristics.		go zone for employees, machinery or even visitors. • Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas. • Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint. • The extent of the prospecting activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised to do so. Areas surrounding the earmarked site that are not part of the demarcated area should be considered as a no-go zone. • However, if any of the protected species are threatened by destruction, the relevant permits should be obtained followed by the relevant mitigation procedures stipulated in the permits. • An Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance. • Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.

	Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.		• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. • Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.
	Flora Construction of roads and drill pads; vehicular movement. **Loss of indigenous vegetation** The construction of roads and drill pads will damage or destroy natural vegetation. It is expected that trampled vegetation will not be significantly affected and any destruction to	Local and Regional	• Minimise the footprint of transformation, by keeping to existing roads where possible. • Ensure measures for the adherence to the speed limit to minimise dust plumes. • Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place. • All footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities.

	natural vegetation will be at a very small scale, based on the low invasive nature of drilling activities. It is likely that areas of high ecological function will rehabilitate following such disturbance events. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species; however, traffic volumes associated with drilling activities are very low. **Loss of Red data and/or protected floral species** Removal of listed or protected plant species during the construction of roads and drill pads and/or illegal harvesting It is possible that prospecting activities will destroy protected species and other species of conservation concern through construction of drill pads and roads, vehicular movement and if any illegal harvesting occurs. Introduction or spread of alien species Clearing of vegetation and disturbance during the construction of roads and drill pads The extent of alien invasive species in the study area is unknown. However, general clearing of vegetation destroy natural vegetation, whereafter invasive plants can increase due to their opportunistic nature in		• It is recommended that these plants are identified and marked prior to intended activity. • These plants should, where possible, be incorporated into the activity layout and left in situ. • However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible. • A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • The appointment of an Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. • All those working on site must be educated about the conservation importance of the flora occurring on site. • Employ measures to ensure that no illegal harvesting takes place. • Minimise the footprint of transformation. • Encourage the growth of natural plant species.

	disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced. However, based on the low invasive nature of drilling activities, this impact is not likely to occur during the proposed operation. **Encouraging bush encroachment** Clearing of vegetation and disturbance during the construction of roads and drill pads The potential extent of bush encroaching species on site is unknown. While general clearing of the area and prospecting activities destroy natural vegetation, bush encroaching plants can increase due to their opportunistic nature in disturbed areas. If encroaching plants establish in disturbed areas, it may the lower potential for future land use and		• Mechanical methods of control to be implemented if needed. • Annual follow-up operations to be implemented.

	decrease biodiversity. With proper mitigation, the impacts can be substantially reduced and if any such species are removed during prospecting activities the prospecting operation can have a positive effect by reducing bush encroachment. Based on the low invasive nature of drilling activities, this impact is expected to be insignificant. **Broadscale ecological processes** Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics. Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level.		

	However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.		
	Surface Water **Alteration/destruction of watercourses** During construction of roads and drill grids. During prospecting activities there is a possibility that the watercourses on site (Orange River, ephemeral river, and drainage lines) might be altered or indirectly affected. This includes direct prospecting within the watercourses as well as development of roads within their channels, riparian areas, buffer zones or catchments. Such activities can completely change the hydrologic regime or habitat conditions of the watercourses, which will not only compromise their ecological functioning, but also have downstream effects. **Siltation of surface water** During clearing of an area for the construction of roads and drill grids; topsoil placement. Vegetation will be stripped in preparation for the prospecting areas and associated	On-site	• All activities associated with the prospecting operation must be planned to avoid any disturbances to the watercourses and their buffer zones. • No new roads should be created across a watercourse and no prospecting should take place in them. If this is unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected watercourses. • Bare ground exposure should always be minimised in terms of the surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased.

	infrastructure. These bare areas will be very susceptible to water erosion without plants to stabilise the soil, creating potential sediment source zones. Similarly, any topsoil stored along drainage paths create additional sediment source zones. High runoff events could potentially cause the drainage lines and rivers to be filled with silt from prospecting areas if the sediment source zones lie along the drainage paths towards these watercourses. This may lead to a change in hydrologic regime or character of the watercourses.		• No new roads or prospecting areas should be developed over watercourses. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring and to identify potential sediment source zones; followed by appropriate remedial actions.
	Ground water No impact to groundwater is expected from the roads that will be used by the planned prospecting operation. Hydrocarbon Spills Hydrocarbon spills from drill vehicles and fuel storage may contaminate the groundwater resource locally	On-site and Local	• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution. • Spill kits to clean up accidental spills from the machinery must be well marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. • All facilities where dangerous materials are stored must be contained in a bund wall. • Vehicles should be regularly serviced and maintained. • Clean & Dirty water system must be well maintained.
	Noise	On-site and Local	• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary.

	Clearing of footprint areas for drilling, stripping and stockpiling of topsoil Construction of internal Roads Additional traffic to and from the mine Prospecting activities Drilling Removal of infra-structure (Temporary Ablution facility)		• The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993. • The applicant will comply with the measures for good practice with regard to management of noise related impacts during prospecting. • The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals. • When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level. • Hearing protection will be available for all employees where attenuation cannot be implemented. • If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points. Mechanical Equipment: • All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act. • All vehicles in operation will be equipped with a silencer on their exhaust system.

			• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.
	Soil **Alteration of soil character and quality** During clearing of an area for drilling and the construction of roads. Topsoil contains living organisms and seed banks that provide ecological resilience against disturbances, and any disturbances to the intact soil profile will change its ability to sustain natural ecological functioning. Vehicles and prospecting equipment may potentially leak hazardous fluids on the soil surface, which will cause soil pollution. Apart from the direct disturbances caused by the prospecting activities, soil compaction by drill pads, heavy machinery and vehicles will cause a decrease in large pores, and subsequently the water infiltration rate into soil.	On-site	• Topsoil needs to be removed and stored separately during prospecting and the construction of roads. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • Vehicles and machinery should be regularly serviced and maintained.

	Loss of soil fertility During clearing of an area for drilling and the construction of roads. Topsoil contains living organisms that naturally regulate the ecological functioning of a habitat. Therefore, any disturbances to the intact soil profile can result in soil sterilisation which will directly affect vegetation communities. Apart from the direct disturbances caused by the prospecting activities, loss of soil fertility can also occur through soil compaction by heavy machinery and vehicles.		• Refuelling and vehicle maintenance must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. • Drip trays must be available on site and installed under all stationary vehicles. • Spill kits to clean up accidental spills from any accidental spillages must be wellmarked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up. • Any soil or area that is contaminated must be cleaned immediately by removing the soil and disposing it as hazardous waste in the correct manner. • Topsoil needs to be removed and stored separately during prospecting and the construction of roads. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other

	Soil Erosion During clearing of an area for drilling and the construction of roads, as well as natural events. Vegetation will be stripped for construction of new roads and drill grids and these areas will be bare and highly susceptible to erosion. Any topsoil can be eroded by wind, rain and flooding. Exposed sediments in the watercourses can be carried away during runoff causing downstream sediment deposition.		sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • Bare ground exposure should be minimised at all times regarding surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • No new roads or drill grids should be developed over watercourses, including drainage lines. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.
	Topography Changes to surface topography Construction of roads and drill pads as well as temporary ablution facilities	Local	• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired.

			• The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • Ground exposure should be minimised in terms of the surface area and duration. • Disturbances during the rainy season (November to March) should be monitored and controlled. • Run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.
	Visual The drill tracks will be visible to some extent from the immediate surroundings. The design of the proposed prospecting development will determine the visual impact. As the prospecting will only entail drilling the visual impact would be low.	On-site and Local	• Replacing layer of topsoil over backfilled areas; • Sloping of rehabilitated and disturbed areas; • Removal of all infrastructures upon mine closure.
Drilling operational and	Air quality Nuisance dust will be created by the drilling machine.	On-site and Local	• Minimise the footprint of transformation, by keeping to existing roads where possible. • Ensure measures for the adherence to the speed limit to minimise dust plumes.

decommissioning			• Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.
	Fauna **Habitat fragmentation** During clearing of an area for the construction of roads and drill pads. Fragmentation of habitats typically leads to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This can be in the form of small-scale fragmentation for reptiles, amphibians, and invertebrates, to more large-scale fragmentation that hinder dispersal of birds and plants. It also includes the degradation of aquatic habitats, like the ephemeral drainage channels and Orange River, which has landscape-level connectivity. Fragmentation of habitats usually results in a subsequent loss of genetic variability between meta-populations occurring within the region. Pockets of fragmented natural habitats hinder the growth and development of populations. The nature of the proposed prospecting activities is not expected to result in the significant loss of connectivity and	Local and Regional	• All activities associated with the prospecting operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave demarcated area except those authorised to do so. • Pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors. • No new roads should be created across a watercourse. • No drilling should take place in the ephemeral drainage channels or rivers. • If watercourse disturbances are unavoidable, a water use license or general authorization to alter the beds and banks of these watercourses should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected terrestrial and aquatic habitats.

	fragmentation of natural terrestrial habitats and is only possible on a local scale. However, it could have regional scale effects if any of the watercourses are severely impacted through improper construction of roads. **Disturbance, displacement and killing of fauna** Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities; intentional killing of fauna. The transformation of natural habitats will result in the loss of micro habitats, affecting individual species and ecological processes. This will result in the displacement of faunal species that depend on such habitats, e.g. birds that nest in trees or animals residing in holes in the ground or among rocks. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls due to religion, superstition, personal beliefs or fears will negatively affect their local populations.		• Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint. • The extent of the prospecting activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised. • Areas surrounding the earmarked site, not part of the demarcated area, should be considered as a no-go zone. • No prospecting should take place in the drainage lines or rivers and no new roads should be created across these watercourses. If unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • If any of the protected wildlife species are directly threatened by habitat destruction or displacement during the prospecting operation, then the relevant permits from DENC should be

			obtained followed by the relevant mitigation procedures stipulated in the permits. • Everyone on site must undergo environmental induction for awareness on not capturing or harming species that are often persecuted out of superstition or fear and to be educated about the conservation importance of the fauna occurring on site. • Reptiles, amphibians, mammals, special invertebrates, or active bird nests exposed during the clearing operations should be captured for later release or translocation by a qualified expert. • Employ measures that ensure adherence to a speed limit of 40 km/h as well as driving mindfully to lower risks of animals being killed on the roads or elsewhere on site.
	Flora **Loss of indigenous vegetation** During clearing of an area for drilling and the construction of roads. The Rietfontein and Nauga prospecting activities are expected to destroy only a very small area of natural vegetation. It is expected that the ecological functioning and biodiversity will not take too long to fully recover. Vehicle traffic and prospecting activities generate lots of dust which can	Local and Regional	• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Implement effective avoidance measures to limit any activities in the highly sensitive areas, by applying the no-go principles. • Ensure measures for the adherence to a maximum speed limit of 40 km/h to minimise dust fallout and associated effects on plants in the adjacent pristine areas.

	reduce the growth success and seed dispersal of many small plant species in the adjacent pristine areas, but considering the nature of the proposed drilling programme, this impact is expected to be negligible. **Loss of Red data and/or protected floral species** Removal of plant species of conservation concern during clearing of an area for drilling and construction of roads. Intentional removal of these plant species for non-mine related purposes, e.g. illegal plant trade, fire-wood, medicinal, ornamental purposes. There are several red listed plant species as well as numerous plant species that are provincially protected which potentially occur on the Rietfontein and Nauga Prospecting Right area (as discussed in this report). Many of the species are expected to be found in the core prospecting area and therefore it is likely that the prospecting operation will impact on their population dynamics. The most significant concern is the loss of- or damage		• Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas, where necessary. • Apply for permits to authorise the large-scale clearance of indigenous plants from DENC at least three months before such activities will commence. • The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities by means of a search-and -rescue operation. • It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout and left in situ. However, if it is unavoidable to remove such individuals, then the relevant permits from DAFF and/or DENC should be applied for at least three months before such activities will commence. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of all the rescued plants. • A management plan should be implemented to ensure proper establishment of ex situ individuals and should include a monitoring programme for at least two years after re-

	to red listed Aloidendron dichotomum, Dinteranthus pole-evansii and Tridentea virescens, as well as nationally protected trees Vachellia haematoxylon and Boscia albitrunca. It is also important to note that saplings are rarely visible during clearance operations and therefore the younger populations often get wiped out. Furthermore, any illegal harvesting of plant species of conservation concern for whatever reason by staff, contractors or secondary land users could have devastating effects on the population of these species.		establishment in order to ensure successful translocation. • The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all related disturbance and must ensure that all contractors and workers undergo environmental induction prior to commencing with work on site. Environmental inductions should occur in the appropriate languages for the workers. • All those working on site must be educated about the conservation importance of the flora occurring on site as well as the legislation relating to protected species. • Employ regulatory measures to ensure that no illegal harvesting takes place.
	Introduction or spread of alien species During clearing of an area for the drilling and construction of roads. Several weeds and invasive species have been recorded in the study region. Any anthropogenic disturbances to natural vegetation, especially the clearance of large areas of land, provide opportunities for invasive plants to increase. This is due to their opportunistic nature of dispersal and		• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Mechanical methods of control should be implemented pro-actively as soon as invasive species start to emerge. • Regular follow-up monitoring of invasive control areas needs to be implemented to ensure effective eradication.

	establishing in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the affected site, because they spread easily to neighbouring habitats where they outcompete indigenous species. Invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity as well as reduction in the ecological value and land use potential. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. The nature of the proposed prospecting activities does not generally carry a high risk for the proliferation of alien species and with proper mitigation, any potential impacts can be substantially reduced. **Encouraging bush encroachment** During clearing of an area for drilling and the construction of roads, improper rehabilitation practises. The extent of bush encroaching species on site cannot be determined through a desktop study. Bush encroachment is a natural phenomenon characterised by the excessive		• Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species. • Mechanical methods of control should be implemented pro-actively when encroaching species form dense stands. • Regular follow-up monitoring of encroached control areas needs to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

	expansion of certain indigenous shrub species at the expense of other indigenous plant species. Overgrazing is generally one of the main causes of bush encroachment, but any surface disturbances where the grassland matrix is removed can lead to the expansion of encroaching shrubs and trees. When the areas surrounding the shrubs area cleared, it causes an open niche for these competitive species to establish and outcompete the surrounding plants, eventually forming dense and impenetrable stands. This lowers the potential for future land use and decreases biodiversity. The nature of the proposed prospecting activities does not generally carry a high risk for encouraging bush encroachment.		
	Surface Water **Alteration/destruction of watercourses** During construction of roads and drill grids. During prospecting activities there is a possibility that the watercourses on site (Orange River, ephemeral river, and drainage lines) might be altered or indirectly affected. This includes direct prospecting within the watercourses as well as development of roads within their channels, riparian areas,	On-site and Local	• All activities associated with the prospecting operation must be planned to avoid any disturbances to the watercourses and their buffer zones. • No new roads should be created across a watercourse and no prospecting should take place in them. If this is unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities.

	buffer zones or catchments. Such activities can completely change the hydrologic regime or habitat conditions of the watercourses, which will not only compromise their ecological functioning, but also have downstream effects. **Siltation of surface water** During clearing of an area for the construction of roads and drill grids; topsoil placement. Vegetation will be stripped in preparation for the prospecting areas and associated infrastructure. These bare areas will be very susceptible to water erosion without plants to stabilise the soil, creating potential sediment source zones. Similarly, any topsoil stored along drainage paths create additional sediment source zones. High runoff events could potentially cause the drainage lines and rivers to be filled with silt from prospecting areas if the sediment source zones lie along the drainage paths towards these watercourses. This may lead to a change in hydrologic regime or character of the watercourses.		• Employ sound rehabilitation measures to restore characteristics of all affected watercourses. • Bare ground exposure should always be minimised in terms of the surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased. • No new roads or prospecting areas should be developed over watercourses. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring and to identify potential sediment source zones; followed by appropriate remedial actions.
	Ground water	On-site and Local	• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution.

	No impact to groundwater is expected from the roads that will be used by the planned prospecting operation. Hydrocarbon Spills Hydrocarbon spills from drill vehicles and fuel storage may contaminate the groundwater resource locally		• Spill kits to clean up accidental spills from the machinery must be well marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. • All facilities where dangerous materials are stored must be contained in a bund wall. • Vehicles should be regularly serviced and maintained. • Clean & Dirty water system must be well maintained.
	Noise Clearing of footprint areas for drilling, stripping and stockpiling of topsoil Construction of internal Roads Additional traffic to and from the mine Prospecting activities Drilling Removal of infra-structure (Temporary Ablution facility)	On-site and Local	• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary. • The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993. • The applicant will comply with the measures for good practice with regard to management of noise related impacts during prospecting. • The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals. • When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.

			• Hearing protection will be available for all employees where attenuation cannot be implemented. • If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points. **Mechanical Equipment:** • All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act. • All vehicles in operation will be equipped with a silencer on their exhaust system. • Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.
	Soil **Alteration of soil character and quality** During clearing of an area for drilling and the construction of roads. Topsoil contains living organisms and seed banks that provide ecological resilience against disturbances, and any disturbances to the intact soil profile will change its ability to sustain natural ecological functioning. Vehicles and prospecting equipment may potentially leak hazardous fluids on the soil surface, which will cause soil pollution. Apart	On-site and Local	• Topsoil needs to be removed and stored separately during prospecting and the construction of roads. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby

	from the direct disturbances caused by the prospecting activities, soil compaction by drill pads, heavy machinery and vehicles will cause a decrease in large pores, and subsequently the water infiltration rate into soil. **Loss of soil fertility**		allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • Vehicles and machinery should be regularly serviced and maintained. • Refuelling and vehicle maintenance must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. • Drip trays must be available on site and installed under all stationary vehicles. • Spill kits to clean up accidental spills from any accidental spillages must be wellmarked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up. • Any soil or area that is contaminated must be cleaned immediately by removing the soil and disposing it as hazardous waste in the correct manner. • Topsoil needs to be removed and stored separately during prospecting and the construction of roads.

	During clearing of an area for drilling and the construction of roads. Topsoil contains living organisms that naturally regulate the ecological functioning of a habitat. Therefore, any disturbances to the intact soil profile can result in soil sterilisation which will directly affect vegetation communities. Apart from the direct disturbances caused by the prospecting activities, loss of soil fertility can also occur through soil compaction by heavy machinery and vehicles.		• These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings.
	Soil Erosion During clearing of an area for drilling and the construction of roads, as well as natural events. Vegetation will be stripped for construction of new roads and drill grids and these areas will		• Bare ground exposure should be minimised at all times regarding surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • No new roads or drill grids should be developed over watercourses, including drainage lines.

	be bare and highly susceptible to erosion. Any topsoil can be eroded by wind, rain and flooding. Exposed sediments in the watercourses can be carried away during runoff causing downstream sediment deposition.		• Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions
	Topography Changes to surface topography Construction of roads and drill pads as well as temporary ablution facilities	Local	• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • Ground exposure should be minimised in terms of the surface area and duration. • Disturbances during the rainy season (November to March) should be monitored and controlled. • Run-off from exposed ground should be controlled with flow retarding barriers.

			• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.

e) Impact Management Outcomes

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

ACTIVITY	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. construction, commissioning, operational, Decommissioning, closure, post closure)	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity
Roads	Air quality	Nuisance dust will be created by the drilling machine.	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• Minimise the footprint of transformation, by keeping to existing roads where possible. • Ensure measures for the adherence to the speed limit to minimise dust plumes. • Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.
	Fauna	Fauna **Habitat fragmentation** During clearing of an area for the construction of roads and drill pads. Fragmentation of habitats typically leads to the loss of	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• All activities associated with the prospecting operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave

		migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This can be in the form of small-scale fragmentation for reptiles, amphibians, and invertebrates, to more large-scale fragmentation that hinder dispersal of birds and plants. It also includes the degradation of aquatic habitats, like the ephemeral drainage channels and Orange River, which has landscape-level connectivity. Fragmentation of habitats usually results in a subsequent loss of genetic variability between meta-populations occurring within the region. Pockets of fragmented natural habitats hinder the growth and development of populations. The nature of the proposed prospecting activities is not expected to result in the significant loss of connectivity and fragmentation of natural		demarcated area except those authorised to do so. • Pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors. • No new roads should be created across a watercourse. • No drilling should take place in the ephemeral drainage channels or rivers. • If watercourse disturbances are unavoidable, a water use license or general authorization to alter the beds and banks of these watercourses should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected terrestrial and aquatic habitats.

		terrestrial habitats and is only possible on a local scale. However, it could have regional scale effects if any of the watercourses are severely impacted through improper construction of roads. **Disturbance, displacement and killing of fauna** Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities; intentional killing of fauna. The transformation of natural habitats will result in the loss of micro habitats, affecting individual species and ecological processes. This will result in the displacement of faunal species that depend on such habitats, e.g. birds that nest in trees or animals residing in holes in the ground or among rocks. Increased noise and vibration will disturb and		• Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint. • The extent of the prospecting activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised. • Areas surrounding the earmarked site, not part of the demarcated area, should be considered as a no-go zone. • No prospecting should take place in the drainage lines or rivers and no new roads should be created across these watercourses. If unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • If any of the protected wildlife species are directly threatened by habitat destruction or displacement during the prospecting

		possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls due to religion, superstition, personal beliefs or fears will negatively affect their local populations.		operation, then the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits. • Everyone on site must undergo environmental induction for awareness on not capturing or harming species that are often persecuted out of superstition or fear and to be educated about the conservation importance of the fauna occurring on site. • Reptiles, amphibians, mammals, special invertebrates, or active bird nests exposed during the clearing operations should be captured for later release or translocation by a qualified expert. • Employ measures that ensure adherence to a speed limit of 40 km/h as well as driving mindfully to lower risks of animals being killed on the roads or elsewhere on site.
	Flora	Flora **Loss of indigenous vegetation** During clearing of an area for drilling and the construction of roads. The Rietfontein and Nauga prospecting activities are expected to destroy only a	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Implement effective avoidance measures to limit any activities in the highly sensitive areas, by applying the no-go principles. • Ensure measures for the adherence to a maximum speed limit of 40 km/h to minimise

		very small area of natural vegetation. It is expected that the ecological functioning and biodiversity will not take too long to fully recover. Vehicle traffic and prospecting activities generate lots of dust which can reduce the growth success and seed dispersal of many small plant species in the adjacent pristine areas, but considering the nature of the proposed drilling programme, this impact is expected to be negligible. **Loss of Red data and/or protected floral species** Removal of plant species of conservation concern during clearing of an area for drilling and construction of roads. Intentional removal of these plant species for non-mine related purposes, e.g. illegal plant trade, fire-wood, medicinal, ornamental purposes.		dust fallout and associated effects on plants in the adjacent pristine areas. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas, where necessary. • Apply for permits to authorise the large-scale clearance of indigenous plants from DENC at least three months before such activities will commence. • The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities by means of a search- and -rescue operation. • It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout and left in situ. However, if it is unavoidable to remove such individuals, then the relevant permits from DAFF and/or DENC should be applied

		There are several red listed plant species as well as numerous plant species that are provincially protected which potentially occur on the Rietfontein and Nauga Prospecting Right area (as discussed in this report). Many of the species are expected to be found in the core prospecting area and therefore it is likely that the prospecting operation will impact on their population dynamics. The most significant concern is the loss of- or damage to red listed Aloidendron dichotomum, Dinteranthus pole-evansii and Tridentea virescens, as well as nationally protected trees Vachellia haematoxylon and Boscia albitrunca. It is also important to note that saplings are rarely visible during clearance operations and therefore the younger populations often get wiped out. Furthermore, any illegal		for at least three months before such activities will commence. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of all the rescued plants. • A management plan should be implemented to ensure proper establishment of ex situ individuals and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all related disturbance and must ensure that all contractors and workers undergo environmental induction prior to commencing with work on site. Environmental inductions should occur in the appropriate languages for the workers. • All those working on site must be educated about the conservation importance of the flora occurring on site as well as the legislation relating to protected species. • Employ regulatory measures to ensure that no illegal harvesting takes place.

		harvesting of plant species of conservation concern for whatever reason by staff, contractors or secondary land users could have devastating effects on the population of these species. **Introduction or spread of alien species** During clearing of an area for the drilling and construction of roads. Several weeds and invasive species have been recorded in the study region. Any anthropogenic disturbances to natural vegetation, especially the clearance of large areas of land, provide opportunities for invasive plants to increase. This is due to their opportunistic nature of dispersal and establishing in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the affected site, because they		• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Mechanical methods of control should be implemented pro-actively as soon as invasive species start to emerge. • Regular follow-up monitoring of invasive control areas needs to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

		spread easily to neighbouring habitats where they outcompete indigenous species. Invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity as well as reduction in the ecological value and land use potential. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. The nature of the proposed prospecting activities does not generally carry a high risk for the proliferation of alien species and with proper mitigation, any potential impacts can be substantially reduced. **Encouraging bush encroachment**		• Mechanical methods of control should be implemented pro-actively when encroaching species form dense stands.

		During clearing of an area for drilling and the construction of roads, improper rehabilitation practises. The extent of bush encroaching species on site cannot be determined through a desktop study. Bush encroachment is a natural phenomenon characterised by the excessive expansion of certain indigenous shrub species at the expense of other indigenous plant species. Overgrazing is generally one of the main causes of bush encroachment, but any surface disturbances where the grassland matrix is removed can lead to the expansion of encroaching shrubs and trees. When the areas surrounding the shrubs area cleared, it causes an open niche for these competitive species to establish and outcompete the		• Regular follow-up monitoring of encroached control areas needs to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species. • However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible. • A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • The appointment of an Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. • All those working on site must be educated about the conservation importance of the flora occurring on site. • Employ measures to ensure that no illegal harvesting takes place.

		surrounding plants, eventually forming dense and impenetrable stands. This lowers the potential for future land use and decreases biodiversity. The nature of the proposed prospecting activities does not generally carry a high risk for encouraging bush encroachment.		• Minimise the footprint of transformation. • Encourage the growth of natural plant species. • Mechanical methods of control to be implemented if needed. • Annual follow-up operations to be implemented.
	Surface Water	**Surface Water Alteration/destruction of watercourses** During construction of roads and drill grids. During prospecting activities there is a possibility that the watercourses on site (Orange River, ephemeral river, and drainage lines) might be altered or indirectly affected. This includes direct prospecting within the watercourses as well as development of roads within their channels, riparian areas, buffer zones or catchments.	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• All activities associated with the prospecting operation must be planned to avoid any disturbances to the watercourses and their buffer zones. • No new roads should be created across a watercourse and no prospecting should take place in them. If this is unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected watercourses.

		Such activities can completely change the hydrologic regime or habitat conditions of the watercourses, which will not only compromise their ecological functioning, but also have downstream effects. **Siltation of surface water** During clearing of an area for the construction of roads and drill grids; topsoil placement. Vegetation will be stripped in preparation for the prospecting areas and associated infrastructure. These bare areas will be very susceptible to water erosion without plants to stabilise the soil, creating potential sediment source zones. Similarly, any topsoil stored along drainage paths create additional sediment source zones. High runoff events could potentially cause the drainage lines and rivers to be filled with silt from		• Bare ground exposure should always be minimised in terms of the surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased. • No new roads or prospecting areas should be developed over watercourses. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring and to identify potential sediment source zones; followed by appropriate remedial actions.

		prospecting areas if the sediment source zones lie along the drainage paths towards these watercourses. This may lead to a change in hydrologic regime or character of the watercourses.		
	Ground water	No impact to groundwater is expected from the roads that will be used by the planned prospecting operation. Hydrocarbon Spills Hydrocarbon spills from drill vehicles and fuel storage may contaminate the groundwater resource locally	Commissioning, Operational, Decommissioning, Closure	• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution. • Spill kits to clean up accidental spills from the machinery must be well marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. • All facilities where dangerous materials are stored must be contained in a bund wall. • Vehicles should be regularly serviced and maintained. • Clean & Dirty water system must be well maintained.
	Noise	Clearing of footprint areas for drilling, stripping and stockpiling of topsoil Construction of internal Roads Additional traffic to and from the mine	Construction, Commissioning, Operational, Decommissioning, Closure	• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary. • The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993.

		Prospecting activities Drilling Removal of infra-structure (Temporary Ablution facility)		• The applicant will comply with the measures for good practice with regard to management of noise related impacts during prospecting. • The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals. • When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level. • Hearing protection will be available for all employees where attenuation cannot be implemented. • If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points. Mechanical Equipment: • All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act. • All vehicles in operation will be equipped with a silencer on their exhaust system.

				• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.
	Soil	Soil Erosion Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pans and drainage line characteristics. Vegetation will be stripped for construction of new roads and drill pads and these areas will be bare and susceptible to erosion. Any topsoil and overburden that is stripped and piled on surrounding areas can be eroded by wind, rain and flooding. The soil/sediments will be carried away during runoff. The affected areas should be rehabilitated, but full restoration might only occur over a number of years, subsequent to the re-establishment of vegetation and hydrologic regime	Commissioning, Operational, Decommissioning, Closure and post closure	• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must be kept separate from sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • Any road construction over drainage lines catchments should be done to allow continuance of the natural hydrological regime. • Ground exposure should be minimised in terms of the surface area and duration. • Disturbances during the rainy season (November to March) should be monitored and controlled. • Run-off from exposed ground should be controlled with flow retarding barriers.

				• Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.
	Topography	Changes to surface topography Construction of roads and drill pads as well as temporary ablution facilities	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • Ground exposure should be minimised in terms of the surface area and duration. • Disturbances during the rainy season (November to March) should be monitored and controlled. • Run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.

	Visual	The drill tracks will be visible to some extent from the immediate surroundings. The design of the proposed prospecting development will determine the visual impact. As the prospecting will only entail drilling the visual impact would be low.	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• Replacing layer of topsoil over backfilled areas; • Sloping of rehabilitated and disturbed areas; • Removal of all infrastructures upon mine closure.
Drilling	Air quality	Nuisance dust will be created by the drilling machine.	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• Minimise the footprint of transformation, by keeping to existing roads where possible. • Ensure measures for the adherence to the speed limit to minimise dust plumes. • Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.
	Fauna	Clearing of vegetation and disturbance during the construction of roads and drill pads. **Habitat fragmentation** Prospecting activities could result in the loss of connectivity and fragmentation of natural habitat, which generally leads to the loss of migration	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• All activities associated with the prospecting operation must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so. • Those pristine areas surrounding the earmarked area that are not part of the

		corridors, in turn resulting in degeneration of the affected population's genetic make-up. This impact will be most profound if characteristics of the natural watercourses are altered. However, due to the low invasive nature of drilling activities this impact is not expected to be significant. **Disturbance, displacement and killing of fauna** Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities. The transformation of natural habitats will result in the loss of micro habitats, affecting individual species and ecological processes. This will result in the displacement of faunal species that depend on such habitats, e.g. birds that nest in trees or animals residing in		demarcated area should be considered as a no go zone for employees, machinery or even visitors. • Employ sound rehabilitation measures to restore the characteristics and habitat functionality of any affected areas. • Careful planning of the operation is needed in order to avoid the destruction of pristine habitats and minimise the overall disturbance footprint. • The extent of the prospecting activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised to do so. Areas surrounding the earmarked site that are not part of the demarcated area should be considered as a no go zone. • However, if any of the protected species are threatened by destruction, the relevant permits should be obtained followed by the relevant mitigation procedures stipulated in the permits. • An Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance. • Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be

		holes in the ground. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect the local populations. **Broadscale ecological processes** Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics. Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to		educated about the conservation importance of the fauna occurring on site. • Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. • Employ measures that ensure adherence to the speed limit to lower the risk of animals being killed on the roads.

		environmental fluctuations. The grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.		
	Flora	Construction of roads and drill pads; vehicular movement. **Loss of indigenous vegetation** The construction of roads and drill pads will damage or destroy natural vegetation. It is expected that trampled vegetation will not be	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• Minimise the footprint of transformation, by keeping to existing roads where possible. • Ensure measures for the adherence to the speed limit to minimise dust plumes. • Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place. • All footprint areas of the prospecting activities must be scanned for Red Listed and

		significantly affected and any destruction to natural vegetation will be at a very small scale, based on the low invasive nature of drilling activities. It is likely that areas of high ecological function will rehabilitate following such disturbance events. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species; however, traffic volumes associated with drilling activities are very low. **Loss of Red data and/or protected floral species** Removal of listed or protected plant species during the construction of roads and drill pads and/or illegal harvesting It is possible that prospecting activities will destroy protected species and other species of conservation concern through construction of drill pads and roads, vehicular movement		protected plant species prior to any destructive activities. • It is recommended that these plants are identified and marked prior to intended activity. • These plants should, where possible, be incorporated into the activity layout and left in situ. • However, if threatened by destruction, these plants should be removed (with the relevant permits) and relocated if possible. • A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • The appointment of an Environmental Control Officer must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. • All those working on site must be educated about the conservation importance of the flora occurring on site.

		and if any illegal harvesting occurs. **Introduction or spread of alien species** Clearing of vegetation and disturbance during the construction of roads and drill pads The extent of alien invasive species in the study area is unknown. However, general clearing of vegetation destroy natural vegetation, wherafter invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not		• Employ measures to ensure that no illegal harvesting takes place. • Minimise the footprint of transformation. • Encourage the growth of natural plant species. • Mechanical methods of control to be implemented if needed. • Annual follow-up operations to be implemented.

		controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced. However, based on the low invasive nature of drilling activities, this impact is not likely to occur during the proposed operation. **Encouraging bush encroachment** Clearing of vegetation and disturbance during the construction of roads and drill pads The potential extent of bush encroaching species on site is unknown. While general clearing of the area and prospecting activities destroy natural vegetation, bush encroaching plants can increase due to their opportunistic nature in disturbed areas. If		

		encroaching plants establish in disturbed areas, it may the lower potential for future land use and decrease biodiversity. With proper mitigation, the impacts can be substantially reduced and if any such species are removed during prospecting activities the prospecting operation can have a positive effect by reducing bush encroachment. Based on the low invasive nature of drilling activities, this impact is expected to be insignificant. **Broadscale ecological processes** Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pan- and drainage line characteristics. Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the		

		landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The grassland habitat is the most vulnerable terrestrial habitat on site in terms of cumulative disturbances. With regards to aquatic communities, the fragmentation of ephemeral drainage ways and pans will destroy connectivity of vital ecological corridors and it will disrupt the hydrological regime on a landscape level. However, due to the low invasive nature of the proposed activity the potential for cumulative impacts is not significant during the proposed prospecting operation.		
	Surface Water	**Surface Water Alteration/destruction of watercourses**	Commissioning, Operational, Decommissioning, Closure and post closure	• All activities associated with the prospecting operation must be planned to avoid any disturbances to the watercourses and their buffer zones.

		During construction of roads and drill grids. During prospecting activities there is a possibility that the watercourses on site (Orange River, ephemeral river, and drainage lines) might be altered or indirectly affected. This includes direct prospecting within the watercourses as well as development of roads within their channels, riparian areas, buffer zones or catchments. Such activities can completely change the hydrologic regime or habitat conditions of the watercourses, which will not only compromise their ecological functioning, but also have downstream effects. **Siltation of surface water** During clearing of an area for the construction of roads and drill grids; topsoil placement. Vegetation will be stripped in preparation for the		• No new roads should be created across a watercourse and no prospecting should take place in them. If this is unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected watercourses. • Bare ground exposure should always be minimised in terms of the surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased.

		prospecting areas and associated infrastructure. These bare areas will be very susceptible to water erosion without plants to stabilise the soil, creating potential sediment source zones. Similarly, any topsoil stored along drainage paths create additional sediment source zones. High runoff events could potentially cause the drainage lines and rivers to be filled with silt from prospecting areas if the sediment source zones lie along the drainage paths towards these watercourses. This may lead to a change in hydrologic regime or character of the watercourses.		• No new roads or prospecting areas should be developed over watercourses. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring and to identify potential sediment source zones; followed by appropriate remedial actions.
	Ground water	No impact to groundwater is expected from the roads that will be used by the planned prospecting operation. Hydrocarbon Spills Hydrocarbon spills from drill vehicles and fuel storage may	Commissioning, Operational, Decommissioning, Closure and post closure	• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution. • Spill kits to clean up accidental spills from the machinery must be well marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.

		contaminate the groundwater resource locally		• All facilities where dangerous materials are stored must be contained in a bund wall. • Vehicles should be regularly serviced and maintained. • Clean & Dirty water system must be well maintained.
	Noise	Clearing of footprint areas for drilling, stripping and stockpiling of topsoil Construction of internal Roads Additional traffic to and from the mine Prospecting activities Drilling Removal of infra-structure(Temporary Ablution facility)	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary. • The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993. • The applicant will comply with the measures for good practice with regard to management of noise related impacts during prospecting. • The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals. • When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level. • Hearing protection will be available for all employees where attenuation cannot be implemented.

				• If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points. **Mechanical Equipment:** • All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act. • All vehicles in operation will be equipped with a silencer on their exhaust system. • Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.
	Soil	Soil Erosion Clearing of vegetation and disturbance during the construction of roads and drill pads; alterations to pans and drainage line characteristics. Vegetation will be stripped for construction of new roads and drill pads and these areas will be bare and susceptible to erosion. Any topsoil and overburden that is stripped and piled on surrounding areas can be eroded by wind,	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must be kept separate from sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.

		rain and flooding. The soil/sediments will be carried away during runoff. The affected areas should be rehabilitated, but full restoration might only occur over a number of years, subsequent to the re-establishment of vegetation and hydrologic regime		• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • Any road construction over drainage lines catchments should be done to allow continuance of the natural hydrological regime. • Ground exposure should be minimised in terms of the surface area and duration. • Disturbances during the rainy season (November to March) should be monitored and controlled. • Run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.
	Topography	Changes to surface topography Construction of roads and drill pads as well as temporary ablution facilities	Construction, Commissioning, Operational, Decommissioning, Closure and post closure	• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.

				• Ground exposure should be minimised in terms of the surface area and duration. • Disturbances during the rainy season (November to March) should be monitored and controlled. • Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.

f) Impact Management Actions

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

ACTIVITY	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution).	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	TIME PERIOD FOR IMPLEMENTATION Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	COMPLIANCE WITH STANDARD (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Roads	Air quality	• Minimise the footprint of transformation, by keeping to existing roads where possible. • Ensure measures for the adherence to the speed limit to minimise dust plumes. • Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.	Upon the cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto.

				•Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
	Fauna	**Habitat Fragmentation** • All activities associated with the prospecting operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave demarcated area except those authorised to do so. • Pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors.	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan.

		• No new roads should be created across a watercourse. • No drilling should take place in the ephemeral drainage channels or rivers. • If watercourse disturbances are unavoidable, a water use license or general authorization to alter the beds and banks of these watercourses should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected terrestrial and aquatic habitats. **Disturbance, displacement and killing of fauna** • Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint. • The extent of the prospecting activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised. • Areas surrounding the earmarked site, not part of the demarcated area, should be considered as a no-go zone. • No prospecting should take place in the drainage lines or rivers and no new roads should be created across these		•Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial Annual performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		watercourses. If unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • If any of the protected wildlife species are directly threatened by habitat destruction or displacement during the prospecting operation, then the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits. • Everyone on site must undergo environmental induction for awareness on not capturing or harming species that are often persecuted out of superstition or fear and to be educated about the conservation importance of the fauna occurring on site. • Reptiles, amphibians, mammals, special invertebrates, or active bird nests exposed during the clearing operations should be captured for later release or translocation by a qualified expert. • Employ measures that ensure adherence to a speed limit of 40 km/h as well as driving mindfully to lower risks of animals being killed on the roads or elsewhere on site.		

	Flora	**Loss of indigenous vegetation** • Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Implement effective avoidance measures to limit any activities in the highly sensitive areas, by applying the no-go principles. • Ensure measures for the adherence to a maximum speed limit of 40 km/h to minimise dust fallout and associated effects on plants in the adjacent pristine areas. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas, where necessary. • Apply for permits to authorise the large-scale clearance of indigenous plants from DENC at least three months before such activities will commence. **Loss of Red data and / or protected floral species**	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		• The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities by means of a search-and rescue operation. • It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout and left in situ. However, if it is unavoidable to remove such individuals, then the relevant permits from DAFF and/or DENC should be applied for at least three months before such activities will commence. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of all the rescued plants. • A management plan should be implemented to ensure proper establishment of ex situ individuals and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all		

		related disturbance and must ensure that all contractors and workers undergo environmental induction prior to commencing with work on site. Environmental inductions should occur in the appropriate languages for the workers. • All those working on site must be educated about the conservation importance of the flora occurring on site as well as the legislation relating to protected species. • Employ regulatory measures to ensure that no illegal harvesting takes place. **Introduction or spread of alien species** • Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Mechanical methods of control should be implemented pro-actively as soon as invasive species start to emerge. • Regular follow-up monitoring of invasive control areas needs to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration		

		and reseeding of indigenous plant species. **Encouraging bush encroachment** • Mechanical methods of control should be implemented pro-actively when encroaching species form dense stands. • Regular follow-up monitoring of encroached control areas needs to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.		
	Surface Water	**Alteration/destruction of watercourses** • All activities associated with the prospecting operation must be planned to avoid any disturbances to the watercourses and their buffer zones. • No new roads should be created across a watercourse and no prospecting should take place in them. If this is unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities.	Upon cessation of prospecting.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees.

		• Employ sound rehabilitation measures to restore characteristics of all affected watercourses. **Siltation of surface water** • Bare ground exposure should always be minimised in terms of the surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased. • No new roads or prospecting areas should be developed over watercourses. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring and to identify potential sediment source zones; followed by appropriate remedial actions.		•The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
	Ground water	• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution.	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts;

		• Spill kits to clean up accidental spills from the machinery must be well marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. • All facilities where dangerous materials are stored must be contained in a bund wall. • Vehicles should be regularly serviced and maintained. • Clean & Dirty water system must be well maintained.		• Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
	Noise	• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary. • The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993. • The applicant will comply with the measures for good practice with regard	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's

		to management of noise related impacts during construction and operation. • The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals. • When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABC 083 as amended, in any place at or in any mine or works where persons may travel or work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level. • Hearing protection will be available for all employees where attenuation cannot be implemented. • If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points. Mechanical Equipment: • All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act. • All vehicles in operation will be equipped with a silencer on their exhaust system.		Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		• Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.		
	Soil	**Alteration of soil character and quality** • Topsoil needs to be removed and stored separately during prospecting and the construction of roads. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction.	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		• Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • Vehicles and machinery should be regularly serviced and maintained. • Refuelling and vehicle maintenance must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. • Drip trays must be available on site and installed under all stationary vehicles. • Spill kits to clean up accidental spills from any accidental spillages must be well-marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up. • Any soil or area that is contaminated must be cleaned immediately by removing the soil and disposing it as hazardous waste in the correct manner. **Loss of soil fertility** • Topsoil needs to be removed and stored separately during prospecting and the construction of roads. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure		

		that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. **Soil Erosion** • Bare ground exposure should be always minimised regarding surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.		

		• No new roads or drill grids should be developed over watercourses, including drainage lines. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.		
	Topography	• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents

		• Ground exposure should be minimised in terms of the surface area and duration. • Disturbances during the rainy season (November to March) should be monitored and controlled. • Run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.		of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
	Visual	• Replacing layer of topsoil over backfilled areas; • Sloping of rehabilitated and disturbed areas; • Removal of all infrastructures upon mine closure.	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan.

				•Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Drilling	Air quality	• Minimise the footprint of transformation, by keeping to existing roads where possible. • Ensure measures for the adherence to the speed limit to minimise dust plumes. • Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearance has taken place.	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto.

				Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
	Fauna	**Habitat Fragmentation** • All activities associated with the prospecting operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave demarcated area except those authorised to do so. • Pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors. • No new roads should be created across a watercourse. • No drilling should take place in the ephemeral drainage channels or rivers. • If watercourse disturbances are unavoidable, a water use license or general authorization to alter the beds and banks of these watercourses should	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the

		be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected terrestrial and aquatic habitats. **Disturbance, displacement and killing of fauna** • Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint. • The extent of the prospecting activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised. • Areas surrounding the earmarked site, not part of the demarcated area, should be considered as a no-go zone. • No prospecting should take place in the drainage lines or rivers and no new roads should be created across these watercourses. If unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • If any of the protected wildlife species are directly threatened by habitat		operation adheres to the contents of the EIA and EMPr documents.

		destruction or displacement during the prospecting operation, then the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits. • Everyone on site must undergo environmental induction for awareness on not capturing or harming species that are often persecuted out of superstition or fear and to be educated about the conservation importance of the fauna occurring on site. • Reptiles, amphibians, mammals, special invertebrates, or active bird nests exposed during the clearing operations should be captured for later release or translocation by a qualified expert. • Employ measures that ensure adherence to a speed limit of 40 km/h as well as driving mindfully to lower risks of animals being killed on the roads or elsewhere on site.		
	Flora	**Loss of indigenous vegetation** • Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Implement effective avoidance measures to limit any activities in the	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's

		highly sensitive areas, by applying the no-go principles. • Ensure measures for the adherence to a maximum speed limit of 40 km/h to minimise dust fallout and associated effects on plants in the adjacent pristine areas. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas, where necessary. • Apply for permits to authorise the large-scale clearance of indigenous plants from DENC at least three months before such activities will commence. **Loss of Red data and / or protected floral species** • The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities by means of a search-and rescue operation. • It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout and		Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		left in situ. However, if it is unavoidable to remove such individuals, then the relevant permits from DAFF and/or DENC should be applied for at least three months before such activities will commence. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of all the rescued plants. • A management plan should be implemented to ensure proper establishment of ex situ individuals and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all related disturbance and must ensure that all contractors and workers undergo environmental induction prior to commencing with work on site. Environmental inductions should occur in the appropriate languages for the workers. • All those working on site must be educated about the conservation		

		importance of the flora occurring on site as well as the legislation relating to protected species. • Employ regulatory measures to ensure that no illegal harvesting takes place. **Introduction or spread of alien species** • Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Mechanical methods of control should be implemented pro-actively as soon as invasive species start to emerge. • Regular follow-up monitoring of invasive control areas needs to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species. **Encouraging bush encroachment** • Mechanical methods of control should be implemented pro-actively when encroaching species form dense stands. • Regular follow-up monitoring of encroached control areas needs to be implemented to ensure effective eradication.		

		• Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.		
	Surface Water	**Alteration/destruction of watercourses** • All activities associated with the prospecting operation must be planned to avoid any disturbances to the watercourses and their buffer zones. • No new roads should be created across a watercourse and no prospecting should take place in them. If this is unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected watercourses. **Siltation of surface water** • Bare ground exposure should always be minimised in terms of the surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased.	Upon cessation of prospecting.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		• No new roads or prospecting areas should be developed over watercourses. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring and to identify potential sediment source zones; followed by appropriate remedial actions.		
	Ground water	• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution. • Spill kits to clean up accidental spills from the machinery must be well marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. • All facilities where dangerous materials are stored must be contained in a bund wall. • Vehicles should be regularly serviced and maintained. • Clean & Dirty water system must be well maintained.	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan.

				•Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
	Noise	• As a minimum, ambient noise levels emanating from the prospecting area will not exceed 82 dB (A) at the site boundary. • The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993. • The applicant will comply with the measures for good practice with regard to management of noise related impacts during construction and operation. • The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals. • When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABC 083 as amended, in any place at or in any mine or works where persons may travel or	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto.

		work, exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level. • Hearing protection will be available for all employees where attenuation cannot be implemented. • If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points. **Mechanical Equipment:** • All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act. • All vehicles in operation will be equipped with a silencer on their exhaust system. • Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/adjusted.		Biennial performance Assessment Reports and Annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
	Soil	**Alteration of soil character and quality** • Topsoil needs to be removed and stored separately during prospecting and the construction of roads. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired.	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents

		• Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • Vehicles and machinery should be regularly serviced and maintained. • Refuelling and vehicle maintenance must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. • Drip trays must be available on site and installed under all stationary vehicles. • Spill kits to clean up accidental spills from any accidental spillages must be well-marked and available on site.		of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		• Workers must undergo induction to ensure that they are prepared for rapid clean-up. • Any soil or area that is contaminated must be cleaned immediately by removing the soil and disposing it as hazardous waste in the correct manner. **Loss of soil fertility** • Topsoil needs to be removed and stored separately during prospecting and the construction of roads. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can		

		be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. **Soil Erosion** • Bare ground exposure should be always minimised regarding surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • No new roads or drill grids should be developed over watercourses, including drainage lines. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.		
	Topography	• If any topsoil is removed during creation of roads or drill pads then these stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.	Upon cessation of prospecting as the case may be.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations

		• Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • Ground exposure should be minimised in terms of the surface area and duration. • Disturbances during the rainy season (November to March) should be monitored and controlled. • Run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.		• COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. •Environmental Awareness training must be provided to employees. •The operation must have a rehabilitation and closure plan. •Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

i) Financial Provision

(1) Determination of the amount of Financial Provision

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

- The main closure objective of Camel Thorn Trading. planned prospecting operation is to restore the site to its current land capability in a sustainable manner.
- To prevent the sterilization of any reserves.
- To prevent the establishment of any permanent structures or features except where the owners have indicated that they would prefer structures to be left.
- The re-vegetation also has the objective to establish a stable and self-sustainable vegetation cover if necessary.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability of the prospecting area.
- To limit and manage the visual impact of the prospecting activities.
- To safeguard the safety and health of humans and animals on the prospecting area.
- The last closure objective is that the prospecting area is closed efficiently, cost effectively and in accordance with government policy.

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

The consultation process with interested and affected parties is ongoing (Appendix 3).

The process as described by NEMA for Environmental Authorisation was followed. See table 1 below for the identification of Interested and Affected Parties to be consulted with.

A copy of the Background Information Document with a cover letter and comments form to invite their comments was sent by registered post to the farm owners and government departments

See Appendix 3 as proof, for other interested parties to come forward and to register as interested parties in the project.

An advert was placed in the Gemsbok on 3 February 2023 to inform the public that a Prospecting Right was accepted for Camel Thorn Trading (Pty) Ltd and that any interested or affected parties must register (copy attached).

Notices were placed at the/on the fences of the farms to make all relevant parties aware of the application.

With this site notice all passers-by are requested to register and submit any written comments to be forwarded to the consultant.

A notification letter on the BAR document was send to all I & APs and the BAR will be placed at the library and municipality in Prieska for easy access by all parties, the documents will also be available on the Wadala Website.

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

The rehabilitation of land disturbed by the operation during the life of the prospecting permit will be accompanied by ongoing monitoring of the environment, until a stable state is reached. The main objectives are to have an uncontaminated, rehabilitated and safe environment, and to restore the area and habitats to a condition acceptable for obtaining a closure certificate.

Final rehabilitation of the site is expected to be within 3 years after the permit has been granted. Final rehabilitation will be executed systematically and will consist of the elements and procedures as listed below. More realistic closure elements will be fully determined by a Professional Mine Surveyor once the operation is active.
Infrastructure Areas:

On completion of the prospecting operation, the various surfaces, including the access road, storage areas and the ablution facilities, will finally be rehabilitated as follows:-

- All remaining material on the surface will be removed to the original topsoil level. This material will then be backfilled into the drill holes / depressions. Any compacted area will then be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.
- All infrastructures, equipment, and other items used during the operational period will be removed from the site.
- On completion of operations, all buildings, structures or objects on the office site will be dealt with in accordance with

Regulation 44 of the Minerals and Petroleum Resources Development Act, 2002, which states:-

3. *Regulation 44: When a prospecting right, mining right, retention permit or mining permit lapses, is cancelled or is abandoned or when any prospecting or mining operation comes to an end, the holder of such right or permit may not demolish or remove any building, structure or object –*
   - *(d) which may not be demolished or removed in terms of any other law;*
   - *(e) which has been identified in writing by the Minister for purposes of this section; or*
   - *(f) which is to be retained in terms of an agreement between the holder and the owner or occupier of the land, which agreement has been approved by the Minister in writing.*
4. *The provision of subsection (1) does not apply to bona fide mining equipment, which may be removed.*

Topsoil Deposits:

- Disposal Facilities:-
  Waste material of all description inclusive of receptacles, scrap, rubble and tyres will be removed entirely from the prospecting area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- On-going Seepage, Control of Rain Water:-
  No monitoring of ground or surface water will take place, except is so requested by the DWS – Kimberley.
- Long Term Stability and Safety:-
  It will be the objective of prospecting management to ensure the long term stability of all rehabilitated areas including the backfilled depressions. This will be done by the monitoring of all areas until a closure certificate has been issued.
- Final rehabilitation in respect of erosion and dust control:-
  Self-sustaining vegetation will result in the control of erosion and dust and no further rehabilitation is planned.

Final Rehabilitation Roads:-

- After rehabilitation has been completed, all roads will be ripped or ploughed, fertilized and seeded, providing the landowner does not want them to remain that way and with written approval from the Director: Mineral Development of the Department of Mineral Resources.

Submission of Information:-

- Reports on rehabilitation and monitoring will be submitted biennially to the Department of Mineral Resources – Welkom, as described in Regulation 55.

Maintenance (Aftercare):-

- Maintenance after closure will mainly concern the regular inspection and monitoring and/or completion of the re-vegetation programme.
- The aim of the Environmental Management Programme is for rehabilitation to be stable and self-sufficient, so that the least possible aftercare is required.
- The aim with the closure of the prospecting activities will be to create an acceptable post-prospecting environment and land-use. Therefore, all agreed commitments will be implemented by Mine Management.

After-effects Following Closure:-

- Acid Mine Drainage:-
  No potential for bad quality leach ate or acid mine drainage development exists after mine closure.
- Long Term Impact on Ground Water:-
  No after effect on the groundwater yield or quality is expected.
- Long-term Stability of Rehabilitated Land:-

One of the main aims of any rehabilitated ground will be to obtain a self-sustaining and stable end result. Cleaning of all drill chip material concurrently and replacing of topsoil where available.

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

- The removal of waste material of any description from the prospecting area and the disposal thereof at a recognised landfill facility.
- The removal of infrastructure, equipment, plant and other items from the site.
- The ripping of compacted areas to a level of 300mm and the levelling of such areas in order to re-establish a growth medium for plants (such areas will furthermore be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to the prospecting operation, if the re-establishment of vegetation is unacceptably slow.
- The backfilling of the final drill hole with drill chips and subsoil and the covering thereof with previously stored topsoil (where-after this area will also be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to the proposed operation, and seedlings

protected for a period of one) if the re-establishment of vegetation is unacceptably slow.

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

It is estimated at R 209,414.41 for the financial provision to manage and rehabilitate the environment.

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

It is hereby confirmed that the financial provision will be provided as determined.

Camel Thorn Trading will fund the operation please see the last audited financial statements to undertake prospecting operations.

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

g) Monitoring of Impact Management Actions
h) Monitoring and Reporting Frequency
i) Responsible persons
j) Time Period for Implementing Impact Management Actions
k) Mechanisms for Monitoring Compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Topography	To minimise the reduction of land capability.	To ensure that rehabilitation post-prospecting slopes are stable, free draining and no slopes have an angle in excess of 20º.	Site Manager/ Environmentalists	Monitoring will be done on an *annual basis* to ensure that the levels and the slopes are in order.
Soil	To prevent soil pollution; To limit soil compaction; To curb soil erosion; and To reinstate a growth medium able to sustain plant life.	Soil depth and chemical composition will be tested and possible erosion damage will be assisted and rectified.	Site Manager/ Environmentalists	Monitoring will be done on an *annual basis* or after a heavy rain event.
Air Quality	To control the incidence of unacceptable levels of dust pollution on site.	To ensure that the prospecting activities minimizes dust omissions, so that dust does not become a nuisance for affected parties and a health hazard.	Site Manager/Foreman appointed SHE Consultant	Visual inspections will be done and managed by dust suppression by a water tanker. Quarterly tests will also be conducted by a Safety Health and Environmental Consultant and submitted to Mine Health and Safety for monitoring purposes.
Fauna	To minimise vegetation destruction in prospecting	To ensure that the species diversity and abundance is not significantly reduces.	Site Manager/ Environmentalists	Monitoring will be done at rehabilitated area on an *annually*

	areas, and therefore a habitat for wildlife; and To eliminate poaching and the extermination of animal species within the boundaries of the study area as well as the surrounding areas.			*basis* to investigate species diversity and abundance.
Flora	To minimise the destruction of vegetation units; and To control invasion of exotic and invasive plant species.	To ensure that the rehabilitated areas become self-maintaining.	Site Manager/ Environmentalists	Monitoring will be done at the rehabilitated areas on a *twice a year basis* (mid-summer and mid-winter), where species diversity and vegetation cover will be investigated.
SOURCE ACTIVITY	**IMPACTS REQUIRING MONITORING PROGRAMMES**	**FUNCTIONAL REQUIREMENTS FOR MONITORING**	**ROLES AND RESPONSIBILITIES** (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	**MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS**
Noise and Vibration	To ensure that the legislated noise and ground vibration levels will always be adhered to. To control the incidence of unacceptable noise levels on site.	The management objective will be to reduce any level of noise, shock and lighting that may influence persons or animals, both inside the area and that which may migrate outside the area.	The manager .	Quarterly reports on fall-out dust and noise monitoring will be conducted as required by legislation. If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.
Surface Water	To conserve water; and To eliminate the contamination of run-off.	The Orange River borders the application area.	Site Manager/Water Supply	No Monitoring will take place as no water will be used for the drilling of the 12 holes only a small amount of domestic water will be transported to site daily for washing and drinking purposes.

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

Auditing of compliance with environmental authorisation, the environmental management programme and the closure plan should be conducted **biennially** by an independent EAP and an Environmental Audit Report should be compiled in such a way that it meets the requirements in terms of Regulation 34 of the National Environmental Management Act 107 of 1998): Environmental Impact Assessment Regulation, 2014. The financial quantum calculation should be done annually and submitted to the competent authority.

The rehabilitation plan should also be reviewed annually in order to fulfil the requirements of Section 41(3) of the MPRDA and should be conducted by an independent EAP. Subsequently, an Annual Rehabilitation Plan should be developed to meet the various requirements set out in the National Environmental Management Act (No 107 of 1998) (NEMA) Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).

These reports should be submitted annually to the Northern Cape DMR offices in Kimberley.

m) Environmental Awareness Plan

The objective of the environmental awareness plan is to ensure that:

- Training needs are identified and all personnel whose work may create a significant impact upon the environment have received appropriate training;
- All employees are aware of the impact of their activities
- Procedures are established and maintained to make appropriate employees aware of:
    - The significant environmental impacts (actual or potential) of their work activities and environmental benefits of improved personal performance,
    - Their roles and responsibilities in achieving conformance with environmental policies, procedures, and any implementation measures,
    - The potential consequences of departure from specified operating procedures.
- Personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and / or experience.

Environmental awareness will be part of the existing training and development plan. Key personnel with environmental responsibilities will be identified and the following principles will apply:

- Procedures will be developed to facilitate training of employees, on-site service providers and contractors;
- Environmental awareness will focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;

Top management will build awareness and motivate and reward employees for achieving environmental objectives;

- Environmental policies will be availed to mine employees and contractors;
- Environmental inductions will be conducted for employees, contractors and visitors;
- There will be an ongoing system of identifying training needs.

General environmental awareness training as part of the induction at the Camel Thorn Trading Operation should focus on the following:

- General environmental awareness
- The prospecting policies and vision concerning environmental management
- Legal requirements
- Prospecting activities and their potential impacts
- Different management measures to manage identified impacts

Prospecting personnel's role in implementing environmental management objectives and targets.

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

It is the responsibility of management to ensure that all employees, contractors and visitors are trained to understand the impacts of their tasks on the environment and to reduce them wherever possible. Environmental awareness should be part of the existing training and development plan. Key personnel with environmental responsibilities should be identified and the following principles should be applied:
Procedures should be developed to facilitate training of employees, on-site service providers and contractors;
Environmental awareness should focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;
Top management should build awareness and motivate and reward employees for achieving environmental objectives;
There should be an ongoing system of identifying training needs.
An environmental, health and safety induction programme should be provided to all employees, contractors and visitors prior to commencing work or entering the site, and they should sign acknowledgement of the induction.
An attendance register and agenda/programme should be filed for each induction.
A daily "toolbox talk" should be held prior to commencing work, which will include discussions on health, safety and environmental considerations. The

toolbox talks should be led by the site manager or the appointed supervisor/s.
Refresher training should also be given to permanent employees and long-term contractors on an annual basis, to ensure that all are competent to perform their duties, thereby eliminating negative impacts on their safety, health and environment.

General environmental awareness training as part of the induction at Camel Thorn Trading should focus on the following:

- General environmental awareness, which incorporates environmental, ecological and heritage elements;
- The mine policies and vision concerning environmental management;
- Legal requirements;
- Mine activities and their potential impacts;
- Different management measures to manage identified impacts;
- Mine personnel's role in implementing environmental management objectives and targets.

Environmental awareness topics to be covered in training should include:

- Natural resource management and conservation;
- Biodiversity awareness and conservation principles;
- Heritage resource awareness and preservation principles;
- Hazardous substance use and storage;
- Waste management; and Incident and emergency actions and reporting;

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

Air quality:
To control the incidence of unacceptable levels of dust pollution on site via dust dispersion control.

Surface water:
Alteration/destruction of watercourses

- All activities associated with the prospecting operation must be planned to avoid any disturbances to the watercourses and their buffer zones.
- No new roads should be created across a watercourse and no prospecting should take place in them. If this is unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities.
- Employ sound rehabilitation measures to restore characteristics of all affected watercourses.

Siltation of surface water

- Bare ground exposure should always be minimised in terms of the surface area and duration.
- Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased.
- No new roads or prospecting areas should be developed over watercourses.
- Disturbances during the rainy season should be monitored and controlled.
- Any potential run-off from exposed ground should be controlled with flow retarding barriers.
- Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring and to identify potential sediment source zones; followed by appropriate remedial actions.

Ground water:

Groundwater Management Plan

The mine must develop a monitoring response protocol. This protocol will describe procedures in the event that groundwater monitoring information indicates that action is required.

Natural flora:

Loss of indigenous vegetation

- Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible.
- Implement effective avoidance measures to limit any activities in the highly sensitive areas, by applying the no-go principles.
- Ensure measures for the adherence to a maximum speed limit of 40 km/h to minimise dust fallout and associated effects on plants in the adjacent pristine areas.
- Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings.
- The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas, where necessary.
- Apply for permits to authorise the large-scale clearance of indigenous plants from DENC at least three months before such activities will commence.

Loss of Red data and / or protected floral species

- The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities by means of a search-and rescue operation.
- It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout and left in situ. However, if it is unavoidable to remove

such individuals, then the relevant permits from DAFF and/or DENC should be applied for at least three months before such activities will commence.

- The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of all the rescued plants.
- A management plan should be implemented to ensure proper establishment of ex situ individuals and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.
- The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all related disturbance and must ensure that all contractors and workers undergo environmental induction prior to commencing with work on site. Environmental inductions should occur in the appropriate languages for the workers.
- All those working on site must be educated about the conservation importance of the flora occurring on site as well as the legislation relating to protected species.
- Employ regulatory measures to ensure that no illegal harvesting takes place.

Introduction or spread of alien species

- Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible.
- Mechanical methods of control should be implemented pro-actively as soon as invasive species start to emerge.
- Regular follow-up monitoring of invasive control areas needs to be implemented to ensure effective eradication.
- Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

Encouraging bush encroachment

- Mechanical methods of control should be implemented pro-actively when encroaching species form dense stands.
- Regular follow-up monitoring of encroached control areas needs to be implemented to ensure effective eradication.
- Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

Fauna:

Habitat Fragmentation

- All activities associated with the prospecting operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.

- The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave demarcated area except those authorised to do so.
- Pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors.
- No new roads should be created across a watercourse.
- No drilling should take place in the ephemeral drainage channels or rivers.
- If watercourse disturbances are unavoidable, a water use license or general authorization to alter the beds and banks of these watercourses should be obtained from DWS prior to such activities.
- Employ sound rehabilitation measures to restore characteristics of all affected terrestrial and aquatic habitats.

Disturbance, displacement and killing of fauna

- Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.
- The extent of the prospecting activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised.
- Areas surrounding the earmarked site, not part of the demarcated area, should be considered as a no-go zone.
- No prospecting should take place in the drainage lines or rivers and no new roads should be created across these watercourses. If unavoidable, a water use license or general authorization to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities.
- If any of the protected wildlife species are directly threatened by habitat destruction or displacement during the prospecting operation, then the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits.
- Everyone on site must undergo environmental induction for awareness on not capturing or harming species that are often persecuted out of superstition or fear and to be educated about the conservation importance of the fauna occurring on site.
- Reptiles, amphibians, mammals, special invertebrates, or active bird nests exposed during the clearing operations should be captured for later release or translocation by a qualified expert.
- Employ measures that ensure adherence to a speed limit of 40 km/h as well as driving mindfully to lower risks of animals being killed on the roads or elsewhere on site.

Broad-scale ecological processes

- Minimise the footprint of transformation.
- No roads should be created across a watercourse.

- No drilling should take place in the river or drainage lines. If unavoidable, a water use licence to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities.
- After such licence has been obtained, care should still be taken to minimise the footprint within each watercourse and to apply effective rehabilitation measures.

Noise and vibration:

- To control the incidence of unacceptable noise and vibration levels on site.
- There will be a shift in the immediate noise levels of the proposed activities on a temporary basis during the drilling phase. Regular feed-back to the community during the operational phase of the project.
- A system whereby complaints are recorded and investigated must be made available.

Visual (Aesthetics):

- Mitigation measures may be considered in two categories:
    - Primary measures that intrinsically comprise part of the development design through an iterative process. Mitigation measures are more effective if they are implemented from project inception when alternatives are being considered; and
    - Secondary measures designed to specifically address the remaining negative effects of the final development proposals.

- Primary measures that will be implemented should mainly be measures that minimise the visual impact by softening the visibility of the prospecting activities, by “blending” with the surrounding areas. Such measures will include rehabilitation of the disturbed areas, by re-vegetation of the area.
- During the construction phase the following mitigation measures should be implemented to minimise the visual impact.
    - Reduce the construction period through careful planning and productive implementation of resources;
    - Ensure that rubble, litter and disused construction materials are managed and removed regularly;
    - Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;
    - Reduce and control construction dust emitting activities through the use of approved dust suppression techniques;
- During operational phase, the following mitigation measures should be implemented to minimise the visual impact.
- Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;
- Rehabilitation of disturbed areas and re-establishment of vegetation;

Soils:

Alteration of soil character and quality

- Topsoil needs to be removed and stored separately during prospecting and the construction of roads.

- These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.
- Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired.
- Topsoil must not be handled when the moisture content exceeds 12 %.
- Topsoil stockpiles must by no means be mixed with sub-soils.
- The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.
- For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment.
- To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction.
- Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings.
- Vehicles and machinery should be regularly serviced and maintained.
- Refuelling and vehicle maintenance must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
- Drip trays must be available on site and installed under all stationary vehicles.
- Spill kits to clean up accidental spills from any accidental spillages must be well-marked and available on site.
- Workers must undergo induction to ensure that they are prepared for rapid clean-up.
- Any soil or area that is contaminated must be cleaned immediately by removing the soil and disposing it as hazardous waste in the correct manner.

Loss of soil fertility

- Topsoil needs to be removed and stored separately during prospecting and the construction of roads.
- These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions.
- Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired.
- Topsoil must not be handled when the moisture content exceeds 12 %.
- Topsoil stockpiles must by no means be mixed with sub-soils.
- The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.
- For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment.
- To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction.
- Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings.

Soil Erosion

- Bare ground exposure should be always minimised regarding surface area and duration.
- Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.

- No new roads or drill grids should be developed over watercourses, including drainage lines.
- Disturbances during the rainy season should be monitored and controlled.
- Any potential run-off from exposed ground should be controlled with flow retarding barriers.
- Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.

Land capability:

- To minimise the reduction of land capability.

Sensitive landscapes:

- To protect sensitive landscapes from potential negative impacts.
- Maintain buffer areas.

Surface environment - waste management:

- To ensure that the discarding of any waste material produced as a result of the proposed prospecting operation, including rubble, litter, garbage, rubbish or discards of any description, whether solid of liquid, takes place only at a site or sites demarcated for such purposes.
  To prevent waste material from being dumped within the borders or the vicinity of the prospecting area.

n) Specific information required by the Competent Authority
(Among others, confirm that the financial provision will be reviewed annually)

The holder of a right as described in the relevant sections of the MPRDA and its regulations must provide the Department of Mineral Resources (DMR) with sufficient financial provision. Officials in the DMR Regional Offices are required to assess, review and approve the quantum of financial provision submitted (that is, the monetary value of the financial provision that has been computed by the holder of a prospecting right, mining right or mining permit during the annual review) as being sufficient to cover the environmental liability at that time and for closure of the mine at that time.

The holder of a prospecting right, mining right or mining permit is required to annually assess the total quantum of environmental liability for the mining operation and to ensure that financial provision is sufficient to cover the current liability (in the event of premature closure) as well as the end-of-mine liability. It is hereby confirmed that the financial provision will be reviewed annually.

The financial provision for closure (quantum and method) will be updated annually as part of the Environmental Programme Performance Assessment; and

The closure plan must be reviewed every five (5) years, and must always keep pace with the current best practices.

2) UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports;

b) the inclusion of comments and inputs from stakeholders and I&APs;

c) the inclusion of inputs and recommendations from the specialist reports where relevant; and

d) 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.

Signature of the environmental assessment practitioner:

Wadala Mining and Consulting (Pty) Ltd

Name of company:

22 March 2023

Date:

END