mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

SCOPING REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT AND/OR BULK SAMPLING ACTIVITIES INCLUDING TRENCHING IN CASES OF ALLUVIAL DIAMOND MINING

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

NAME OF APPLICANT: **ALS MINING (Pty) Ltd**
TEL NO: **082 576 5549 (LOHAN)**
CEL NO: **082 576 5549**
FAX NO: **0**
POSTAL ADDRESS: **PO Box 2189; Kimberley; 8300**
PHYSICAL ADDRESS: **Kekewich street; Kimberley; 8301**

FILE REFERENCE NUMBER SAMRAD: **(NC) 30/5/1/2/2/10227 MR**

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.

OBJECTIVE OF THE SCOPING PROCESS

The objective of the scoping report is to, through a consultative process—

(a) identify the relevant policies and legislation relevant to the activity;
(b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
(c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
(d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
(e) identify the key issues to be addressed in the assessment phase;
(f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
(g) identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

2) Contact Person and Correspondence Address

a) Details of:-

i) Details of the EAP who prepared the report:

Name of the Practitioner:	**ROELIEN OOSTHUIZEN**
Tel No.:	**084 208 9088**
Fax No.:	**086 510 7120**
E-mail address:	roosthuizen950@gmail.com
Physical Address:	**Farm Oberon; Kimberley; 8301**
Postal Address:	**P.O. Box 110823, Hadisonpark; 8306**

ii) Appointed by:

Als Mining (Pty) Ltd

iii) Expertise of the EAP

(1) The qualifications of the EAP

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 2 (A PORTION OF PORTION 1), PORTION 4, PORTION 6 (A PORTION OF PORTION 1), PORTION 7 (A PORTION OF PORTION 1) OF THE FARM FOLMINK 331; REMAINING EXTENT OF PORTION 1, PORTION 2 (A PORTION OF PORTION 1) AND PORTION 4 OF THE FARM KLOOF FONTEIN 332; THE FARM 597 AND REMAINING EXTENT MIDDEL WATER 18 WITHIN THE ADMINISTRATIVE DISTRICT OF HAY AND PRIESKA, NORTHERN CAPE Total Extent of application area: 13 786.3431ha
Application area (Ha)	13 786.3431 ha (Thirteen thousand seven hundred and eighty-six comma three four three one hectares).
Magisterial district:	Hay and Prieska
Distance and direction from nearest town	The farms are about 40 km north west of Prieska. The proposed prospecting area falls within the Siyathemba District Municipality located at Prieska town, situated in Hay and Prieska Districts, Northern Cape, South Africa.
21 digit Surveyor General Code for each farm portion	C0310000000033100002 C0310000000033100004 C0310000000033100006 C0310000000033100007 C0310000000033200001 C0310000000033200002 C0310000000033200004 C0310000000059700000 C0600000000001800000
Locality map	Attach a locality map at a **scale not smaller than 1:250000 and attach as Appendix 2**
Description of the overall activity. **(Indicate Prospecting Right, mining Permit, Mining right, Bulk Sampling, Production Right, Exploration Right, Reconnaissance permit, Technical co-operation permit, Additional listed activity)**	ALS Mining is in the process of applying for a Mining Right for the mining of diamonds. They therefore seek to apply for an additional Environmental Authorisation for this area which will include the listed activities for a mining operation. ALS Mining is the holder of a Prospecting Right on the same property.

c) Locality map

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

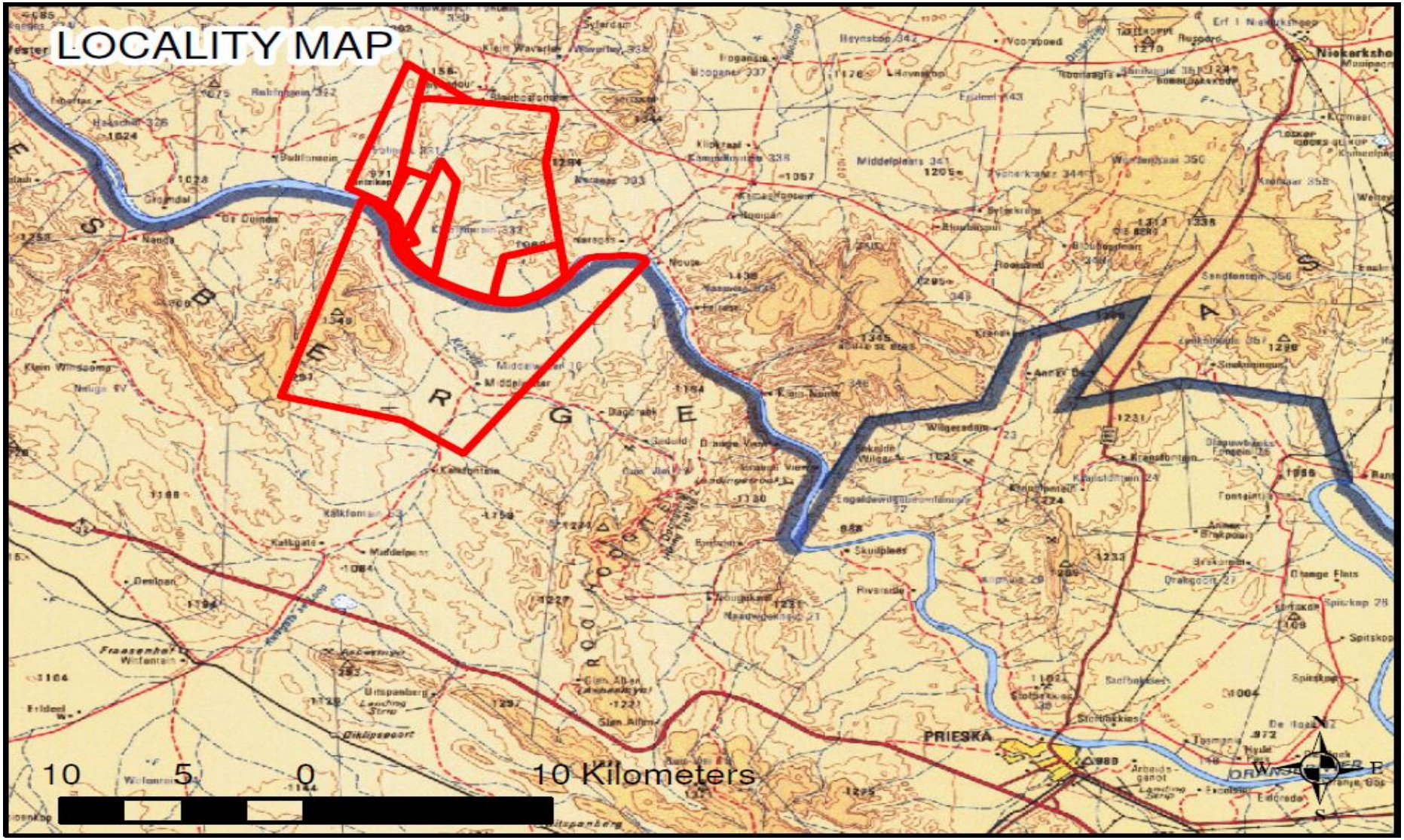

Figure 1. 1:250 000 topocadastral map KIMBERLEY 2824 indicating the application areas in red.

d) Description of the scope of the proposed overall activity

i) Listed and specified activities

(provide a plan drawn to a scale acceptable to the competent authority but not less that 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)

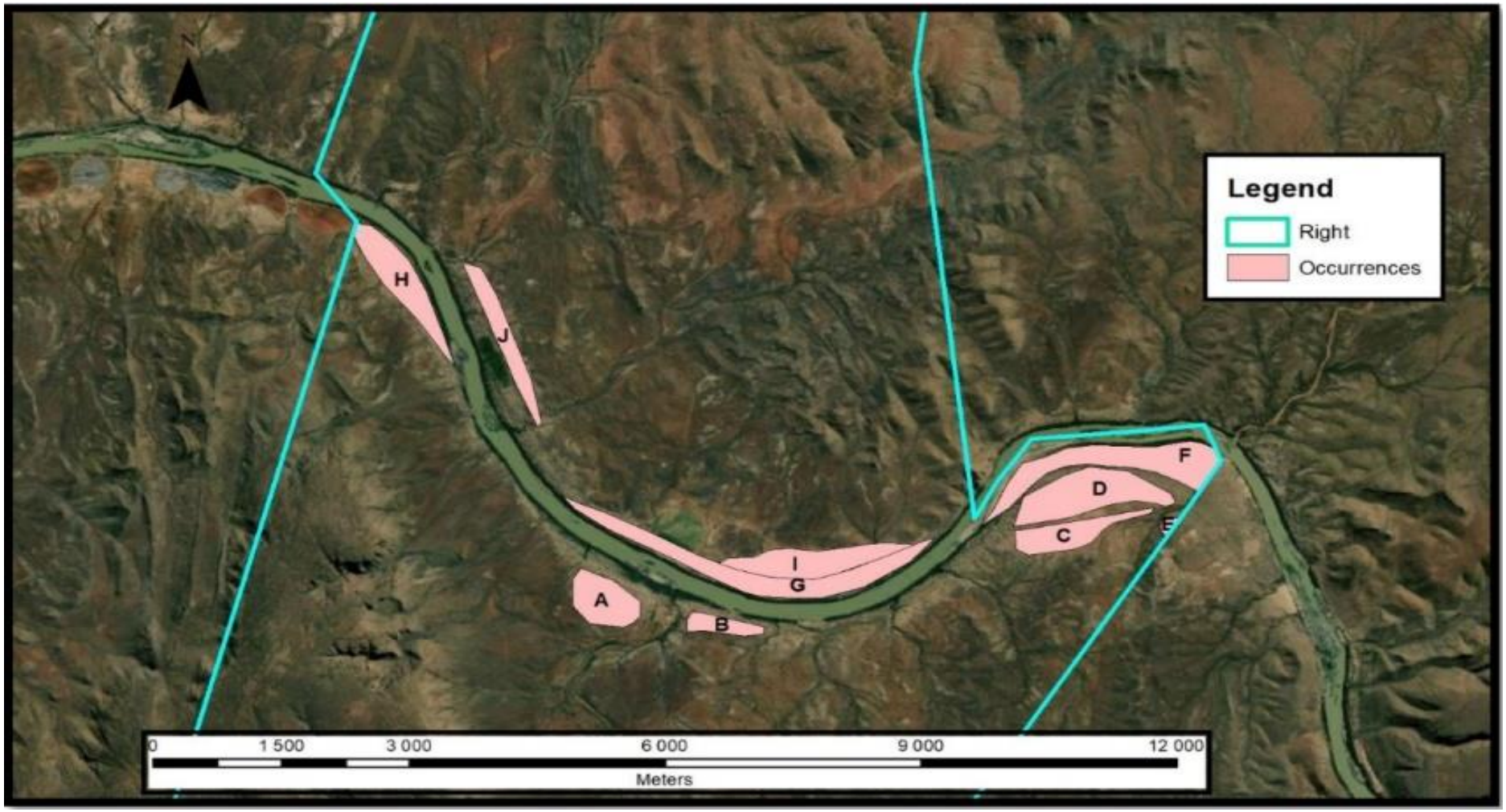

Figure 2. Location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed in site.

Table 1. Listed and Specified Activities

Name of activity (e.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	Aerial extent of the activity (Ha or m²)	Listed Activity (mark with an X where applicable or affected)	Applicable Listing Notice (GNR544, GNR545 or GNR546 / Not listed GNR983, GNR984, GNR985/ Not listed)
Activity 9: "The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- (vii) with an internal diameter of 0.36 metres or more; or (viii) with a peak throughput of 120 litres per second or more;	Water distribution Pipelines	X	NEMA: LN1 (GNR327)
Activity 12: "The development of— The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or **(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse"** Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities);	Clean and dirty water system It is anticipated that the operation will establish storm water control berms and trenches to separate clean and dirty water on the mining site.	X	NEMA: LN1 (GNR327)
Activity 13: The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic meters or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014;	Possible storage dam and tanks	X	NEMA: LN1 (GNR327)
Activity 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, **excavation, removal or moving** of	Possible excavation within the 1:100-year flood line if approval is received from DWA	X	NEMA: LN1 (GNR327)

soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;			
Activity 24: The development of a road- (ii) a road with a reserve wider than 13,5 meters or where no reserve exists where the road is wider than 8 metres.	Access and haul roads 20 000m²	X	NEMA: LN1 (GNR327)
Activity 17: Any activity including the operation of that activity which requires a **mining right** as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including – (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, crushing, screening or washing; But excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing notice 2 applies. The ALS operation directly relates to mining of a mineral resource (diamonds) and requires a mining right.	13 786.3431 ha It is anticipated that ±40 ha will be disturbed.	X	NEMA: LN2 (GNR325)
Activity 14: The development and related operation of facilities or infrastructure for the storage and handling of dangerous goods (fuel), where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic meters.	2 X 23 000l diesel tanks = 46 000l with capacity for storing of old oils and new oils to be added to calculation	X	NEMA: LN1 (GNR327)
Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding 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.	±40 ha	X	NEMA: LN2 (GNR325)

<table>
<tr>
<td>Activity 12(g): 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 list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;
ii. Within critical biodiversity areas identified in bioregional plans;</td>
<td>In terms of the Screening Report the application area falls within Critical Biodiversity Area 1 and 2 as well as Ecological Support and FEPA Sub catchments

<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>Critical biodiveristy area 2</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>
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<tr>
<td>Activity 11: The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)</td>
<td>0.3ha

The disposal of inert waste of 10 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by other legislation.

The continuous establishment and reclamation of temporary stockpiles resulting from activities which require a mining right.</td>
<td></td>
<td>NEMWA: Category B (GNR 633)</td>
</tr>
<tr>
<td>Office complexes
Temporary workshop facilities
Storage facilities
Concrete bund walls and diesel depots
Ablution facilities
Salvage Yard
Topsoil stockpiles
Overburden stockpiles</td>
<td>± 200 m2
± 300 m2
± 2 00 m2
± 250 m2
± 30 m2
±0,3 ha
± 500 m2
±500 m2</td>
<td></td>
<td>Not Listed</td>
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Water tanks	3m x 3m = 9m² each		
Waste disposal site (domestic and industrial waste): It is anticipated that the operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area: • Small amounts of low-level hazardous waste in suitable receptacles. • Domestic waste. • Industrial waste.	15m x 30m = 450m²		Not Listed

ii) Description of the activities to be undertaken

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

Basic overview of the mining method

The following is a description of the alluvial diamond mining operation, which is being utilized by Als Mining (Pty) Ltd. The mining method being employed is a strip-mining process with oversize material from the gravel scalping and the tailings from the plant, being used as backfill material prior to final rehabilitation.

Topsoil will be removed from the first block, where after it will be stored separately on the high ground of the proposed mining area. Stored topsoil will be kept separate from overburden and will not be used for the building or maintenance of access roads. Stored topsoil will be adequately protected from being eroded or blown away.

Exposed diamondiferous gravel of Block 1 will then be removed by means of an excavator onto a in-pit vibrating grizzley or scalping screen and the +32 mm oversize material is discarded back into the open pit (about 55% reduction). The screen will be moved adjacent to each pit. Once the pit is complete it will be moved to the next pit.

The remaining –32 mm fraction is, loaded and transported to the nearby treatment facility using articulated dump trucks where it is stockpiled before it is fed into the Processing Facility.

The Als Mining alluvial diamond project is located on the northern and southern banks of the Orange River, about 20km north west of the town of Prieska on Portion 2 (portion of Portion 1), Portion 4, Portion 6 (portion of Portion 1), Portion 7 (portion of Portion 1) of the farm Folmink no. 331 and the Remaining Extent of Portion 1, Portion 2 (portion of Portion 1) and Portion 4 of the farm Kloof Fontein no. 332 and Farm 597 as well as the Remaining Extent of the farm Middel Water no.18 in the Pixley Ka Seme District Municipality and approximately 232km southwest of Kimberley in the Northern Cape Province of South Africa.

Access to the area is via an all-weather well-maintained secondary dirt road between Prieska and Koegas running along the northern bank of the Orange River. The Middel Water portion of the proposed mining right area can also be reached via a well-maintained secondary dirt road off the N10 approximately 30km from Prieska towards Groblershoop.

Access to the project and the physiography are not considered risk factors in exploring and subsequent mining of the alluvial gravels. The climate is average and permits exploration and mining operations to continue all year.

The local area has a small to medium population density and labour is sourced from the surrounding towns of Prieska and Douglas. Fuel and basic supplies can be obtained at Douglas or Prieska and the property has land and mobile telephone connectivity.

Both potable and process water can be obtained in sufficient quantities from the nearby Orange River and underground sources to adequately supply the Als Mining exploration and subsequent trial mining operation.

The climate of the region is temperate with moderate summer rainfall with the highest concentration during January and February in the form of thunderstorms, allowing year-round mining activities. The area is characterised by rolling hills and outcrops inclining towards the north with no obvious obstacles to access.

Infrastructure in the area is relatively well developed with good roads, an electricity grid and water. Experienced labour is available in the area as is an extensive network of secondary industries geared towards small and large-scale diamond mining. ESKOM power is available on the farm whilst water for processing is sourced from the Orange River, which runs through the proposed mining right area. Both water and Electricity may have to be routed to where it is required which may be costly.

e) Policy and Legislative Context

Table 2. Applicable legislation and guidelines used to compile the report

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 Mining Right has been applied for (NC) 30/5/1/2/2/10227MR. - 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) - 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)	- Control measures are to be implemented upon the approval of the EMPR.

	- 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. 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 *	- A permit application regarding protected plant species need to be lodged with DENC if any protected species need to be rescued or removed. Control measures are to be implemented upon the approval of the EMPR.

<table>
<tr>
<td></td>
<td>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 fo 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)</td>
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<tr>
<td>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.</td>
<td>- Chapter 2 lists all protected areas.</td>
<td>Applicable. The mining operation does fall within protected areas which is known and also indicated by the screening report.

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<td>National Environmental Management: Waste Management Act (Act 59 of 2008)</td>
<td>- 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)</td>
<td>- To be implemented upon the approval of the EMPR.</td>
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</table>

	- 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)	
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 necessary. - 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 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	- Control measures are to be implemented upon the approval of the EMPR. Fossil finds procedure are attached to the PIA.

	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; (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; - 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)	- A water use application (WULA) must be submitted and will be submitted to run concurrently with the Mining Right application. - Control measures are to be implemented upon the approval of the EMPR.

	- 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.
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.
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 be implemented upon the approval of the EMPR.

	- 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	
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 (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

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 ALS Project is in line with the 'Beneficiation Strategy for the Minerals Industry of South Africa' (DMR, 2011) in terms of aiming to beneficiate diamonds for sale/export. The benefits of this will fall directly to the Northern Cape Province and, specifically, the Siyathemba District.

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 ALS 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.

The application is for a Mining Right over the Existing Prospecting Right of the applicant.

In order to advance the project and to prove the presence of a minable resource of diamonds ALS undertook a in depth investigation.

Drilling was undertaken by an experienced alluvial drilling contractor, Saamstaam Bore. Vertical percussion drilling was utilized, drilled in a regular grid composing 100m line spacing's and 50m borehole spacing's. Samples were collected in 1m intervals.

All boreholes were comprehensively logged by an experienced geologist, familiar with the alluvial occurrences of the Middle Orange River system – Hunter Kennedy.

Diamond mining will contribute to South Africa's status in world diamond production and Als vision is to be an active participant in the industry. Importantly it is a product that is exported and earns foreign exchange.

Should this proven reserve be mined, it would provide a significant contribution to the local community and the economy of the country.

Need

Analysis of the Diamond Industry – ALROSA(website)

The Information on the analysis of the diamond industry was obtained from the ALROSA website who is one of the biggest diamond producers in the world.

The world diamond market is represented by diamond mining and trade in rough diamonds. The bulk of the world diamond mining is concentrated in nine countries, with their share in the global production in physical terms as high as 99%.

The world's largest producers of natural diamonds are Russia, the Democratic Republic of Congo (DRC) and Botswana, all together accounting over 60% of the global diamond production.

Top Countries in the Global Diamond Production 2016: 134.1 mln. Carats

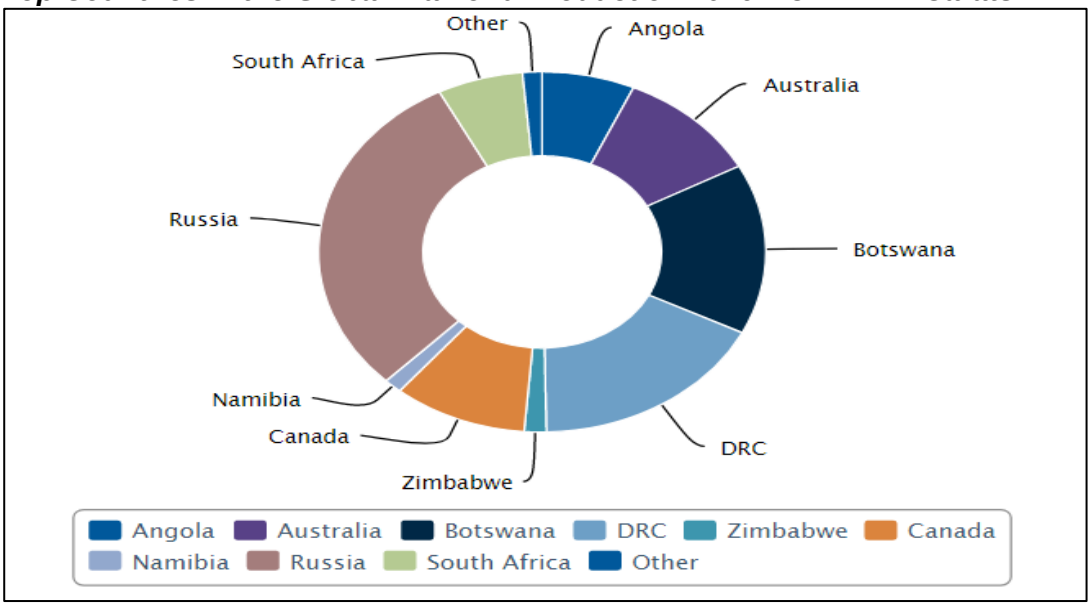


Figure 3. Kimberley Process companies' data Global Diamond Production 2011-16 (thousands of carats)

World diamond production based on the costs of produced rough diamonds are dominated by Russia, Botswana and Canada with a combined production of more than 60% of the total worldwide production.

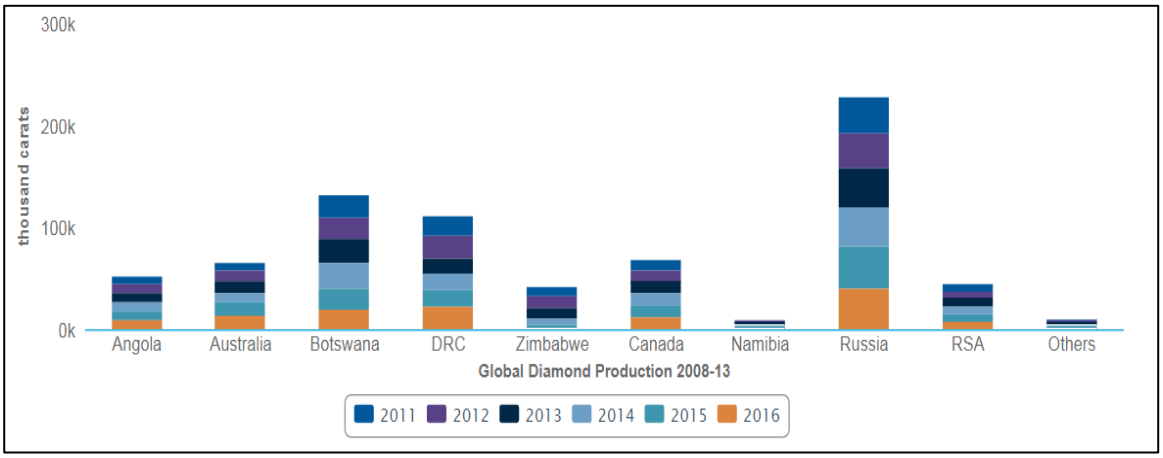


Figure 4. Global Diamond Production 2011-16 (thousands of carats) Kimberley Process companies' data

Russia ranks first in the world's diamond production. ALROSA Group accounts for 93% of the total diamond production in the Russian Federation in physical terms, and it is the leader of the global diamond mining industry. Major mining companies are engaged in mining in the main diamond-producing countries, the exception being Zimbabwe and the DRC, where diamond deposits are developed by small companies and prospectors. The graph below represents the geography of the companies' activities including exploration.

Diamond Production by Leading Companies, 2016(- including Ekati; Companies' data)***

The world's diamond mining is concentrated in the major primary deposits accounting for about 60% of the global diamond production. The remaining production is concentrated in placer deposits, the principal of them located in the DRC (Mbiji-Mayii) and Zimbabwe (Marange).

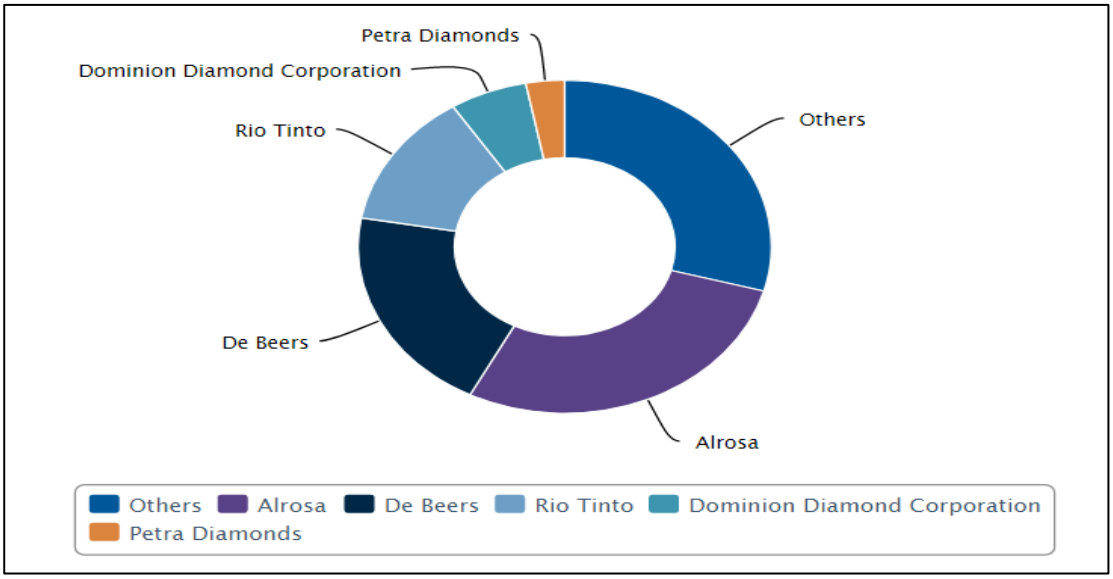


Figure 5. Diamond Production by Leading Companies, 2016(* - including Ekati; Companies' data)

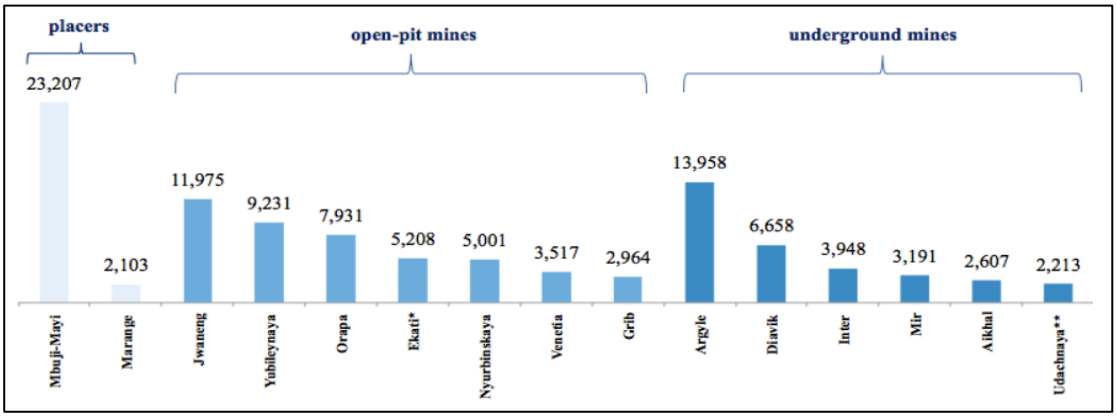


Figure 6. Production Output of the World's Major Diamond Deposits, 2016 (thousand carats) Kimberley Process and companies' data; * - Ekati includes open-pit and underground mining; ** - output, including further development of the open-pit.

By their attributes diamonds from deposits fall into two categories: gem quality and industrial grade diamonds. The former is used in diamond jewellery production, while the latter is used for industrial purposes (manufacture of drills, saws, and abrasive powders). Gem quality rough diamonds are sorted by size, colour, quality and shape, and then are sold to buyers in conformity with the sales policy adopted in a rough diamond production company. Depending on the quality of the mined rough diamonds, the current state of the market, the adopted marketing policy, companies use different approaches to diamond sales: sights, tenders, auctions, spot transactions and long-term contracts.

The world's largest trading centres, which concentrate the bulk of trade in natural rough diamonds, are India, Belgium, the UAE, the USA, Hong Kong and Israel. Being sold from mines, natural rough diamonds arrive at cutting and polishing plants to become polished diamonds that will be used in jewellery making.

(The information above was sourced from the ALROSA website. ALROSA is a world leader in the world diamond mining industry, a Russian partially state-owned diamond mining company)

The Diamond Pipeline

The Diamond Pipeline can be defined as the route the diamond takes from mine to end consumer. The diamond pipeline, typically, comprises**.**

Figure 7. The Diamond Pipeline

***Exploration/Prospecting*;** involves geologists finding diamond deposits in different areas. Prospecting is vital to the future survival of any diamond business as there is a predicted supply-demand gap.

***Mining and Recovery*;** once diamonds have been discovered and surveys shown that it is financially viable to mine them; they are now recovered from the ground. The manner in which they are mined and recovered depends on their source, thus, where they are found.
Sorting and valuing; process of sorting and valuing of diamonds, categorizing them according to size, quality, model and colour.

***Cutting and polishing*;** refers to manufacturing of diamonds; the process of turning rough diamonds into polished.

***Polished Market*;** this is referred to as the 'diamond exchange bourse', a place where diamonds are traded. These are located in some of the world's major diamond manufacturing centres, e.g. Belgium.

Retailing; polished diamonds find their way to Jewellers and Consumers through Wholesalers and Retailers.

International Diamond Market Trends and forecasts 2020 and beyond
Global financial stability has proven quite volatile over the past 4-5 years and the coronavirus pandemic has impacted severely on the demand for diamonds and diamond jewellery related to the economic fallout and it is foreseen to continue well beyond 2020.

According to Paul Zimnisky a diamond analyst global Diamond production fell by more Than 20% in 2020 to 113million carats (20%) due to planned production declines by major producers and significant pandemic related suspensions and curtailments across the industry.

Whilst much uncertainty remains regarding the severity and duration of the current situation, global diamond jewellery demand can fall as much as 25%, possibly not recovering to pre-pandemic levels until 2022 or 2023 according to Zimnisky. (Information obtained from: mining.com/diamond-industry-forecast- for-2021-and-beyond).

g) Period for which the environmental authorisation is required

The period applied for, being 14 years, based on the production calculated in the mining works programme of ALS Mining. The potential for the identification for further reserve gravels may further extend the life of mine.

h) Description of the process followed to reach the proposed preferred site

NB!! – This section is not about the impact assessment itself; It is about the determination of the specific site layout having taken into consideration (1) the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result.

The location of the mine is determined by the geological location of the mineral resource.

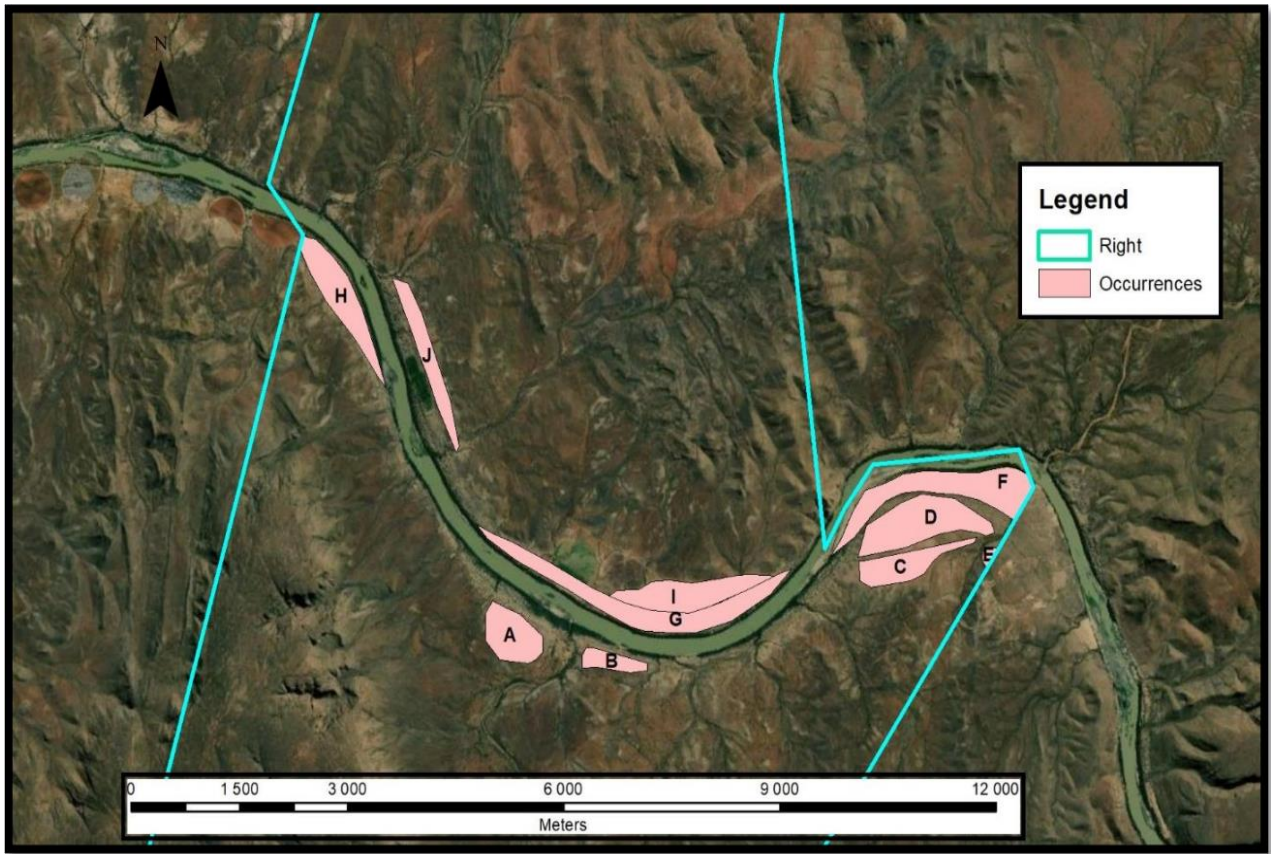


Figure 8. Property maps showing extrapolation of the inferred resources beyond nominal sample spacing.

i) Details of the development footprint alternatives considered

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

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

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

Portion 2 (a Portion van Portion 1),Portion 4, Portion 6 (a Portion of Portion 1), Portion 7 (a Portion of Portion 1) of the Farm Folmink 331; Remaining Extent of Portion 1, Portion 2 (a Portion of Portion 1) and Portion 4 van the Farm Kloof Fontein 332; The Farm 597 and Remaining Extent Middel Water 18, situated within the administrative district of Hay and Prieska in the Northern Cape Province. Magisterial District: Prieska
Extent : 13678,3431 hectares (Thirteen thousand six hundred and seventy eight comma three four three one hectares)

The property on which the Mining right was 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 area is accessible via tar and gravel roads from different directions.

Access to the area is via an all-weather well-maintained secondary dirt road between Prieska and Koegas running along the northern bank of the Orange River. The Middel Water portion of the proposed mining right area can also be reached via a well-maintained secondary dirt road off the N10 approximately 30km from Prieska towards Groblershoop. A water application was submitted to the Department of Water and Sanitation which may include a Section 21 (a), (b), (g), (i) and (c) application.

Alternatives considered:-

As the area covered under the Mining Right had been selected based on the assumption of alluvial gravels and indication of the presence of alluvial gravels, it will not be viable to consider an alternative site for the mine. Alternatives for land are thus not available, as the mining right application cannot be considered over another area.

Therefore, there are no alternatives to the area.

(a) The type of activity to be undertaken:

Currently, major land uses in the region include activities related to mining and agriculture. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep

farming, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014). Those portions on the ALS property that are not subjected to mining activities are utilised for grazing pastures. A very small proportion of the alluvial plains along the river have been under irrigation.

The planned mining technique is that of a opencast alluvial diamond mining operation with oversize material from the gravel scalping and the tailings from the plant, being used as backfill material prior to final rehabilitation. Gravels are excavated, loaded and transported to the nearby treatment facility using articulated dump trucks. **No irrigation pivots will be disturbed or mined without prior agreement from the farm owner.**

Alternatives considered: -

The mining blocks is within the target area known to carry diamonds and therefore no alternative to the application area can be considered. The only alternative land use on the area that will be selected for the processing plant is agriculture / grazing.

(b) The design or layout of the activity:

The site infrastructure will need to be strategically placed by incorporating mining project demands and environmental sensitivities identified during the Environmental Impact Assessment process. Thus, the site layout will primarily be based on proximity to the nearby access roads, proximity to the areas earmarked for mining as well as limited additional impact on the environmental (non-perrennial drainage lines, pivots the river and wind direction), heritage resources and discussions with the relevant interested and affected parties.

The following infrastructure will be established and will be associated with the mining operation outside the 1:100-year floodline zone.

- Processing Plant: Als Mining plan to open 3 sites with processing plants that may consist of both Rotary Washing Plants and or Bourevestnic Diamond Processing Plants with the associated washing and screening processes.

- Ablution Facilities: In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.

- Clean & Dirty water system: Berms
  It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site.

- Fuel Storage facility (Concrete Bund walls and Diesel tanks):
  It is anticipated that the operation will utilize 2 x 23 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place.

- Mining Area: Opencast mining to mine for alluvial diamonds.

- Roads (both access and haulage road on the mine site):
  Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the mining operation will create an additional 2 - 10 km of roads, with a width of 15 meters.

- Salvage yard (Storage and laydown area).

- Product Stockpile area.

- Waste disposal site
  The operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area:

  - Small amounts of low-level hazardous waste in suitable receptacles;
  - Domestic waste;
  - Industrial waste.

- Temporary Workshop Facilities and Wash bay.

- Water distribution Pipeline.

- Water tank :
  It is anticipated that the operation will establish 1 x 10 000 litre water tanks with purifiers for potable water.

Alternatives considered:-

Alternatives for fuel storage include surface storage, underground storage and the storage of fuel in mobile tanks with a metal bund wall. Underground storage has an adverse negative pollution potential, because it is not easy to monitor leakages. Remediation measures are also not as effective as compared to surface storage tanks. Mobile tanks are a viable option for infield screening activities, but the best viable long term option is the instalment of fuel tanks within a concrete bund wall.

In terms of processing may consist of both Rotary Washing Plants and or Bourevestnic Diamond Processing Plants with the associated washing and screening processes.

In terms of water use alternatives; the operation is located next to the Orange River and the Mining area is next to the river. Plastic pipelines are considered to be the best long term option for transferring water, due to their temporary nature which causes minimum environmental disturbances.

Therefore, a pipeline route will be designed based on the principle of minimum impacts to the environment.

In terms of power generation the options available was for Generators or ESKOM power. All of the electricity needs for the operations will be generated

by a diesel generator and there would therefore be no additional pressure on the Eskom Electricity Grid.

In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.

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

- **Technique**
  The mining method being employed is a strip mining process with oversize material from the gravel scalping and the tailings from the plant, being used as backfill material prior to final rehabilitation.

  Topsoil will be removed from the first block, where after it will be stored separately on the high ground of the proposed mining area. Stored topsoil will be kept separate from overburden and will not be used for the building or maintenance of access roads. Stored topsoil will be adequately protected from being eroded or blown away.

  Exposed diamondiferous gravel of Block 1 will then be removed by means of an excavator onto a in-pit vibrating grizzley or scalping screen and the +32 mm oversize material is discarded back into the open pit (about 55% reduction). The screen will be moved adjacent to each pit. Once the pit is complete it will be moved to the next pit.

  The remaining –32 mm fraction is , loaded and transported to the nearby treatment facility using articulated dump trucks where it is stockpiled before it is fed into the Processing Facility.

- **Technology**
  The screened material which was transported and stockpiled from the pits are loaded into a series of rotary pans or alternatively fed through Bourevestnic X-Ray Processing Plants. Tracer tests are done regularly to ensure that the pans / Bourevestnic Maschines are operating at the required effiency and accuracy. Bourevestnik Maschines may prove to be more efficient in areas where heavy minerals or iron stone are encountered which will make pan plants less efficient.

  Where the Rotary Pans are used concentrate is tapped continuously from each of the pans every three hours into a final recovery unit which is designed to use X-ray diamond recovery method.

  The following procedure will be followed in terms of backfilling and rehabilitation:

  - The coarse gravel sifted at the grizzly screen, tailings from the pans or the Bourevestnik machines and fine concentrate will be transported back to and dumped into open Block 1. During this process of backfilling, variation in the dumping sequence of different sized materials will be followed to ensure better compaction and stability of the reclaimed gravel. This will ensure that the voids surrounding the coarse gravel will be filled up with finer sediments. Compaction will be achieved through the movement of heavy vehicles over the area during the backfilling stage.

- The mining sequence will be followed until the last block is reached. Topsoil stored at the beginning of the mining operation will now be utilized for the final rehabilitation of the last block on the land portion.

Alternatives considered:-

The planned mining activities include (opencast method) with an excavator up to bedrock. The operation is also associated with processing techniques that make use of modern technologies. These are the most economic viable method currently being used by the diamond fraternity. There is no other feasible, alternative mining method for the mining and extraction of alluvial diamonds.

(d) The operational aspects of the activity:

Exposed diamondiferous gravel of Block 1 will then be removed by means of an excavator onto a in-pit vibrating grizzley or scalping screen and the +32 mm oversize material is discarded back into the open pit (about 55% reduction). The screen will be moved adjacent to each pit. Once the pit is complete it will be moved to the next pit.

The remaining –32 mm fraction is, loaded and transported to the nearby treatment facility using articulated dump trucks where it is stockpiled before it is fed into the Processing Facility.

Alternatives considered:-

The conventional opencast load-haul-mining method has been proven to be the most economic viable method currently being used by the diamond fraternity. There is no other feasible, alternative mining method for the mining and extraction of alluvial diamonds.

(e) The option of not implementing the activity:

Currently, major land uses in the region include activities related to mining and agriculture. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014). Therefore, mining activities are believed to be one of the economically beneficial options for the areas.

Socio-Economy

The operation will make provision for ±61 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.

Heritage and Cultural Resources

A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR A PROPOSED Prospecting RIGHTS APPLICATION ON THE FARMS FOLMINK 331, KLOOFFONTEIN

332, MIDDELWATER 18 AND FARM 597, CLOSE TO PRIESKA, NORTHERN CAPE PROVINCE was done by Prof. A.C. van Vollenhoven (L.AKAD.SA.) on 26 June 2018. The report is appended as Appendix 5 to this report.

Six sites of cultural heritage significance were identified during the survey. These were all found outside of the area of impact. Background information is given in order to place the surveyed area in a historical context and to contextualize possible finds that could be unearthed during mining activities.

There is limited archaeological information available of the area around Prieska. Known information is included in the discussion below.

Stone Age

The Stone Age is the period in human history when lithic material was mainly used to produce tools (Coertze & Coertze 1996: 293). In South Africa the Stone Age can be divided in three periods. It is, however, important to note that dates are relative and only provide a broad framework for interpretation. The division for the Stone Age according to Korsman & Meyer (1999: 93-94) is as follows:
Early Stone Age (ESA) 2 million – 150 000 years ago
Middle Stone Age (MSA) 150 000 – 30 000 years ago
Late Stone Age (LSA) 40 000 years ago – 1850 - A.D.

This geographical area is not well-known as one containing many prehistoric sites. One however must realize that this most likely only indicates that not much research has been done here before.

MSA lithic tools were found on the farm Bundu, some 30 km to the south-west (Kiberd 2002). LSA material have been excavated at Noute-se-Berg towards the south-east of the study area (Beaumont & Vogel 1989). These dated to 1650 BP (Beaumont & Morris 1990). At Prieska more LSA tools were excavated by Beaumont. Many Middle and Late Stone Age tools have been found by Archaetnos during surveys in the Northern Cape. These include isolated MSA and LSA stone tools found at Verdoorst Kolk, close to Brandvlei and at Kanakies close to Loeriesfontein (Archaetnos' database).

At Kenhardt, approximately 150 km north-west of the surveyed area stone tools were also identified. On the farm Konkooksies 91 in the Pofadder district, five sites with Middle and Late Stone Age tools were identified (Archaetnos database). Rock engraving (rock pecking) sites are known from the nearby Putsonderwater (Archaetnos database). Rock engravings are associated with the Late Stone Age people.
The mentioned Late Stone Age sites are associated with the San people. Mitchell (2002: 126) indicates that the language group who occupied the Northern Cape is the /Xam. These people were hunters and gatherers which means that they would have moved around, leaving little trace of their existence. The Hantam,

Namaqualand and Bushmanland were of the last regions of the Cape Province to be settled by early European farmers. The result was that it became a last outpost of the /Xam Bushman who still hunted and gathered there in the last decades of the 19th Century (Deacon 1986, 1997).

Isolated MSA and LSA tools were found scattered throughout the surveyed area. This indicates the presence of these people during the Stone Age.
From the above mentioned it is clear that Stone Age people did utilize the area by settling and probably hunting and gathering in it. The environment definitely would be supportive to Stone Age activities. The hills most likely would have given natural shelter and material to make stone tools from. These volcanic intrusions definitely give material suitable for the manufacture of lithic tools. Although the large flat surrounding area would not have given shelter, it must have been a prime hunting area.

Iron Age
The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artifacts (Coertze & Coertze 1996: 346). In South Africa it can be divided in two separate phases according to Van der Ryst & Meyer (1999: 96-98), namely:
Early Iron Age (EIA) 200 – 1000 A.D.
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however, indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:
Early Iron Age (EIA) 250 – 900 A.D.
Middle Iron Age (MIA) 900 – 1300 A.D.
Late Iron Age (LIA) 1300 – 1840 A.D.

No Early or Middle Iron Age sites have been identified in the area of study. Iron Age people occupied the central and eastern parts of southern Africa from about 200 A.D., but the San and Khoi remained in the western and southern parts (Inskeep 1978: 126; see also Huffman 2007).

During the Late Iron Age (LIA), people stayed in extensive stonewalled settlements, such as the Thlaping capital Dithakong, 40 km north of Kuruman. Sotho-Tswana and Nguni societies, the descendants of the LIA mixed farming communities, found the region already sparsely inhabited by the Late Stone Age (LSA) Khoisan groups, the so-called 'first people'. Most of them were eventually assimilated by LIA communities and only a few managed to survive, such as the Korana and Griqua. This period of contact is sometimes known as the Ceramic Late Stone Age and is represented by the Blinkklipkop specularite mine near Postmasburg and finds at the Kathu Pan (De Jong 2010: 36). It is also known that Late Iron Age people did utilize the area close to the Orange River, albeit briefly, as they did mine copper in the Northern Cape (Inskeep 1978: 135). Iron Age people therefore did not settle in the

study area. It therefore is no surprise that no such sites were identified during the survey.

Historical Age

The historical age started with the first recorded oral histories in the area. It includes the moving into the area of people that were able to read and write. This era is sometimes called the Colonial era or the recent past. Due to factors such as population growth and a decrease in mortality rates, more people inhabited the country during the recent historical past. Therefore, and because less time has passed, much more cultural heritage resources from this era have been left on the landscape.

It is important to note that all cultural resources older than 60 years are potentially regarded as part of the heritage and that detailed studies are needed to determine whether these indeed have cultural significance. Factors to be considered include aesthetic, scientific, cultural and religious value of such resources.

Such sites include the many historical buildings and structures indicated on the SAHRA database such as a British blockhouse in Prieska as well as buildings in Kakamas, Keimoes, Loeriesfontein and Brandvlei (SAHRA Database). These sites are associated with the early missionaries, travelers, first white farmers and establishment of towns during the 19th century.

From the 1880's onwards colonial settlement was promoted in the area. Government-owned land was surveyed and divided into farms, which were transferred to farmers. Surveyors were given the task of surveying and naming some of the many farms in this region. These farms were allocated to prospective farmers, but permanent settlement only started in the late 1920s and the first farmsteads were possibly built during this period. The region remained sparsely populated until the advent of the 20th century (De Jong 2010: 36).

Most of the farms in the broader geographic region were still Government farms and were leased to farmers in 1875 (Van Zyl 2010: 13). It seems as if shortly hereafter farms were sold to individuals. The above-mentioned information means that the buildings on these farms could only have been built after the mid-19th century and most likely after 1875.

As indicated six sites have been identified. None of these will directly be impacted on by the proposed prospecting activities. However, secondary impact, e.g. dust may be experienced, and the developers need to be aware of these sites in order to steer well clear thereof.

Site 1 – Terraced stone walling/ weir

The site consists of parallel stone walling forming a weir in a dry river bed, with associated stone walling along the river. The highest of the remaining walls is approximately 1 m high.

GPS: 29°22'24.3"S
22°31'37.1"E

Site 2 – Farm yard
The site consists of a house and various outbuildings and other related farm features. It is in a dilapidated condition and probably roundabout 60 years of age (dating to the 1960s).
GPS: 29°26'07.7"S
22°31'38.8"E

Site 3 – Lower grinding stone
This is not an actual site by an isolated lower grinding stone. It is similar to those used during the Iron Age for grinding sorghum. This one however also have paintings on which seems to have been done fairly recently. It may therefore be totally out of context.
GPS: 29°25'35.2"S
22°30'34.9"E

Site 4 – whetstone
This again is not an actual site by an isolated find, namely a whetstone. It was probably used during the Stone Age to sharpen arrow heads. Nothing else was noted in its vicinity and therefore it may be totally out of context.
GPS: 29°24'12.5"S
22°30'25.1"E

Site 5 – Grave yard
This is a grave yard consisting of at least three graves. These are all stone packed and two of them have headstones. No legible information is available. There is also nothing else of cultural heritage value in the vicinity. It is therefore believed to be the graves of travelers or people who died during the time the farm was used for winter grazing.
All the graves are therefore unknown graves. These should be dealt with as heritage graves (older than 60 years).
GPS: 29°23'37.4"S
22°30' 29.8"E

Site 6 – farmhouse and stone kraal
The site consists of a house with four rooms, built from stone as well as an associated kraal. It may be the first permanent building on the farm and probably dates back to the late 19th/ early 20th century. The windows of the house have been closed up by stones, an indication that it later-on received another function, probably a storeroom.
GPS: 29°22'20.2"S
22°31'33.9"E

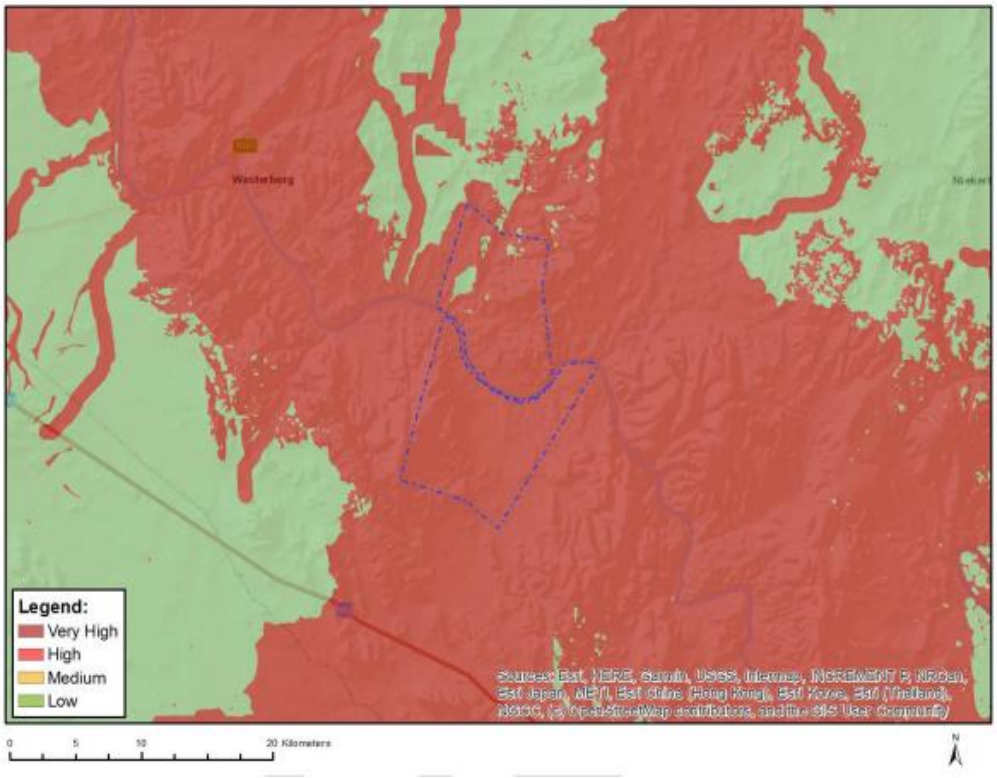
Should any other heritage features and/or objects be located or observed, a heritage specialist will be contacted immediately. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that a

heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. If the prospecting operation is approved, the heritage resources if any other had been encountered will be protected through the demarcation of no-go zones and fencing off.

Biodiversity

In terms of the screening tool that had been done for the mining right application the application area falls into Critical Biodiversity Area 1 and 2 as well as ecological support areas and Freshwater ecosystem priority area quinary catchments. The necessary specialist studies will be done to confirm this.

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	Critical biodiveristy area 1
Very High	Critical biodiveristy area 2
Very High	Ecological support area
Very High	FEPA Subcatchments

Figure 9. Map of relative terrestrial biodiversity in terms of the screening tool.

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 as described by NEMA for Environmental Authorisation was followed and is still in process. The following steps were already taken:

- Notification letters were sent to all interested and/or affected parties on the 4 July 2023. Attached to each of these letters was a Draft Scoping report, containing information relating to the proposed project for comments.
- A newspaper advert will be placed in the Kathu Gazette on 7 July 2023.
- Notices were placed at the entrances to the farms and in Prieska at the Library and Municipality.

Proof of notification and consultation is attached as Appendix 3. The consultation process is still in process.

Summary of issues raised by I&APs

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

Table 3. Consultation with I&Aps

PLEASE SEE ATTACHED AS 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)

- ***GEOLOGY:***

Regional Geology

The bedrock of the Orange River valley between the confluence of the Vaal River and the Orange and Prieska, referred to as the Middle Orange, is dominated by flat-lying Dwyka tillite and siltstone of the Karoo Supergroup. These sediments were deposited by the Dwyka icesheet, with a flow direction from the north-east, in a broad valley roughly corresponding with the present Vaal-Orange system.

The Dwyka comprises matrix supported diamicite with pebbles and boulders of both local and transported lithologies, set in a rock-flour matrix, together with dropstone-bearing mudstones, shales and silts. Underlying the Dwyka, and exposed where the Orange has incised through that sequence, are lavas and pyroclastics of the Ventersdorp Supergroup, overlain in places by sediments of the Transvaal Supergroup, comprising shales, quartzites and dolomites. The bedrock is cut in places by faults and dolerite sheets, which are rarely exposed and can only, be mapped using geophysics. The surface on which the Dwyka was deposited was irregular with several topographic highs (presumed to be roches moutonnes) and glacially striated surfaces.

The present surface of the Dwyka comprises a gently undulating terrain lying at an elevation of between 1,050m and 1,100m amsl. The river has incised into this surface to a depth of between 90m and 150m. Owing to the irregularity of the pre-Dwyka surface, several reaches of the river are superimposed on pre-Dwyka topographic highs, which due to their relative resistance to erosion, give rise to more rugged topography. Here the Orange River is confined to gorges with increased river gradients. In contrast, the easily-eroded Dwyka has been dissected by minor tributaries of the Orange River, giving rise to trellis-type drainage pattern. To the north of the Orange River, the Ghaap Plateau represents an ancient surface of Transvaal Supergroup rocks.

Local Geology

The present drainage of the region consists of the Vaal-Harts River from the north-east, and the Orange River from the south-east. There is, however, strong

evidence that a major drainage, flowing along the eastern face of the Ghaap Plateau, entered the system in the vicinity of Oranjeoord, approximately 20km downstream from the Vaal-Orange confluence, during the Miocene-Pliocene.

It is suggested that this substantial river may have had as much as four times the discharge of the Orange River. Given that the area was already relatively arid, the river must have had a large catchment area, McCarthy (1983) suggesting that it had the upper Zambezi, Okavango and Kwando Rivers as tributaries. The upper Limpopo may also have flowed into the system during the Miocene-Pliocene. The alluvial diamonds of the Middle Orange have several probable primary source areas:-- the diamondiferous kimberlites of Lesotho, eroded by the present Orange River; diamonds from the same source as the Lichtenburg – Western Transvaal diamondfields, eroded by the Vaal-Harts system; diamonds derived from the kimberlites of the Kimberley area; and diamonds from Botswana and the Postmasburg fields, including the Finsch kimberlite, eroded by the palaeo-drainage note above.

A terrace deposit is defined as an alluvial package of sediments in a braided river environment. Subsequent incision by the river at times of less energetic flow cuts into the braided deposits, leaving them perched above current river level. If this incision takes place in the centre of the valley-fill, terraces will be developed on both banks of the river. If incision is accompanied by lateral migration, as is often the case, the terrace is restricted to one bank only. Therefore, "terrace" is a morphological term, and the terrace can display any or all of the typical braided stream features, such as splays, chute bars, point bars, channels, sand banks. The terrace initially preserves the morphology of the braided river deposits, but later erosion can dissect or totally remove the terrace. On a regional scale, the terraces tend to have an elongated sheet-like shape, with an overall gentle gradient downstream, but this gradient can be stepped at barriers across the river valley, such as lithological changes in bedrock, cross dykes, etc. Consequently, contemporaneous terraces can be deposited at differing elevations, and conversely, terraces at the same elevation were not necessarily deposited during the same cycle, at the same time.

Several attempts have been made to correlate named terraces along the Vaal and middle Orange Rivers using the base elevations, both above sea level and above the present river level, of the various deposits. These attempts at correlation have met with limited success. In addition to the problem of stepping, no allowance can be made for post-depositional regional warping. Subsequent differential incision of the river into the terrace platform can also render the latter approach doubtful. The descriptions of the gravels given here are composite of information taken from McCarthy (1998).

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study 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 in 2018 (Appendix 4). This study will be revised to include impacts for the proposed mining operation.

According to Thomas (1995) the geological features on the ALS property are very complex, but primarily comprise Quaternary and Vaalian deposits (Figure 10). Red windblown sand covers a portion in the south-east, among Campbell Rand dolomite and limestone of the Griqualand West Supergroup. In the south-west, Kuruman banded iron-stone and finely laminated shale of the Asbestos Hills Formation is prominent, while the north-east is dominated by Ongeluk basaltic andesites of Griqualand West Supergroup as well as shale and siltstone of the Naragas Formation (Figure 10). A large portion in the centre of the property south of the river as well as areas north-west of the river is covered with scree and surface rubble (Figure 10). South-east of the river, blue riebeckitic jaspelite of the Daniëlskuil Formation as well as outcrops of the Kameelfontein Formation is present. Green mudstone of the Pannetjie Formation is found directly south of the river among some alluvium deposits. The most significant alluvium deposits are however found north of the Orange River channel. These will primarily be the focus of the prospecting operation.

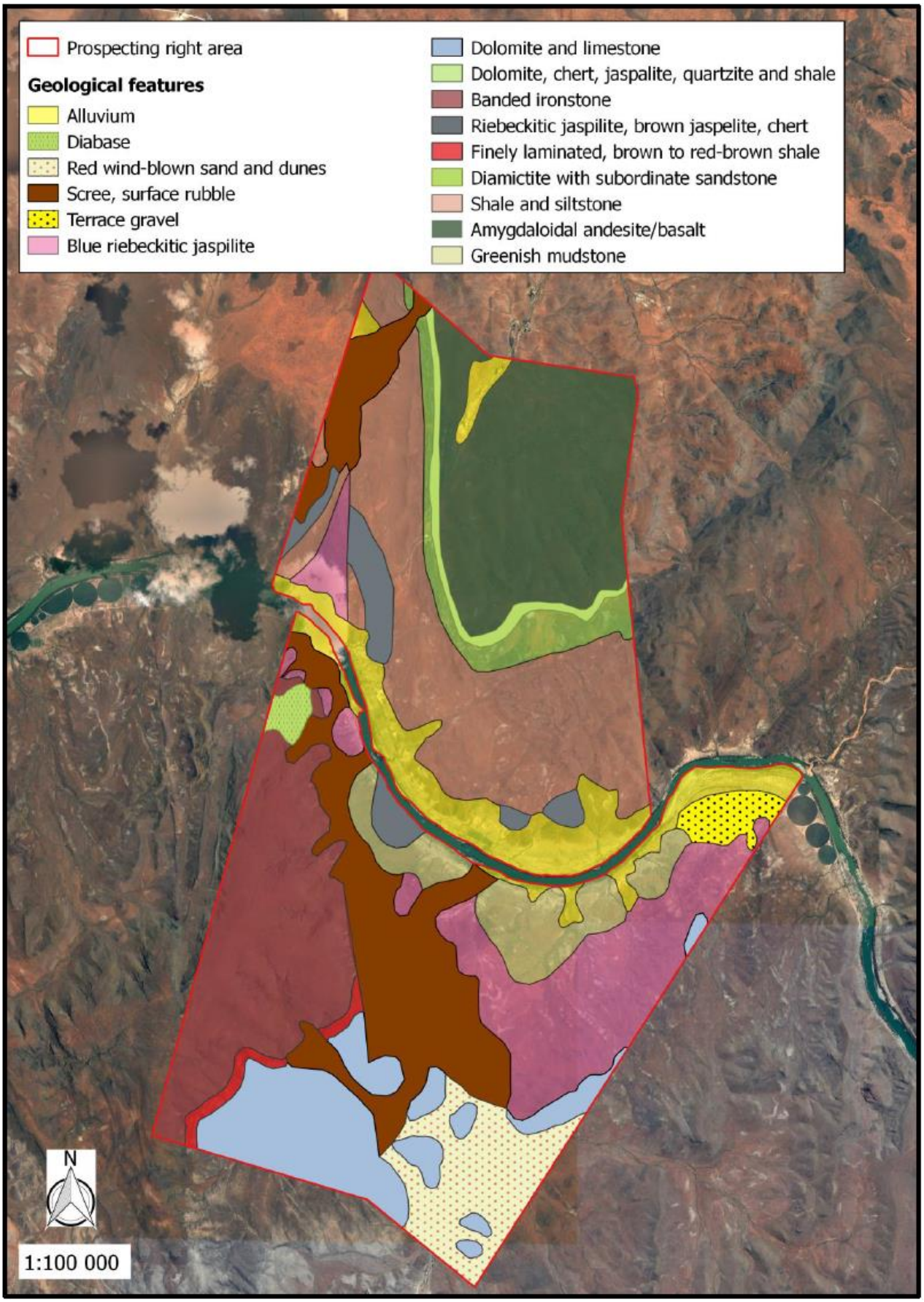


Figure 10. The distribution of geological features in the study area. (Map taken out of the ecological study by Boscia Ecological Consultants by Dr Betsie Milne).

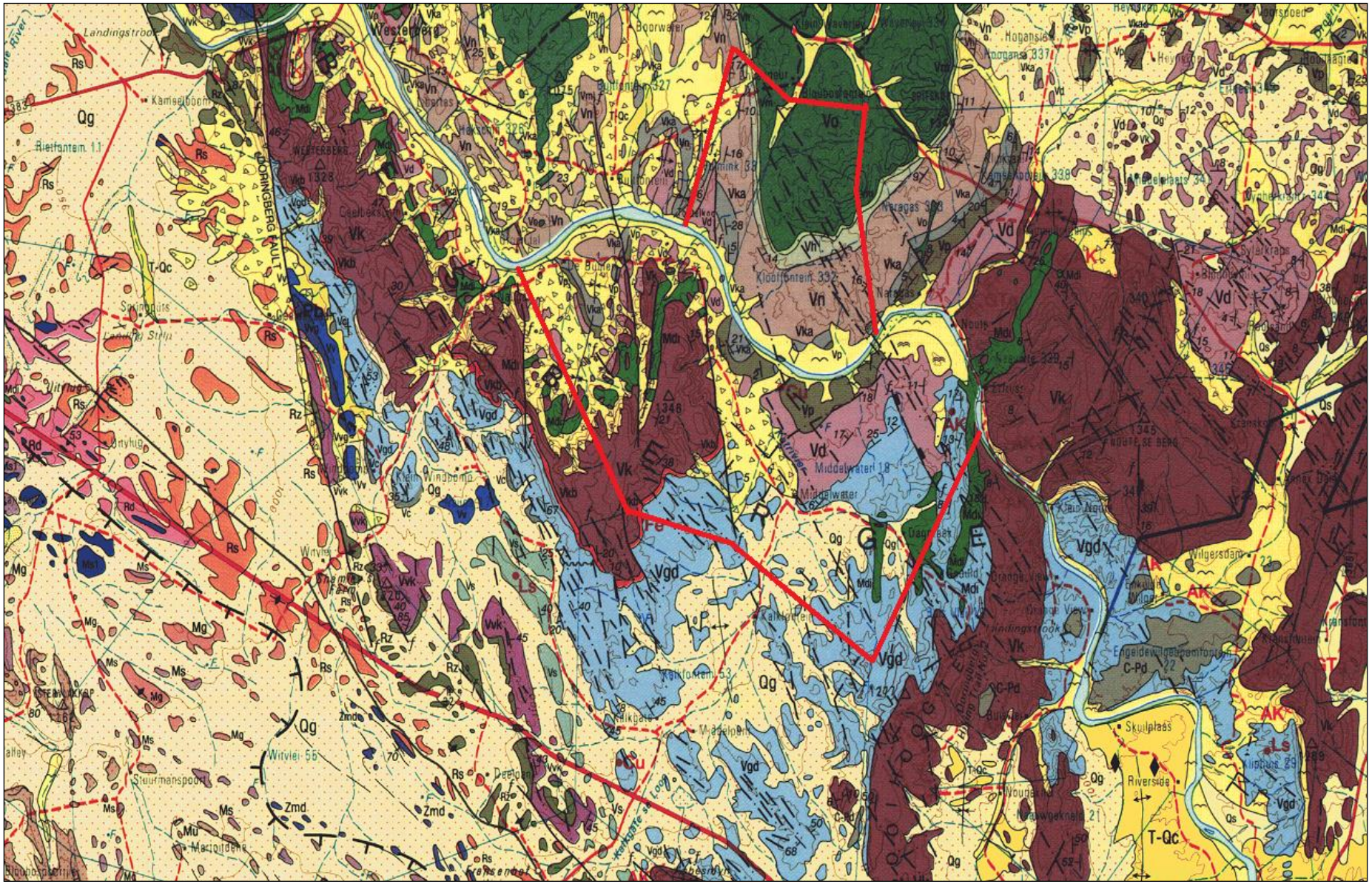


Figure 11. Extraction of Geological Map Prieska 2922 1:250 000

- ***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 metres 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 Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study 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 in 2018 (Appendix 4). This study will be revised to include impacts for the proposed mining operation.

The area is characterized by rugged terrain, with irregular hills and ridges that slope towards the Orange River. The altitude ranges from 909 m near the river to 1 345 m above sea level on the hilltops. The terrain is indicated by a gentle slope of 3 % on the ridge slopes and very steep slopes of 60 % around the hilltops. Land types found on the property include Ae211k, Ag116t, Ag130a, Ag140a, Fb383a, Fb388a, Fb378g, Ib340a, Ib341e and Ib341l. The core prospecting area is, however, closely associated with land type Fb383a. Here, Glenrosa and/or Mispah forms are primarily found with lime being rare or absent in upland soils but generally present in low-lying soils. (Ecological report by Dr. B Milne, 2018).

SOILS:

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study 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 in 2018 (Appendix 4). This study will be revised to rate impacts for the proposed mining operation.

The Soils of the study area have been described by Dr. Milne as According to Thomas (1995) the geological features on the ALS property are very complex, but primarily comprise Quaternary and Vaalian deposits. Red windblown sand covers a portion in the south-east, among Campbell Rand dolomite and limestone of the Griqualand West Supergroup. In the south-west, Kuruman banded iron-stone and finely laminated shale of the Asbestos Hills Formation is prominent, while the north-east is dominated by Ongeluk basaltic andesites of Griqualand West Supergroup as well as shale and siltstone of the Naragas Formation. A large portion in the centre of the property south of the river as well as areas north-west of the river is covered with scree and surface rubble. South-east of the river, blue riebeckitic jaspelite of the Daniëlskuil Formation as well as outcrops of the Kameelfontein Formation is present. Green mudstone of the Pannetjie Formation is found directly south of the river among some alluvium deposits. The most significant alluvium deposits are however found north of the

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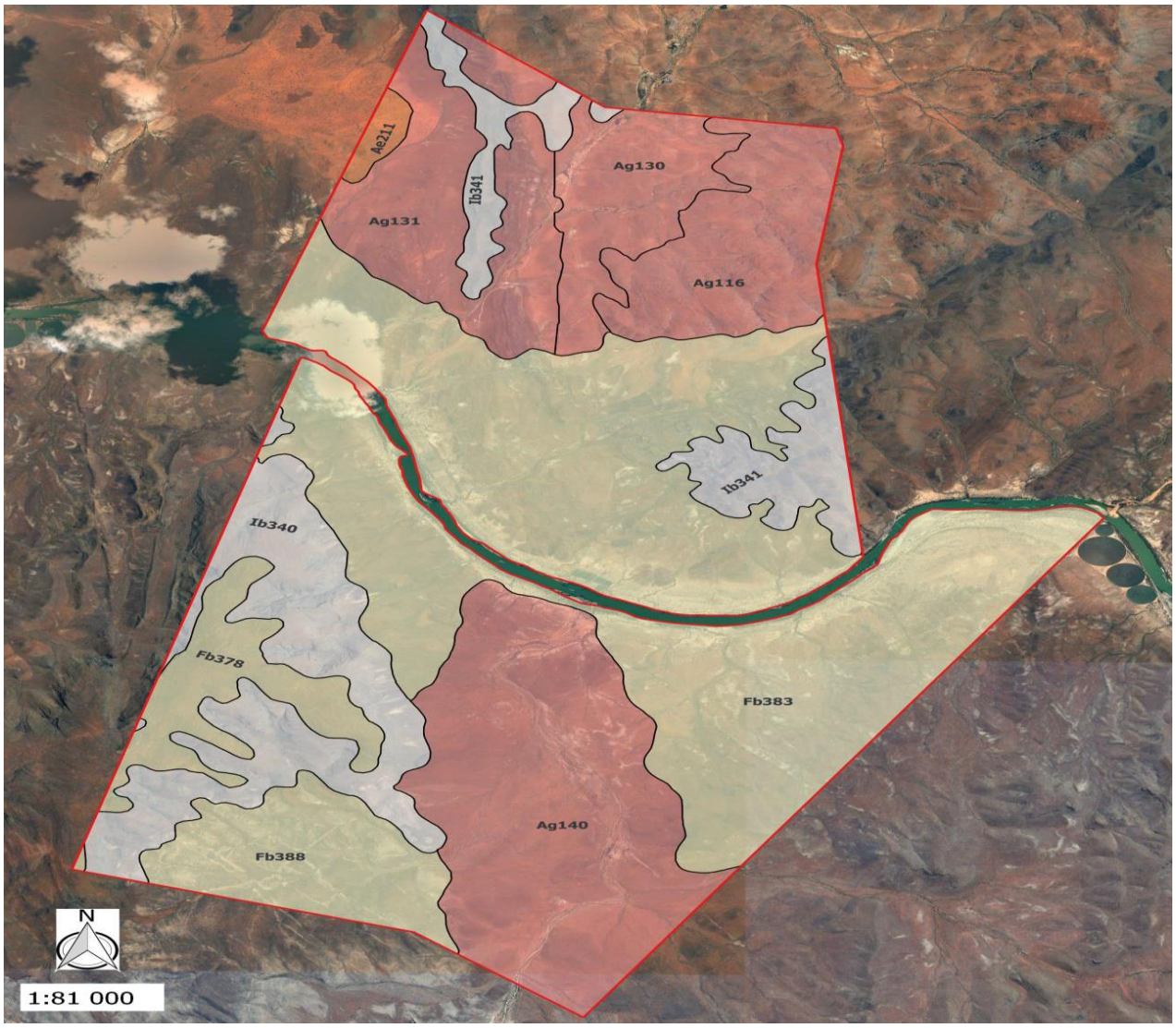


Figure 12. The distribution of land types at the study site. (Map taken out of the Ecological study by Dr. B Milne, May 2018)

- ***LAND CAPABILITY AND LAND USE:***

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study 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 in 2018 (Appendix 4). This study will be revised to rate impacts for the proposed mining operation.

Currently, major land uses in the region include activities related to mining and agriculture. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014). Those portions on the ALS property that are not subjected to prospecting activities are utilised for grazing pastures. A very small proportion of the alluvial plains along the river have been under irrigation. (Taken out of the Ecological Study done by Boscia Ecological Consultants, Dr. Betsie Milne May 2018, p13).

- ***FLORA (NATURAL VEGETATION):***

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study 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 in 2018 (Appendix 4). This study will be revised to rate impacts for the proposed mining operation.

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 three broad-scale vegetation units, i.e. Northern Upper Karoo, Lower Gariep Broken Veld and Bushmanland Arid Grassland.

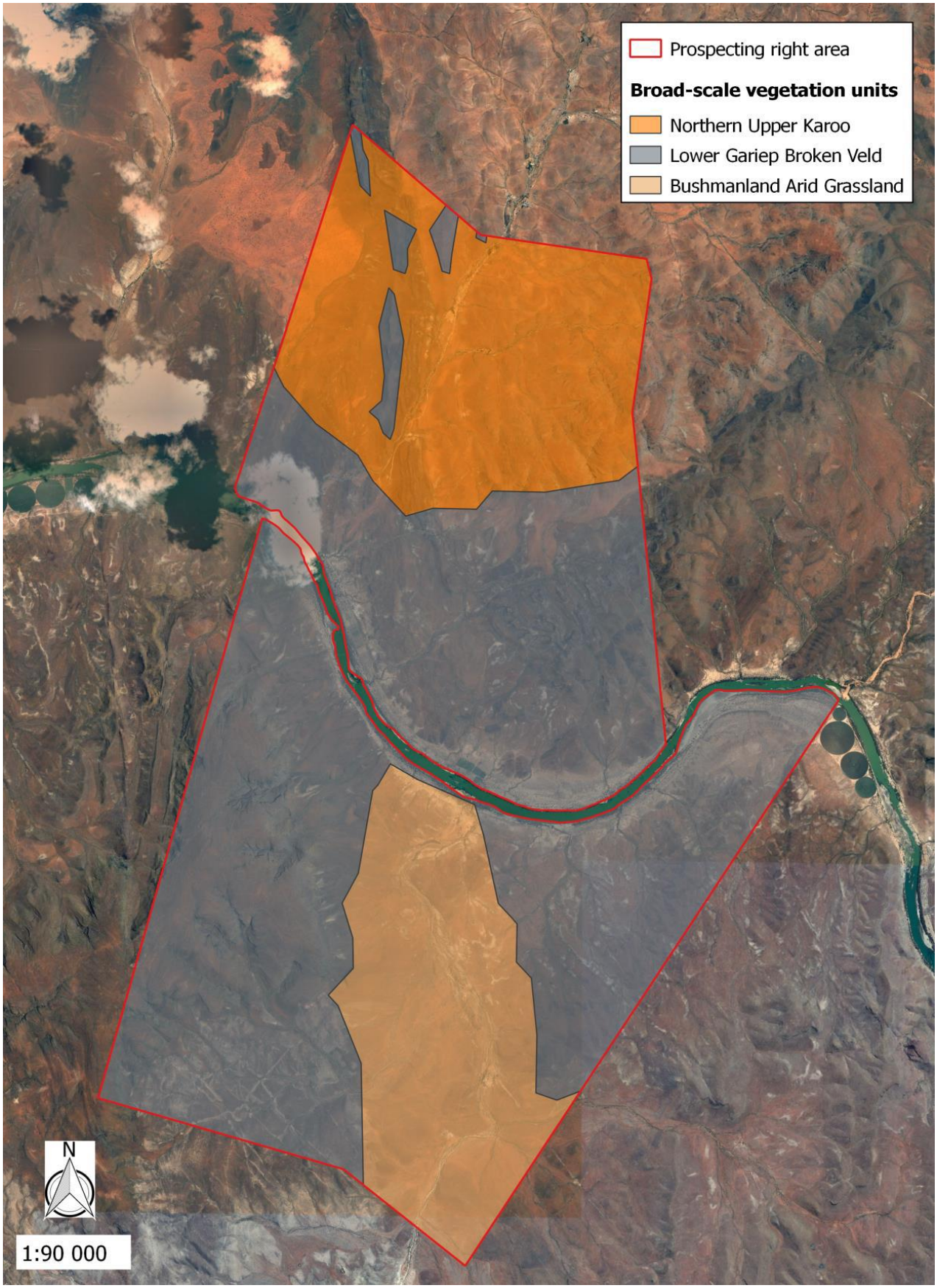


Figure 13. The broad-scale vegetation units (Mucina and Rutherford 2012) present in the study area. (Map taken out of the Ecological study by Dr. B Milne, May 2018)

Northern Upper Karoo is found in the Northern Cape and Free State at altitudes between 1 000 and 1 500 m. It is mostly restricted to the Northern regions of the Upper Karoo plateau from Prieska, Vosburg and Carnarvon in the west to Phillipstown, Petrusville and Petrusburg in the east. The topography is typically flat to gently sloping, but isolated hills of the Upper Karoo Hardeveld (in the south) and Vaalbos Rocky Shrubland (in the northeast) and numerous pans are interspersed in this unit. The vegetation occurs mainly as shrubland dominated by dwarf karoo shrubs, grasses and Senegalia mellifera. The geology and soil of this unit varies greatly. Geology includes Shales of the Volksrust Formation, Dwyka Group Diamictite, Jurassic Karoo Dolerite sills and sheets, and calcretes of the Kalahari Group. Soils range from shallow to deep, red-yellow, apedal, freely drained soils to very shallow Glenrosa and Mispah forms. The most dominant landtypes are Ae, Ag and Fc. It is estimated that about 4 % of the unit has been cleared for cultivation or transformed by building of dams; and human settlements are increasing in the north-eastern parts. Erosion is moderate, very low and low, while Prosopis glandulosa, considered among the top 12 agriculturally significant invasive alien plants in South Africa, are widely distributed in this unit. The unit is classified as being least threatened and it is not currently conserved within any formal conservation areas. Endemic plant species known from this unit include Lithops hookeri, Stomatium pluridens, Atriplex spongiosa, Galenia exigua and Manulea deserticola.

- **NATURAL FAUNA:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining 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 area attached as **Appendix 4**. This study will be revised to include impacts for the proposed mining operation.

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 or specially protected 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.

The many landscape features on the ALS property 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 60 terrestrial mammals and seven bat species have been recorded in the region, of which Slender Mongoose, Yellow Mongoose, South African Ground Squirrel, Smith's Red Rock Rabbit, Rock Hyrax, Vervet Monkey and signs of Aardvark activities were encountered during the site visit.

Nine listed terrestrial mammal species and four listed bat species potentially occur in the area. The African Straw-coloured Fruit-bat, Geoffroy's Horseshoe Bat and Honey Badger have a high chance of occurring across the site, given their wide habitat tolerances. The Dassie Rat and Littledale's whistling rat both have a high potential of occurring on site based on their preferences for rocky and open shrubland habitat, respectively. The Cape Clawless Otter has a high potential to occur in the vicinity of the Orange River due to their preference for aquatic habitats. On the other hand, the Bushveld Gerbil and Lesser Dwarf Shrew have a moderate potential of occurring in the more grassy areas on site, while the South African Hedgehog and Black-footed cat may potentially occur on site on account of their preferences for arid areas. They are both however rather skittish and therefore they will most likely be found very seldomly. The Brown Hyaena has a low potential to be found on site mainly based on the fact that farm fences are restricting their occurrences across their natural distribution range. The Dent's Horseshoe Bat and Darling's Horseshoe Bat also have a low chance to be found on site due to their preference for savanna habitat.

Virtually all mammals of the study area are protected; either according to Schedule 1, 2 or 3 of NCNCA. Those that are specially protected include Aardvark, South African Hedgehog, Aardwolf, African Wild Cat, Black-footed cat, Cape Fox, Brown hyena, Bat-eared Fox, Striped Polecat and Honey Badger. Problem animals (Schedule 4) include Black-backed Jackal, Vervet Monkey, Chacma Baboon and Caracal.

The core prospecting activities are associated with the alluvial plains and terraces along the Orange River. All fauna associated with this habitat will be affected. Listed mammals that are most likely to be impacted in the form of species- and/or habitat loss resulting from the prospecting activities include Aardvark. The most significant is probably Aardvark burrows which will be destroyed. Any disturbances to the Aardvark burrows will displace this protected species locally and there is a risk of individuals being killed during excavation activities. Littledale's whistling rat and Bushveld Gerbil can also potentially be found here and could accidentally be disturbed or killed during prospecting activities.

Reptiles

The ALS prospecting area lies within the distribution range of at least 51 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) and most are protected either according to Schedule 1, 2 or 3 of NCNCA, except for agamas, geckos and skinks. Specially protected species include Karusasaurus polyzonus (Southern Karusa Lizard) and Chamaeleo dilepis dilepis (Namaqua Chamaeleon).

The habitat diversity for reptiles in the study area is high and includes the aquatic and riparian zones, rocky hills and ridges, alluvial plains and ephemeral drainage lines. The rocky hills are considered to be the most important habitat for reptiles at the site, but it is not foreseen that the prospecting activities will take place here and therefore the prospecting operation is not considered to cause significant habitat loss for the local reptile population. In general, impacts by the proposed prospecting operations on reptiles are likely to be low.

Amphibians

Fourteen amphibian species are known from the region. Low amphibian diversity is normal for an arid area, but is likely to increase within the aquatic and wetland ecosystem of the Orange River and ephemeral streams. As a result, higher amphibian diversity is most likely to be found in these habitats, while only those species which are relatively independent of water are likely to be common in the terrestrial habitats.

Pyxicephalus adspersus (Giant Bull Frog) is the amphibian species of conservation concern that potentially occur in the study area. It is listed as Near Threatened in terms of the Red Data Book of Frogs and is protected according to Schedule 1 of the NCNCA. They are primarily associated with temporary pans or vleis and therefore have a low potential to be found on site. All other amphibians of the study area are protected according to Schedule 2 of NCNCA. Impacts on amphibians are likely to be low as no prospecting activities are planned in any of the aquatic or riparian habitats.

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 and all of these species are protected either according to Schedule 1, 2 or 3 of NCNCA.

Seventeen listed bird species are known from the region, all of which are classified as Vulnerable, Near Threatened or Endangered. The Verreaux's Eagle (Vulnerable) is confirmed to occur on site. A pair was seen soaring over the hills during the site visit. They nest in rocky habitats and on cliffs

and might only be found in the core prospecting area when hunting. The remaining listed species could occur in the core areas either by occasionally passing over or foraging on the alluvial plains. Flamingos and Chestnut-banded Plovers are however not expected to occur here as they prefer saline wetland habitats.

Sociable Weaver nests are found in some of the Vachellia erioloba trees along the access roads. These community nests have a high ecological importance, because they provide shelter and shade for a large diversity of birds and other fauna. These birds are also protected according to Schedule 2 of the NCNCA.

Some of the nests are likely to be affected if activities destroy the associated trees during road construction. Therefore, if any such activities are to be planned in the vicinity of these nests, or if there is a likelihood that they are to be disturbed by any related activities; a permit from DENC is required before such disturbance takes place.

In general, bird species of the study area are likely to experience some disturbances as a result of the ALS prospecting activities. The most significant impacts are however expected to be in the form of habitat destruction on the alluvial plains. This will especially impact those species that rely on this habitat for breeding, nesting and foraging. Terrestrial birds are likely to experience local disturbances, where habitat loss will be confined to the footprint of core sites and their activities will cause disturbances in the form of noise and movement. Birds are however highly mobile and are expected to move to similar adjacent habitats, if necessary. Therefore, the ALS prospecting activities would not constitute a significant loss that would compromise the available habitat for any of the terrestrial resident bird species.

Apart from general disturbances and habitat loss, other potential impacts would come from the accidental or intentional killing of birds. Monitoring during the prospecting operation is vital in order to ensure no or low impact.

Fish

Fish species expected to occur in the active channel of the Orange River is listed in Table 9 in the ecological report, along with their IUCN 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 an 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.

No prospecting activities are planned near the river and therefore the ALS operation is not expected to have any impacts on the fish communities.

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). Their immense species diversity makes it almost impossible to list all species that may possibly occur on site. Nevertheless, key morphospecies as well as species of conservation concern are discussed here.

Eight invertebrate species of the Northern Cape appear on the IUCN Red Data list of threatened species, along with species that are specially protected according to Schedule 1 of the NCNCA. All other invertebrates from the class Insecta and Arachnida are protected either according to Schedule 2 or 3 of the NCNCA.

Two major habitats delimit possible invertebrate communities on site, i.e. the perennial Orange River and a variety of terrestrial habitats collectively classified as Karoo vegetation for insect preference, according to Picker et al. (2004).

i. Perennial Orange River

Invertebrates expected to be associated with the Orange River include Flatworms, earthworms, leeches, freshwater crabs and shrimps, mayflies, damselflies, dragonflies, moths, giant water bugs, boatmen, water striders, marsh treaders, creeping water bugs, water specs, water mites, spunges, waterscorpions, backswimmers, riffle bugs, caddisflies, diving beetles, riffle beetles, whirligig beetles, small water beetles, water scavenger beetles, water snipe flies, midges, house flies, black flies, hoverflies, horseflies, crane flies and freshwater limpets, snails, clams and mussels. The prospecting operation does not envisage altering the active channel of the Orange River and is therefore not expected to have any impacts on the river invertebrate communities.

ii. Karoo vegetation

Invertebrate communities associated with the karoo vegetation represent unique species assemblages, with an above-average representation of beetles, grasshoppers, flies, wasps and lacewings. Insects in general are widely distributed and extremely diverse. Therefore, it is not possible to list specialised communities that occur here without a dedicated study. However, those species of conservation concern listed are most likely to be associated with this invertebrate habitat. Of all invertebrates on the ALS property, those occurring on the alluvial plains vegetation are likely to be most affected, because the core activities will take place here.

Alogenius cavifrons (Pitted Darkling Beetle) was especially conspicuous on the alluvial plains during the site visit. The most profound impacts will be in the form of habitat loss and the inevitable death of those that occur in the path of prospecting activities. These impacts are however expected to be largely local.

Critical biodiversity areas and broad-scale processes

The proposed prospecting site falls within critical biodiversity areas, 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 as a whole. The majority of the study site comprise of Critical Biodiversity Area Two and Ecological Support areas, while the Orange River and one of its tributaries, the Katrivier, are classified as Critical Biodiversity Area One. No protected areas occur in or near the study site.

Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) also classifies the Orange River and two of its main tributaries on the site to have Highest Biodiversity Importance, which constitute a high risk for mining. The core prospecting area falls within this delineation.

The areas adjacent to the latter are categorised as having Moderate Biodiversity Importance and a moderate risk for mining. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the impacts of mining in order to support mainstreaming of biodiversity issues in decision making in the mining sector.

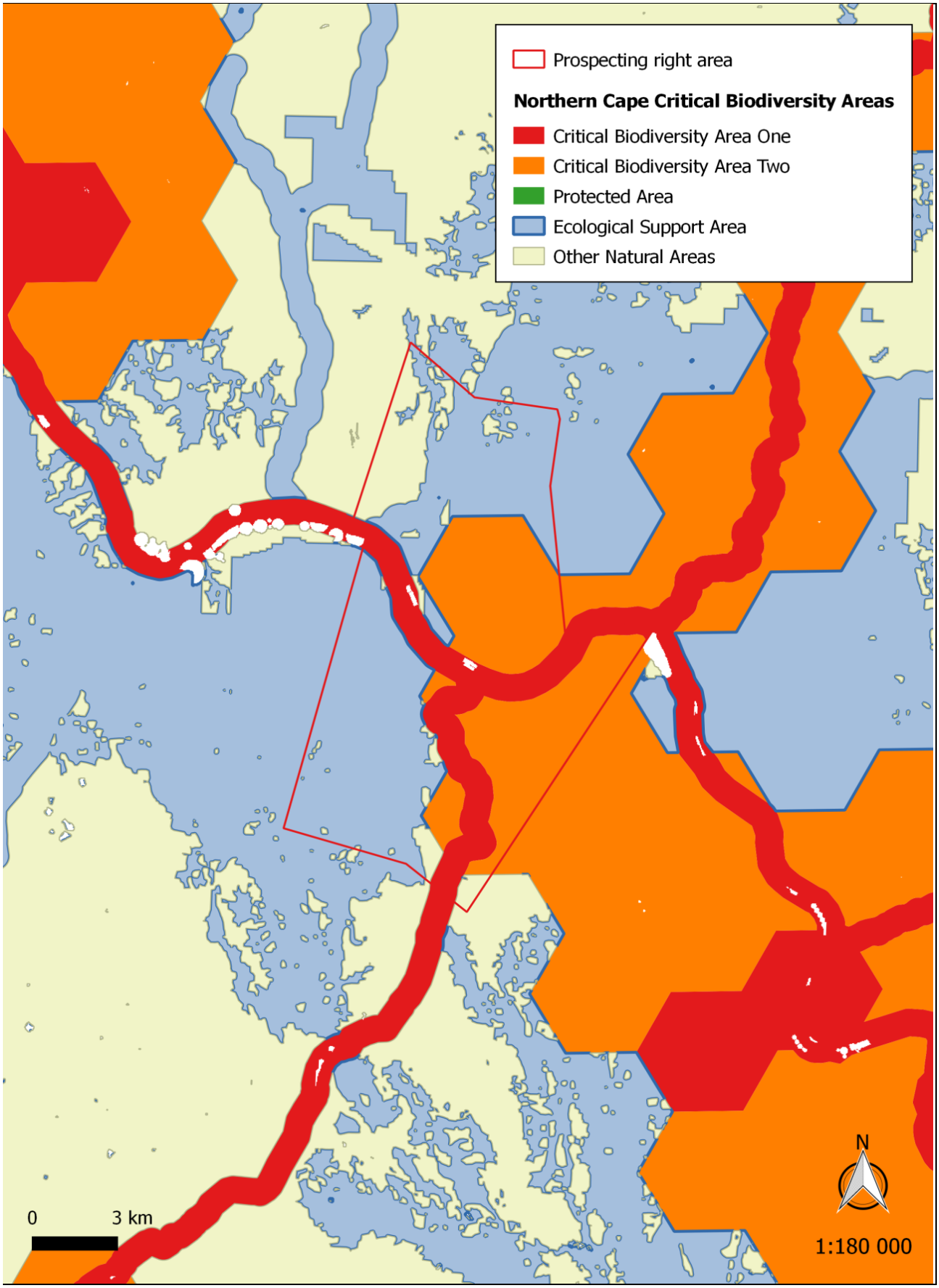


Figure 14. The study area in relation to the Northern Cape Critical Biodiversity areas. (Map taken out of the Ecological study by Dr. B Milne, May 2018)

All rivers (ephemeral and perennial), their riverbeds and associated 100 m buffers have been identified as ecological corridors within the Pixley Ka Seme District Municipality (Rumboll 2014). Here, special care must be taken with mining and agricultural practises so as to avoid water pollution and over extraction. These should be maintained to limit the potential impact of development on the water resources.

Furthermore, the proposed prospecting area falls within the Griqualand West Centre of Endemism (Van Wyk and Smith 2001), as does many other mining operations. A centre of plant endemism is an area with high concentrations of plant species with very restricted distributions, known as endemics. They are extremely vulnerable; relatively small disturbances in a centre of endemism may easily pose a serious threat to its many range restricted species. The GWC is considered a priority in the Northern Cape, because the number of threats to the area is increasing rapidly. This is a cause of concern, because the GWC is still greatly misunderstood and under researched. Important elements might therefore be lost or disturbed due to a lack of knowledge, which could assist in protecting its fundamental processes. The cumulative effect of prospecting in this region exacerbate the potential risk of losing information on ecosystem function owing to the lack of basic research information within this area.

The ALS operation itself is expected to cause habitat transformation along the alluvial plains of the Orange River through the excavation of open pits, and will thereby contribute to cumulative habitat loss and the disruption of the broad-scale landscape connectivity in the region. The study area falls within a zone where one of South Africa's largest economically most important alluvial deposits of diamonds are found. The primary secondary source of alluvial diamond deposits in the Northern Cape extends along the Orange and Vaal Rivers (Gresse 2003), while the most significant crop irrigation in the Northern Cape also stretches along these rivers (Durand 2006). The cumulative impacts in the vicinity of the study area are therefore considered to be moderately high.

Figure 15. The study area in relation to the Mining and Biodiversity Guidelines. (Map taken out of the Ecological study by Dr. B Milne, May 2018).

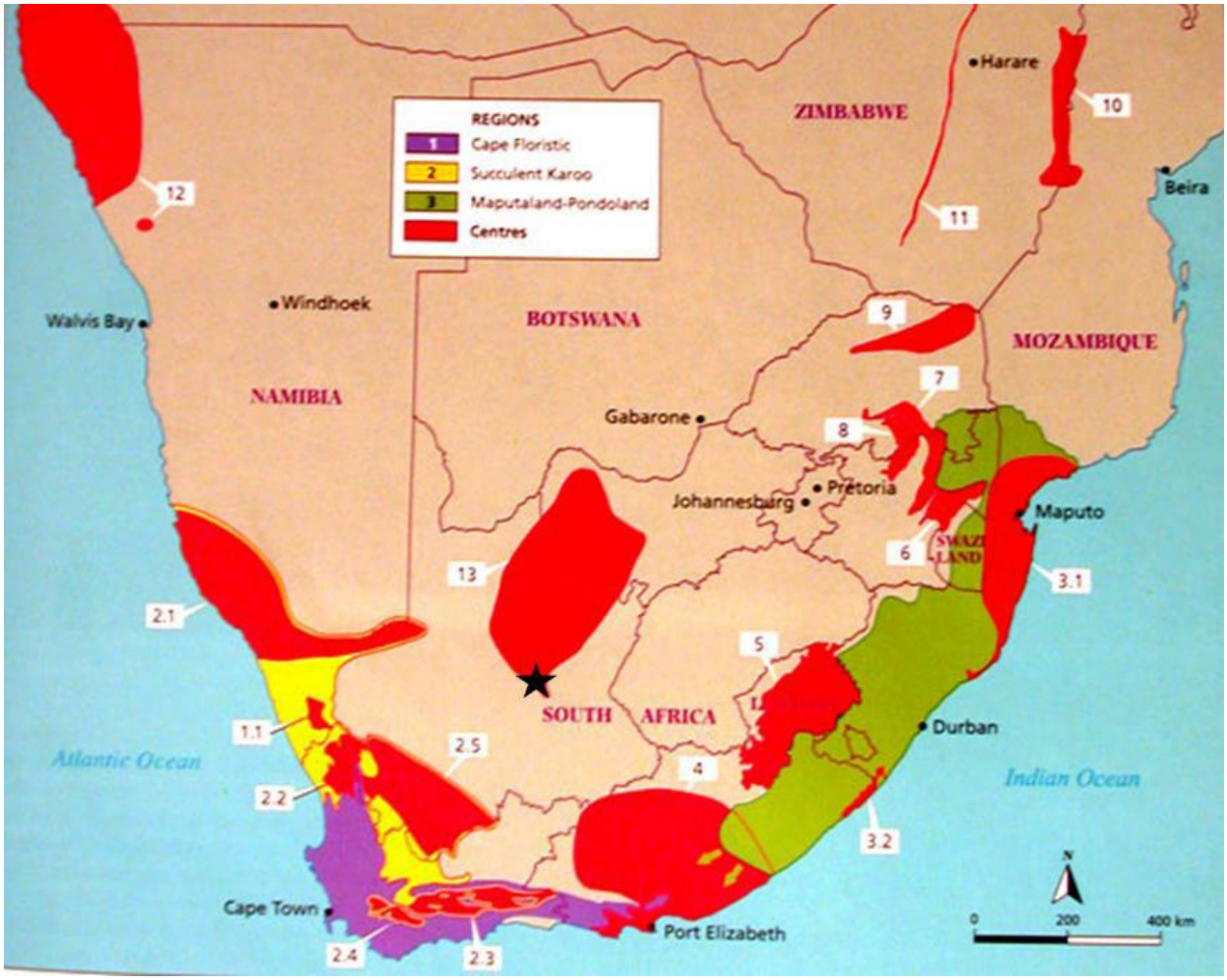


Figure 16. A map indicating the regions of floristic endemism in southern Africa, according to Van Wyk and Smith(2001), with the study site locality indicated by the black star. (Map taken out of the Ecological study by Dr. B Milne, May 2018)

- ***SURFACE WATER AND DRAINAGE:***

  The Orange River borders the application area. It is unlikely that the prospecting operation will negatively affect any surface water. There is a larger non perennial natural drainage channel on Middelwater on the prospecting area. This channel will only receive water when it rains.

  There are a few clearly defined waterways outside the flood plain. Closer to the river in the flood plain area, small drainage features has developed where storm water is collected and discharges along defined waterways into the Orange River. Due to the low rainfall, these waterways are mainly seasonal.

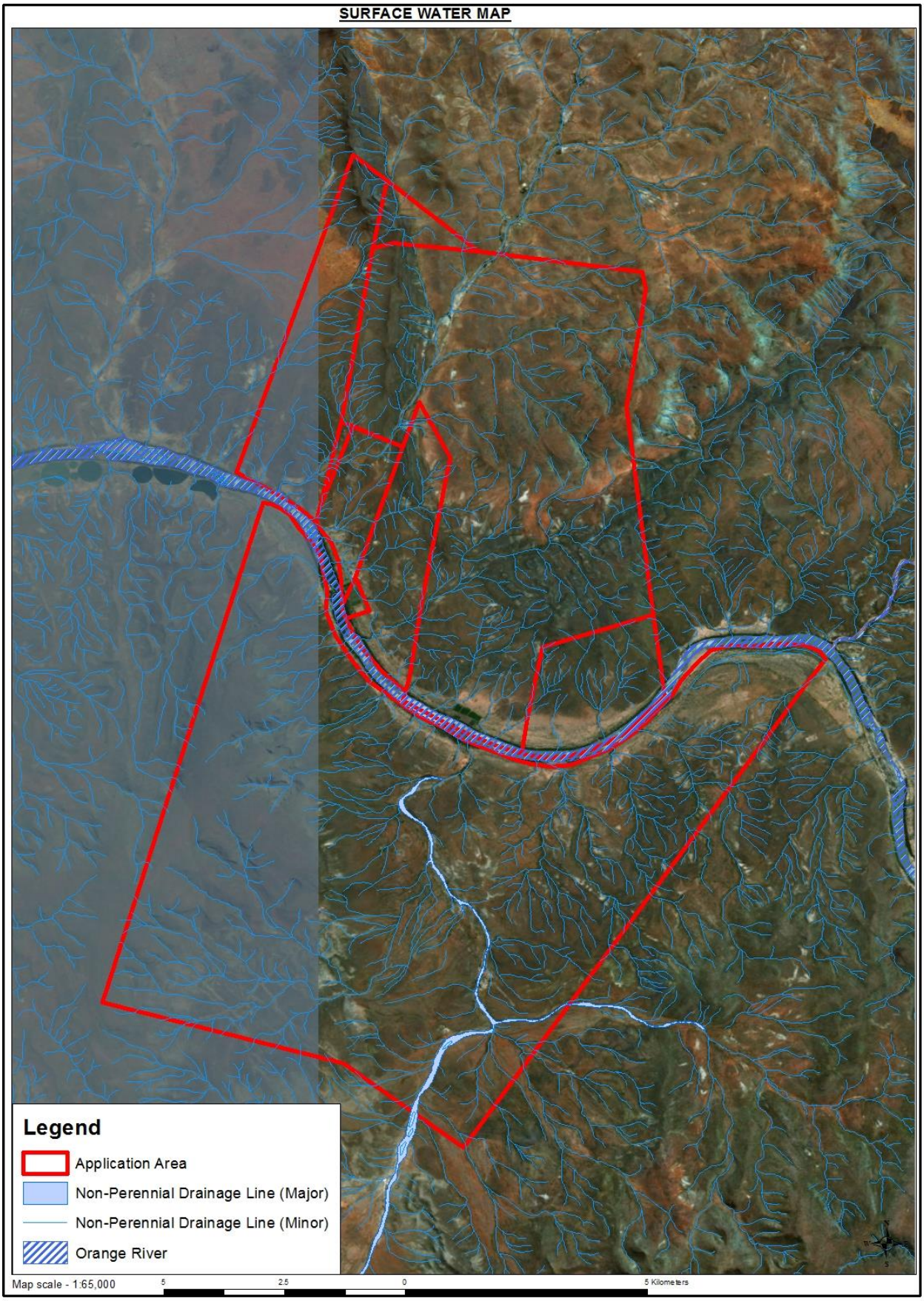


Figure 17. See dry Non- Perrennial Drainage channels indicated in blue on the proposed Prospecting area.

The surface water flow patterns are a function of the local topography:

The defined waterways in the floodplain area that is next to the Orange River and protected with a 100 m buffer zone, should be preserved as storm water drainage canals. The ecological function of these channels is to collect storm water (sheet flow) during rain events from the upper reaches before it converge with the Orange River.

Application for authorization should be submitted in terms of the NWA to extend the operation into the flood plain area. Clear management procedures should be developed to ensure that these waterways are protected or re-instated to prevent pooling and divert runoff unhindered into the Orange River.

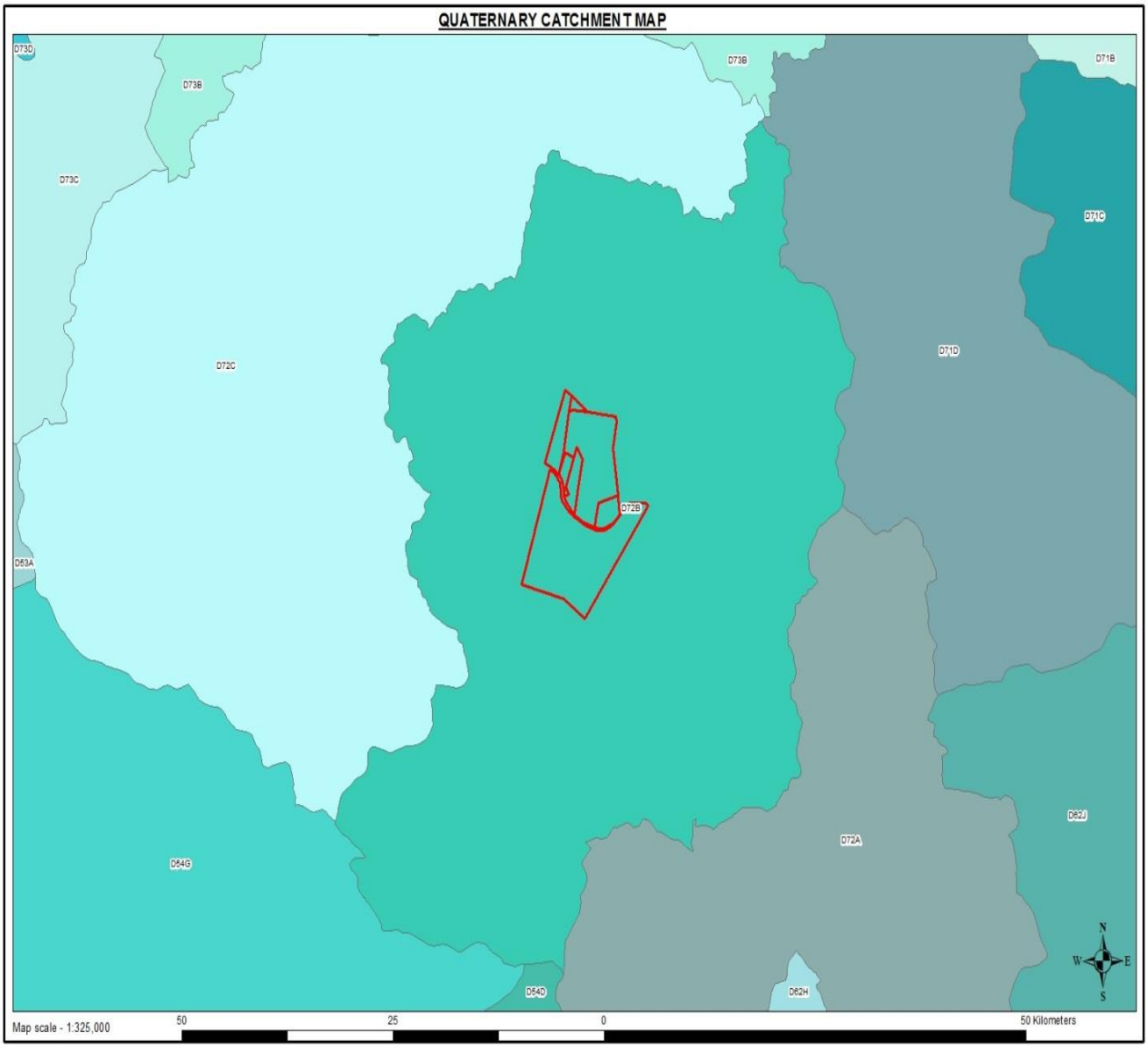


Figure 18. Catchment area

Classification of the Watercourse

The study area straddles quaternary drainage catchments D71D and D71C of the Lower Orange Water Management Area. The topography is characterized by very flat terrain with ground elevation lying between 1000 and 1 050 metres above mean sea level. Surface drainage is predominantly to the west into the Orange River through the various dry non perennial drainage channels.

Wetlands

There are no known dry pans which occur within the prospecting 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 use:

  At present ground water supplies drinking water to the domestic animals on the farms.

  Ground-water zone:

  The diamond bulk sampling does not affect the quality of the ground water in any manner. There are no harmful or toxic properties in the gravels being mined. The recycling of the water only requires sediment settling, thus no aquifers and aquicludes are on the property.

- **AIR QUALITY:**

  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 on the farm.

  Existing sources

  The current source of air pollution in the area stems from numerous mining operations within the area (Thunderflex 78 Pty Ltd, Van Wyk), various tigers eye operations and from vehicles traveling on the gravel roads of the area.

  New source

  The source of air pollution on the farm will be nuisance dust generated by the opencast prospecting process, the loading of gravels onto the transport trucks, the dumping of gravels over each sites primary screen or feeder bins as well as from the movement of trucks and vehicles on the

prospecting roads. Gas emissions from machinery will be within legal limits.

Areas of impact

As the prevailing wind direction for the area is north to Northwest for the months January to September and changing from north to sometimes westerly winds during October to December, there is a potential for fall-out dust to impact on the surrounding farm properties – which can be described as the nearest potential area of impact. The dust management programme recommended should include daily dosing of access roads and stockpile areas.

The dust is controlled by watering down the roadway used by these trucks. The mineral processing is a wet process; thus no dust is generated.

A complain register for surrounding owners and the community will be kept on site and the management of dust would be guided by these additionally comments of public.

- **NOISE AND VIBRATION**

Existing sources:

Noise on site will come from the large vehicles (ADT trucks, front-end loaders, back actors), from the working pan.

There are numerous mining operations on both sides of the prospecting operations. Although these operations do generate noise the overall impact can be described as Low.

The impact would be of more importance regarding the direct worker environment that should adhere to the requirements in terms of the Mine Health and Safety Act. These noise levels will be continuous, and the operators will be issued with earplugs.

Noise is normally encountered during the normal operation hours at the processing plant. Processing plant noise and mine vehicles are limited between 7am and 5pm every day during the week. Noise levels are monitored on the prospecting area and where necessary, protective equipment is used in certain areas where machinery is used.

- ***ARCHAEOLOGICAL***

A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR A PROPOSED Prospecting RIGHTS APPLICATION ON THE FARMS FOLMINK 331, KLOOFFONTEIN 332, MIDDELWATER 18 AND FARM 597, CLOSE TO

PRIESKA, NORTHERN CAPE PROVINCE was done by Prof. A.C. van Vollenhoven (L.AKAD.SA.) on 26 June 2018.

Six sites of cultural heritage significance were identified during the survey. These were all found outside of the area of impact. Background information is given in order to place the surveyed area in a historical context and to contextualize possible finds that could be unearthed during mining activities.
There is limited archaeological information available of the area around Prieska. Known information is included in the discussion below.

Stone Age

The Stone Age is the period in human history when lithic material was mainly used to produce tools (Coertze & Coertze 1996: 293). In South Africa the Stone Age can be divided in three periods. It is, however, important to note that dates are relative and only provide a broad framework for interpretation. The division for the Stone Age according to Korsman & Meyer (1999: 93-94) is as follows:
Early Stone Age (ESA) 2 million – 150 000 years ago
Middle Stone Age (MSA) 150 000 – 30 000 years ago
Late Stone Age (LSA) 40 000 years ago – 1850 - A.D.

This geographical area is not well-known as one containing many prehistoric sites. One however has to realize that this most likely only indicates that not much research has been done here before.
MSA lithic tools were found on the farm Bundu, some 30 km to the south-west (Kiberd 2002). LSA material have been excavated at Noute-se-Berg towards the south-east of the study area (Beaumont & Vogel 1989). These dated to 1650 BP (Beaumont & Morris 1990). At Prieska more LSA tools were excavated by Beaumont.
Many Middle and Late Stone Age tools have been found by Archaetnos during surveys in the Northern Cape. These include isolated MSA and LSA stone tools found at Verdoorst Kolk, close to Brandvlei and at Kanakies close to Loeriesfontein (Archaetnos' database).
At Kenhardt, approximately 150 km north-west of the surveyed area stone tools were also identified. On the farm Konkooksies 91 in the Pofadder district, five sites with Middle and Late Stone Age tools were identified (Archaetnos database). Rock engraving (rock pecking) sites are known from the nearby Putsonderwater (Archaetnos database). Rock engravings are associated with the Late Stone Age people.
The mentioned Late Stone Age sites are associated with the San people. Mitchell (2002: 126) indicates that the language group who occupied the Northern Cape is the /Xam. These people were hunters and gatherers which means that they would have moved around, leaving little trace of their

existence. The Hantam, Namaqualand and Bushmanland were of the last regions of the Cape Province to be settled by early European farmers. The result was that it became a last outpost of the /Xam Bushman who still hunted and gathered there in the last decades of the 19th Century (Deacon 1986, 1997).

Isolated MSA and LSA tools were found scattered throughout the surveyed area. This indicates the presence of these people during the Stone Age.
From the above mentioned it is clear that Stone Age people did utilize the area by settling and probably hunting and gathering in it. The environment definitely would be supportive to Stone Age activities. The hills most likely would have given natural shelter and material to make stone tools from. These volcanic intrusions definitely give material suitable for the manufacture of lithic tools. Although the large flat surrounding area would not have given shelter, it must have been a prime hunting area.

Iron Age
The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artifacts (Coertze & Coertze 1996: 346). In South Africa it can be divided in two separate phases according to Van der Ryst & Meyer (1999: 96-98), namely:
Early Iron Age (EIA) 200 – 1000 A.D.
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however, indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:
Early Iron Age (EIA) 250 – 900 A.D.
Middle Iron Age (MIA) 900 – 1300 A.D.
Late Iron Age (LIA) 1300 – 1840 A.D.

No Early or Middle Iron Age sites have been identified in the area of study. Iron Age people occupied the central and eastern parts of southern Africa from about 200 A.D., but the San and Khoi remained in the western and southern parts (Inskeep 1978: 126; see also Huffman 2007).
During the Late Iron Age (LIA), people stayed in extensive stonewalled settlements, such as the Thlaping capital Dithakong, 40 km north of Kuruman. Sotho-Tswana and Nguni societies, the descendants of the LIA mixed farming communities, found the region already sparsely inhabited by the Late Stone Age (LSA) Khoisan groups, the so-called 'first people'. Most of them were eventually assimilated by LIA communities and only a few managed to survive, such as the Korana and Griqua. This period of contact is sometimes known as the Ceramic Late Stone Age and is represented by the Blinkklipkop specularite mine near Postmasburg and finds at the Kathu Pan (De Jong 2010: 36). It is also known that Late Iron Age people did utilize

the area close to the Orange River, albeit briefly, as they did mine copper in the Northern Cape (Inskeep 1978: 135).
Iron Age people therefore did not settle in the study area. It therefore is no surprise that no such sites were identified during the survey.

Historical Age
The historical age started with the first recorded oral histories in the area. It includes the moving into the area of people that were able to read and write. This era is sometimes called the Colonial era or the recent past. Due to factors such as population growth and a decrease in mortality rates, more people inhabited the country during the recent historical past. Therefore, and because less time has passed, much more cultural heritage resources from this era have been left on the landscape.
It is important to note that all cultural resources older than 60 years are potentially regarded as part of the heritage and that detailed studies are needed to determine whether these indeed have cultural significance. Factors to be considered include aesthetic, scientific, cultural and religious value of such resources.
Such sites include the many historical buildings and structures indicated on the SAHRA database such as a British blockhouse in Prieska as well as buildings in Kakamas, Keimoes, Loeriesfontein and Brandvlei (SAHRA Database). These sites are associated with the early missionaries, travelers, first white farmers and establishment of towns during the 19th century.

From the 1880's onwards colonial settlement was promoted in the area. Government-owned land was surveyed and divided into farms, which were transferred to farmers. Surveyors were given the task of surveying and naming some of the many farms in this region. These farms were allocated to prospective farmers, but permanent settlement only started in the late 1920s and the first farmsteads were possibly built during this period. The region remained sparsely populated until the advent of the 20th century (De Jong 2010: 36).
Most of the farms in the broader geographic region were still Government farms and were leased to farmers in 1875 (Van Zyl 2010: 13). It seems as if shortly hereafter farms were sold to individuals. The above-mentioned information means that the buildings on these farms could only have been built after the mid-19th century and most likely after 1875.

As indicated six sites have been identified. None of these will directly be impacted on by the proposed prospecting activities. However, secondary impact, e.g. dust may be experienced, and the developers need to be aware of these sites in order to steer well clear thereof.

Site 1 – Terraced stone walling/ weir

The site consists of parallel stone walling forming a weir in a dry river bed, with associated stone walling along the river. The highest of the remaining walls is approximately 1 m high.
GPS: 29°22'24.3"S
22°31'37.1"E

Site 2 – Farm yard
The site consists of a house and various outbuildings and other related farm features. It is in a dilapidated condition and probably roundabout 60 years of age (dating to the 1960s).
GPS: 29°26'07.7"S
22°31'38.8"E

Site 3 – Lower grinding stone
This is not an actual site by an isolated lower grinding stone. It is similar to those used during the Iron Age for grinding sorghum. This one however also have paintings on which seems to have been done fairly recently. It may therefore be totally out of context.
GPS: 29°25'35.2"S
22°30'34.9"E

Site 4 – whetstone
This again is not an actual site by an isolated find, namely a whetstone. It was probably used during the Stone Age to sharpen arrow heads. Nothing else was noted in its vicinity and therefore it may be totally out of context.
GPS: 29°24'12.5"S
22°30'25.1"E

Site 5 – Grave yard
This is a grave yard consisting of at least three graves. These are all stone packed and two of them have headstones. No legible information is available. There is also nothing else of cultural heritage value in the vicinity. It is therefore believed to be the graves of travelers or people who died during the time the farm was used for winter grazing.
All the graves are therefore unknown graves. These should be dealt with as heritage graves (older than 60 years).
GPS: 29°23'37.4"S
22°30' 29.8"E

Site 6 – farm house and stone kraal
The site consists of a house with four rooms, built from stone as well as an associated kraal. It may be the first permanent building on the farm and probably dates to the late 19th/ early 20th century. The windows of the house have been closed up by stones, an indication that it later-on received another function, probably a storeroom.

GPS: 29°22'20.2"S
22°31'33.9"E

Should any other heritage features and/or objects be located or observed, a heritage specialist will be contacted immediately. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that a heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. If the prospecting operation is approved, the heritage resources if any other had been encountered will be protected through the demarcation of no-go zones and fencing off.

- ***SENSITIVE LANDSCAPES:***

(Taken out of the Ecological Report by Dr. Betsie Milne). The sensitivity map for the ALS prospecting operation is illustrated in Figure 19. The riparian woodland along with the ephemeral rivers, streams and drainage lines are considered to be of very high sensitivity due to their vital ecological and hydrological functionality and significance. All watercourses in the study area are also unique habitats protected in terms of the National Water Act (Act No 36 of 1998). These units are essentially no-go areas.

The remaining study, which comprises the alluvial plains and hilltops, slopes and ridges, is considered to be of high sensitivity primarily due to the high occurrences of species of conservation concern that occur widespread across these units. In addition, the sandy substrate of the alluvial plains will be highly prone to erosion after the natural vegetation has been removed. Although these units are not regarded as no-go areas, activities should only proceed with caution as it may not be possible to mitigate all impacts appropriately.

Figure 19. A sensitivity map for the ALS prospecting area. (Map taken out of the Ecological Study by Dr. Betsie Milne May 2018)

- **VISUAL**

The prospecting site would possibly be visible form the secondary gravel road that travels to Niekerkshoop. The negative visual impacts associated with open pits for the bulk sampling and the washing pan will however have a low negative impact since it will be visible to the landowners. There is however no method of reducing the impact during bulk sampling operations (operational phase), it can only be mitigation by doing concurrent rehabilitation of open pits as prospecting progress.

1.14 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.

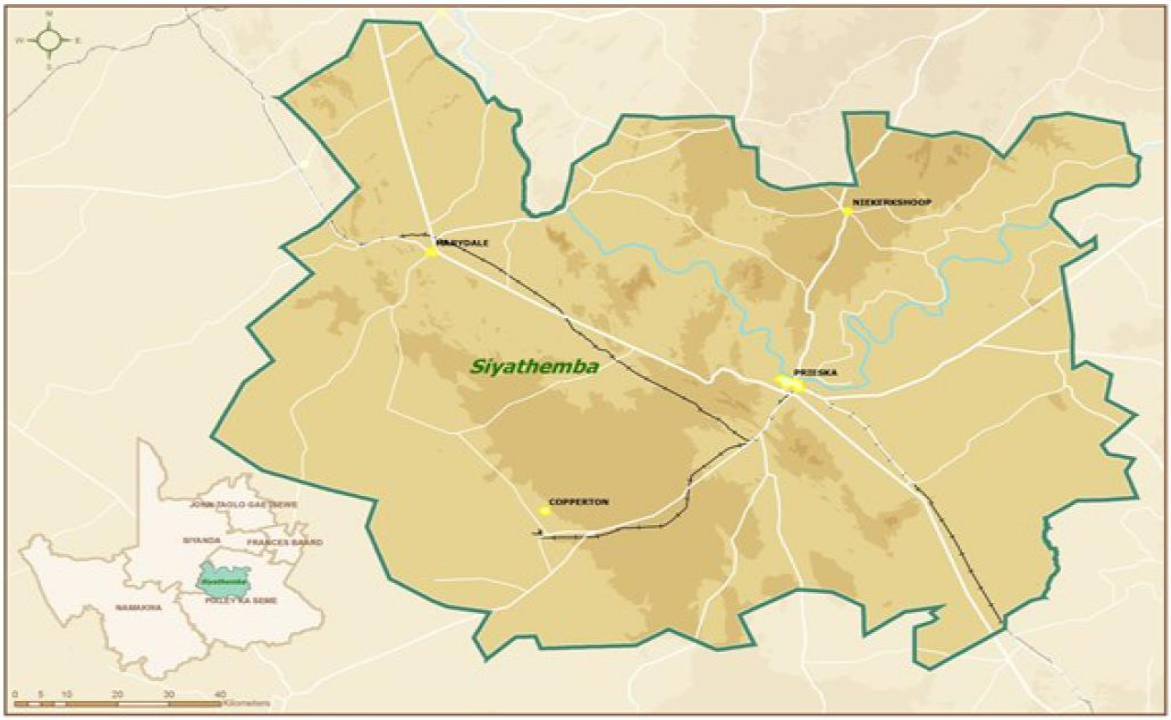


Figure 20. Locality Map

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 4 Wards.

Table 4: Local Municipality Structure

Ward	Area
Ward 1	e'Thembenin in Prieska
Ward 2	Prieska
Ward 3	Section in Prieska including Copperton, farms and Marydale town
Ward 4	Section in Prieska, farms in Niekerkshoop

Population

The local and regional population is illustrated in the table 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 5: 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

Source: Statistics South Africa 2011

	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

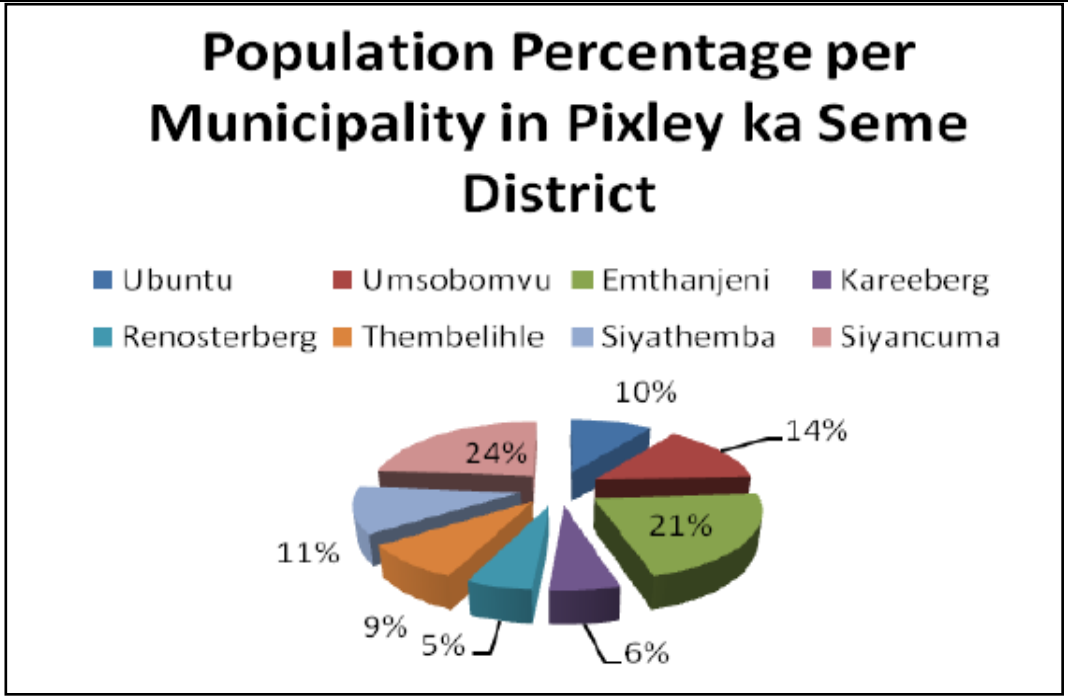


Figure 21. Population Percentage Source: Statistics South Africa 2011

In regional context, this meant 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 groups 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 a significant 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 & Gender Composition	The Age & Gender Profile of the local population is illustrated by Table 6. With regards to this profile, the following observations were made: ***Table 6: Age & 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 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 2000to 0.6 dependants (children & the elderly) in 2010for 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 Africa (12.6%) averages in the same year.

Water

Table 7 below gives a comparative indication of the status of water provisioning in the district as captured during the 2001 census.

Table 7: 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 dwellings by 2011. Piped water inside dwellings is about 47.00%. The table below indicates that provisioning of FBW for all municipalities in the district.

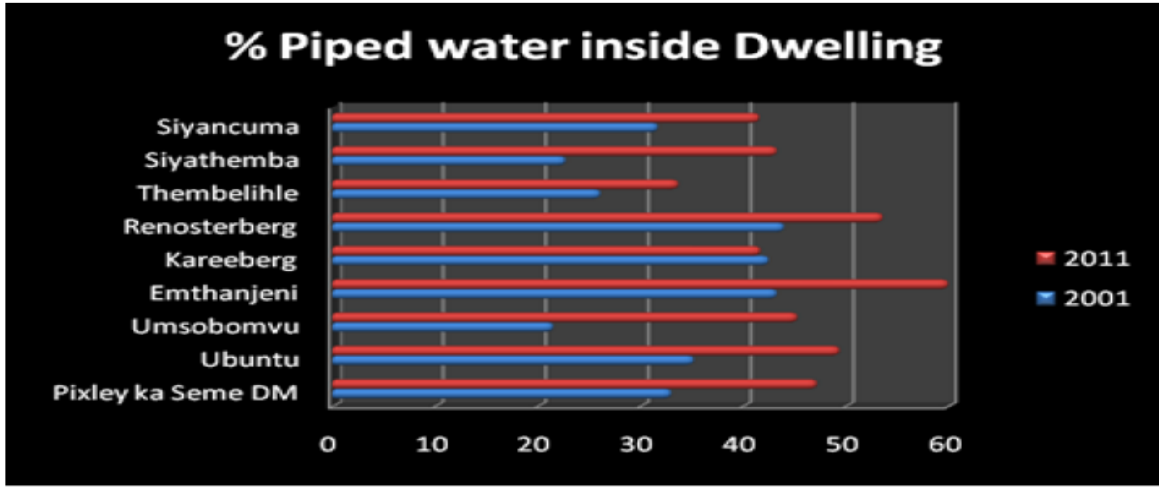


Figure 22. Piped Water inside Dwelling Source: Statistics South Africa 2011

Table 8: Access to water by households

	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

Source: Statistics South Africa 2011

Even though many urban residents in the region have access to water and improved sanitation system, some local municipalities are still have water and sanitation backlogs. Siyancuma local municipality has the highest backlog. The table below gives a reflection of the current situation in the region as at March 2011.

Table 9: 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

Source: Statistics South Africa 2011

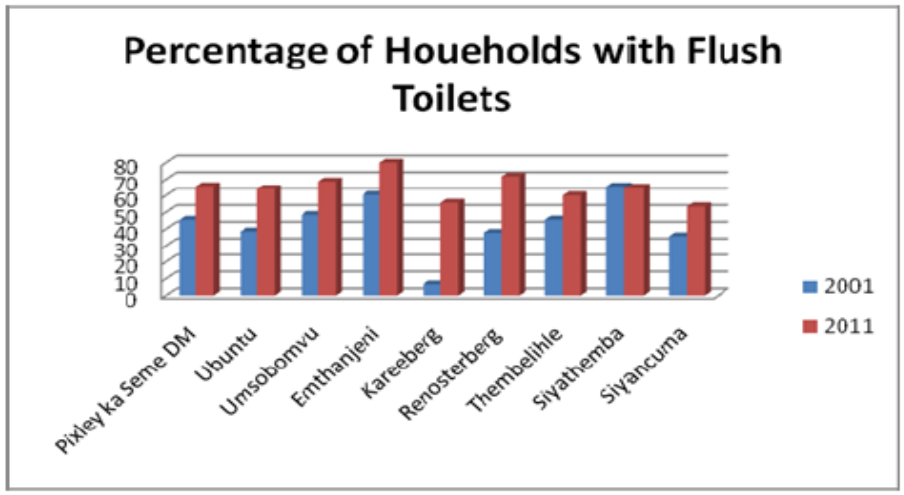


Figure 23. Households with Flush Toilets Source: Statistics South Africa 2011

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

Table 10: 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

The table and map above shows that, Pixley Ka Seme has Flush Toilets connected to sewerage at 65.70% households, Emthanjeni being the highest with 85.06% and Thembelihle being the east with 64.41%. However it must be mentioned 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 Cambell. Full water borne sanitation is currently being constructed in Schmidtsdrift and the sanitation system will be completed with the completion of house structures.

Table 11: 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 PKSA 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 12: 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

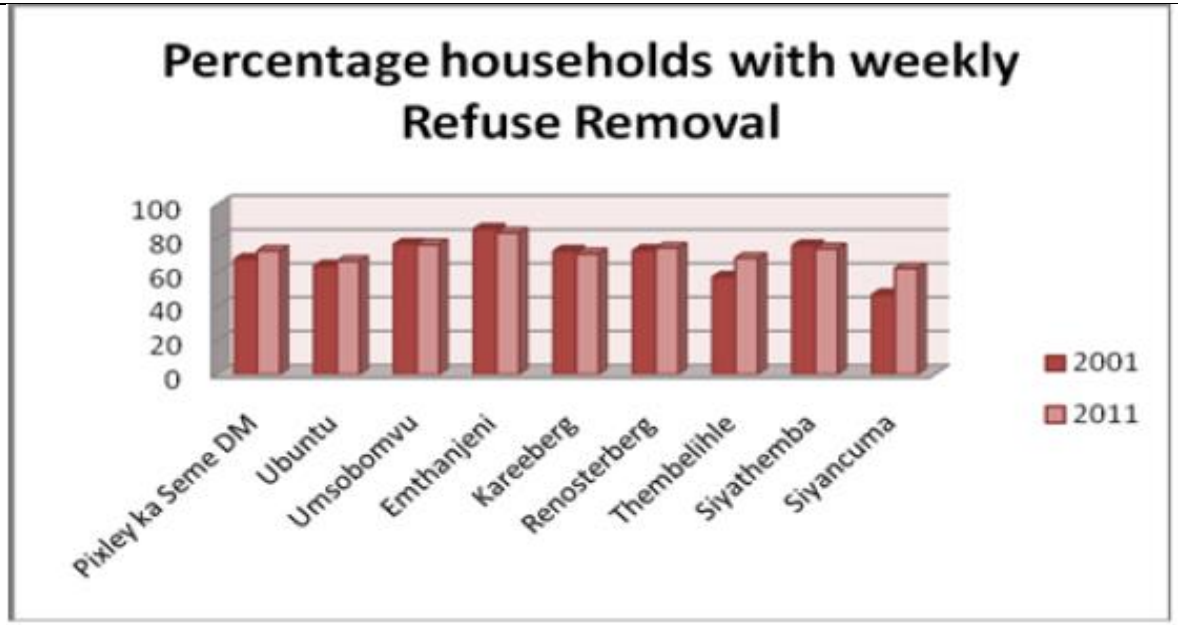


Figure 24. Households with weekly Refuse Removal Source: Statistics South Africa 2011

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 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.

Electricity

The table below gives a comparative indication of the access to the source of energy in the district as captured during 2011 censuses.

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 demands and tariffs may slow down this last effort.

Households using electricity as a source of energy for cooking increased from 47,5% in 1993 to 73,9% in Census 2011.

Table 13: 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

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 14: 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

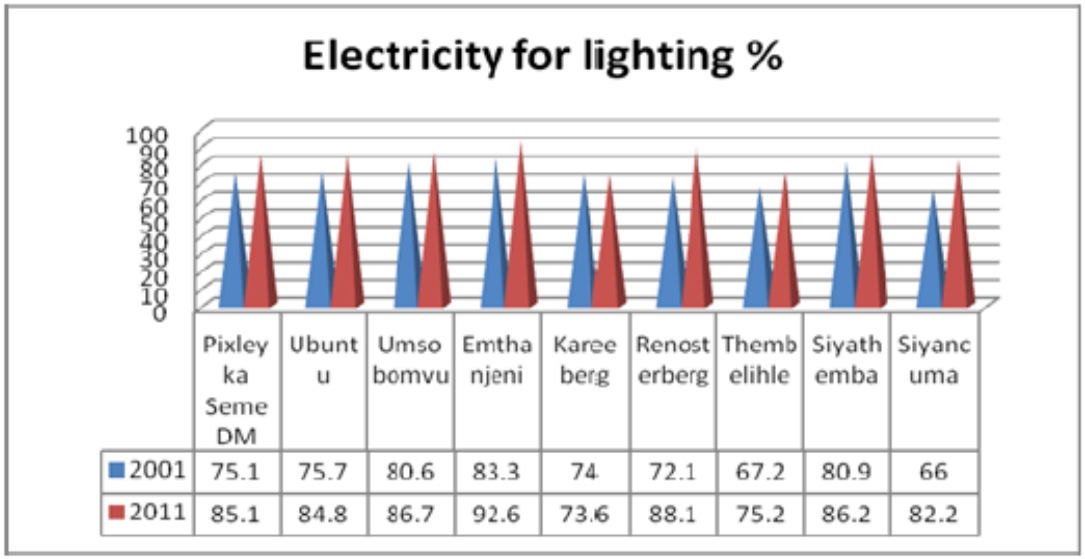


Figure 25. Electricity for lighting Source: Statistics South Africa 2011

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-utilisation of this renewable natural resource in certain places. Of major concern in this regard is wood harvesting and usage in the rural areas.

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.

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 below. Within the District, 82,8% of households live in formal housing, 10,8% in informal housing and only 2% in traditional houses. Household in the whole PKSD is about 49 193 in respect to the Census 2011, where the average Household Size is about 3.70% and the housing owned is at 52.00%.

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	-

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 the homes and Cell phones.

Table 16: Household access to Telephones

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 incidence of poverty.

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

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

Over the last 15 years the rate 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 is almost halved since 2001 when 19% aged 20+ had no schooling in the 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 year olds with proper levels of education are expected to drive these proportions further down in the years to come.

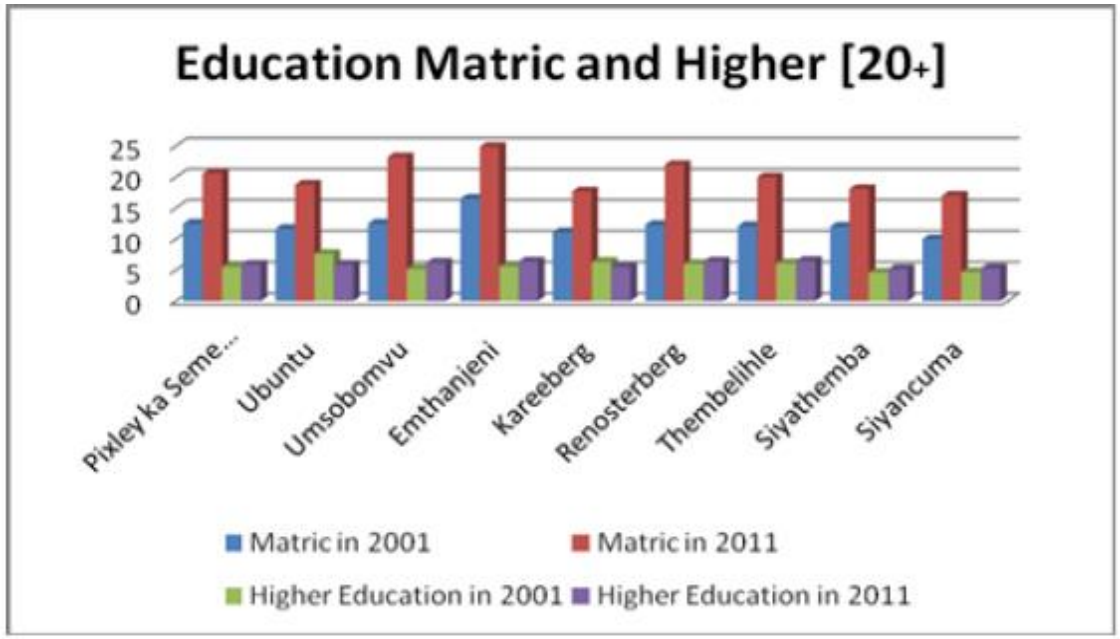


Figure 26. Education Matric and Higher Source: Statistics South Africa 2011

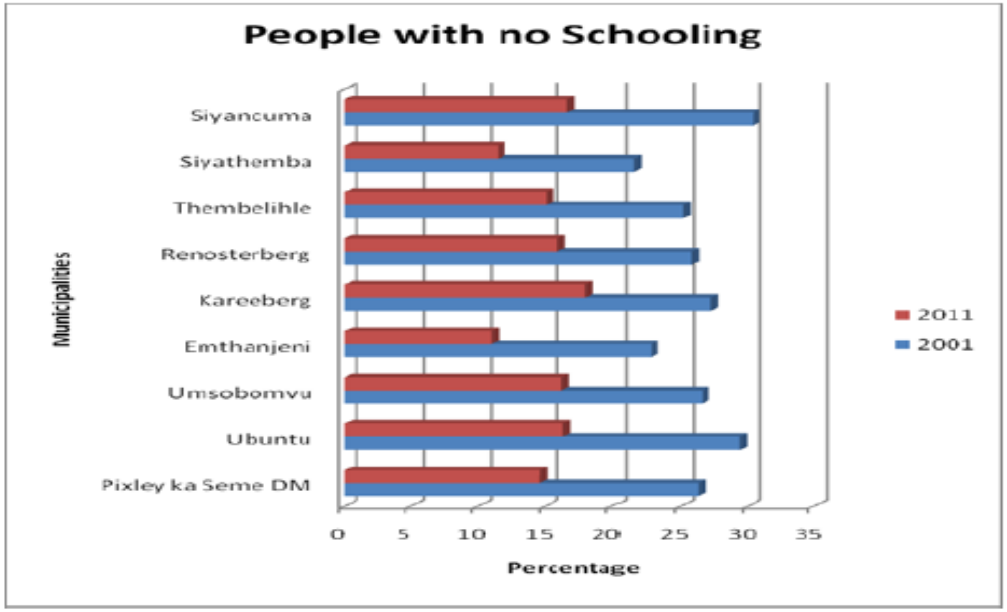


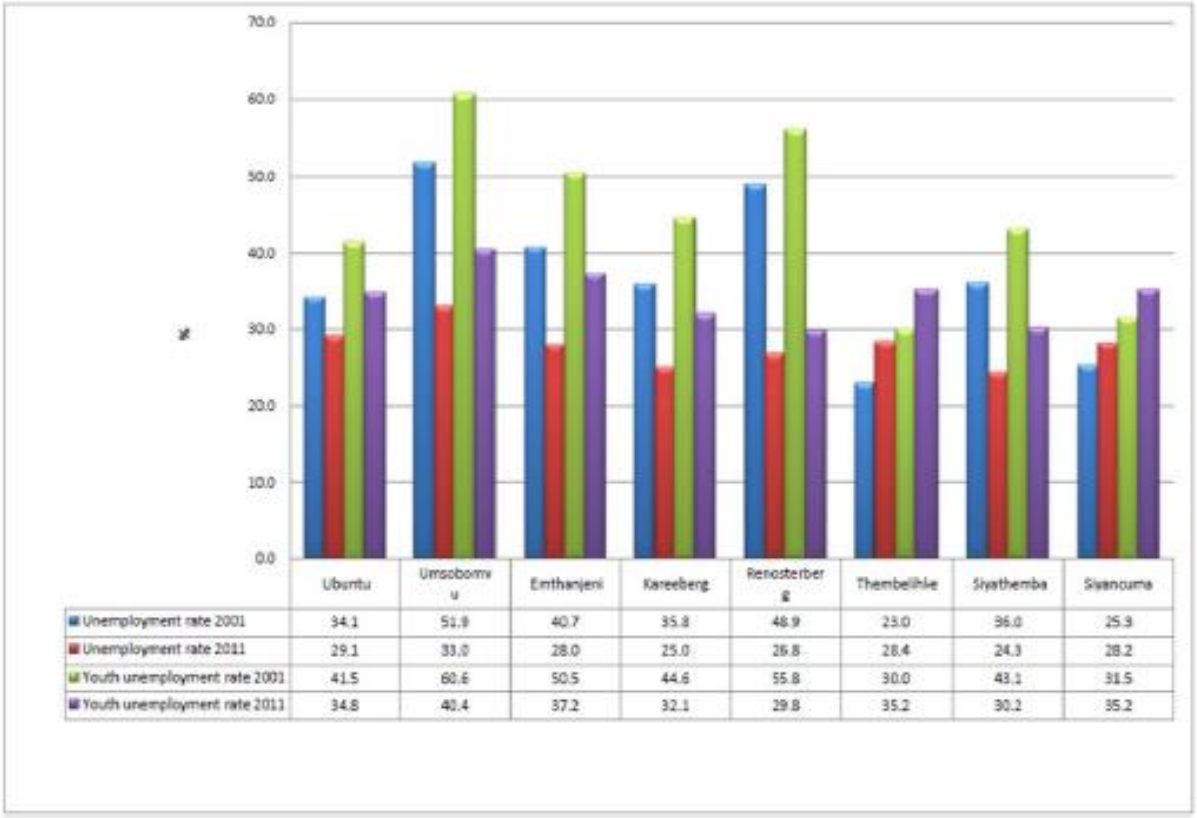
Figure 27. No schooling Source: Statistics South Africa 2011

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

	The above table presents the level of education of PKS Municipality's labour force; the statistics for the Northern Cape 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%.
Unemploy-ment	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 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



	Ubuntu	Umsobomvu	Emthanjeni	Kareeberg	Renosterberg	Thembelihle	Siyathemba	Siyancuma
Unemployment rate 2001	34.1	51.9	40.7	35.8	48.9	23.0	36.0	25.3
Unemployment rate 2011	29.1	33.0	28.0	25.0	26.8	28.4	24.3	28.2
Youth unemployment rate 2001	41.5	60.6	50.5	44.6	55.8	30.0	43.1	31.5
Youth unemployment rate 2011	34.8	40.4	37.2	32.1	29.8	35.2	30.2	35.2

Figure 28. Unemployment & Youth Unemployment

The municipalities that have the largest percentage of unemployed are Umsobomvu and Renosterberg with unemployment rates of 30,2% and 31,5% respectively. When the actual numbers of unemployed in the districts are considered, 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 to 7,2% provided the unemployed 20 153 are employed in these areas.

Labour

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 20 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: 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 grante from social services departments.

Economic Characteristics

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: % 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 sector 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 is 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.

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.

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); transprot, 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.

Table 23 below indicates the location quotients of the economic sectors in the municipalities.

Table 23: Indicates the location quotients of the economic sectors in the municipalities

	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

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 26, 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.

(15) *SENSITIVE LANDSCAPES:*

"Sensitive Environments" that have statutory protection are the following:-

1. Limited development areas (Section 23 of the Environmental Conservation Act, 1989 (Act 73 of 1989).
2. Protected natural environments and national heritage sites.
3. National, provincial, municipal and private nature reserves.
4. Conservation areas and sites of conservation significance.
5. National monuments and gardens of rememberance.
6. **Archaeological and palaeontolocial sites.**
7. Graves and burial sites.
8. Lake areas, offshore islands and the admirality reserve.
9. Estuaries, lagoons, wetlands and lakes.
10. **Streams and river channels and their banks.**
11. Dunes and beaches.
12. Caves and sites of geological significance.
13. Battle and burial sites.
14. Habitat and/or breeding sites of Red Data Book species.
15. Areas or sites of outstanding natural beauty.
16. Areas or sites of special scientific interest.
17. Areas or sites of special social, cultural or historical interest.
18. Declared national heritage sites.
19. Mountain catchment areas.
20. Areas with eco-tourism potential.

The relevant specialists will be appointed to assess whether there are any sensitive landscapes within the applicationa area.

(b) Description of the Current Land Use

(1) *Land Use before Mining:*

Currently, major land uses in the region include activities related to mining and agriculture.

The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014).

(2) Evidence of Disturbance:-

Those portions on the ALS property that are not subjected to prospecting activities are utilised for grazing pastures. A very small proportion of the alluvial plains along the river have been under irrigation.

(1) Existing Structures:-

The developments on the application area indicated below.

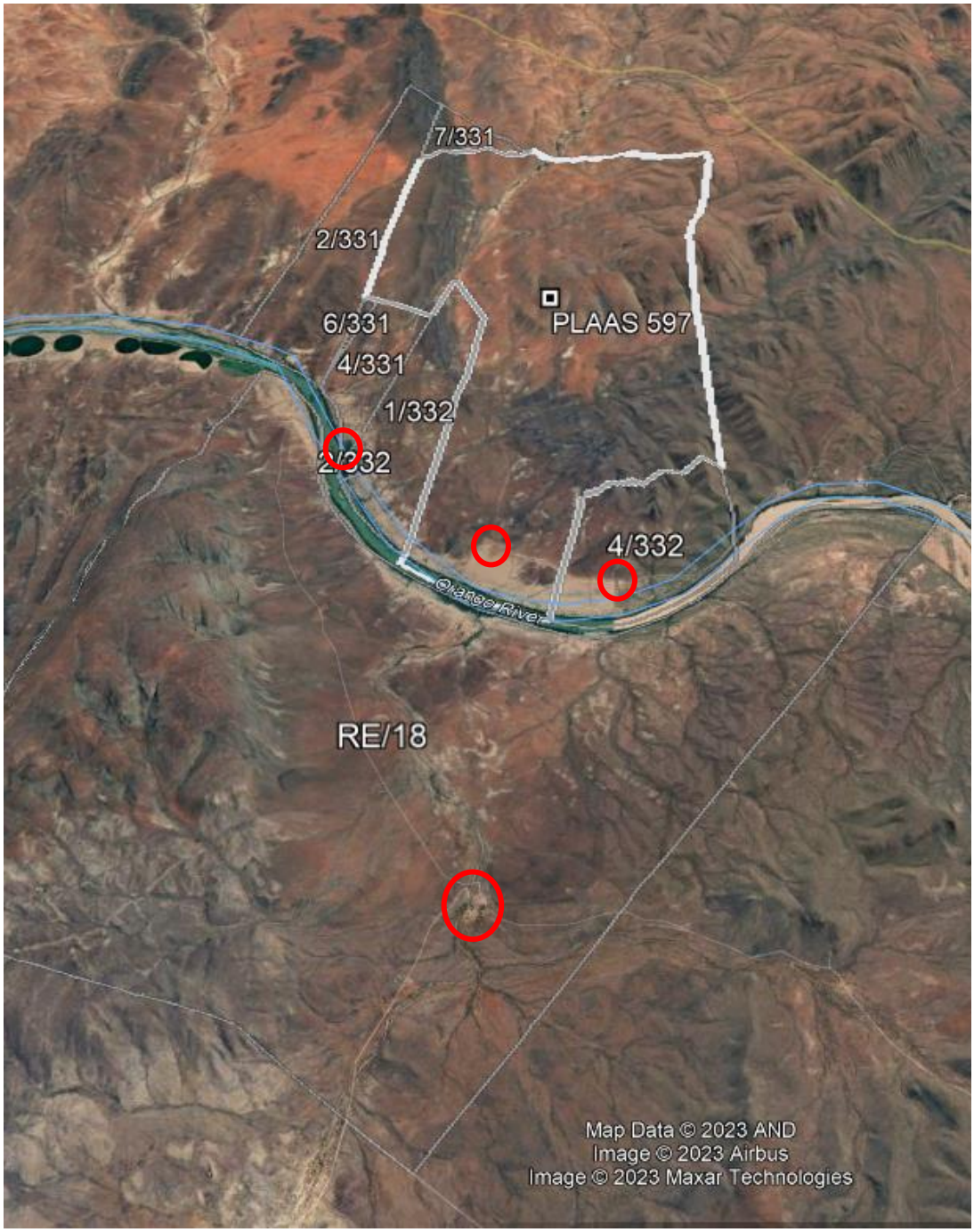


Figure 29. Location of developments on Middelwater 18 and Farm 597

Figure 30. Existing developments on Middelwater 18

Figure 31. Existing developments on Farm 597.

Figure 32. Existing developments on Portion 2 and 4 of Farm 332

Figure 33. Existing Prospecting on Portion 4 of Farm 332

All 100m safety borders from formal infrastructure will be kept, no work will be conducted in agricultural lands.

(c) Description of Specific Environmental Features and Infrastructure on Site

The infrastructure on site comprehensively discussed in section d(ii) as part of the mining methodology discussion, as well as in section g as part of the mine footprint description. Furthermore, a comprehensive description of the environment was presented in section (i) as part of the baseline report.

(d) Environmental and current land use map

(Show all environmental, and current land use features)

Figure 34. Environmental and current land use map

v) Impacts identified

(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.)

Nature of Impact	Significance	Probability	Duration
Sterilisation of mineral resources.	Low	Highly unlikely	Decommissioning
Changes to surface topography due to topsoil removal, alluvial mining, placement of infrastructure and development of residue deposits.	Medium to High	Certain	Long Term Life of operation
Soil erosion by water and wind on disturbed and exposed soils; potential for dust production and soil microbial degradation; potential contamination of soils due to spillages.	Medium to High	Possible	Long Term Life of operation
Loss of land capability through topsoil removal, disturbances, and loss of soil fertility.	Medium to High	Possible	Short term
Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation.	Medium	Possible	Short term
Pollution of underground water sources.	Low	Possible	Long Term Residual
Deterioration of water resources through alluvial mining.	Medium to High	Possible	Long Term Residual
Deterioration in water quality through spillages and runoff from sites.	Medium to High	Possible	Long Term Life of operation
The clearance of vegetation; potential loss of floral species with conservation value; potential loss of ecosystem function.	Low to Medium	Certain	Long Term Life of operation
Proliferation of alien invasive plants species.	Low to Medium	Possible	Long Term Residual
Displacement of faunal species.	Low to Medium	Possible	Long Term Life of operation
The loss, damage and fragmentation of floral and faunal habitats; potential loss of ecosystem function.	High	Certain	Long Term Residual
Sources of atmospheric emission associated with the mining operation are likely to include fugitive dust from materials handling operations, wind erosion of stockpiles and vehicle entrainment of road dust.	Low	Certain	Life of Operation Decommissioning
Increase in continuous noise levels; the disruption of current ambient noise levels; and the disruption of sensitive	Low to medium	Certain	Long Term Life of Operation

receptors by means of increased noise and vibration.			
Visual impact of the mine infrastructure, Mine Residue dams and visibility of dust.	Medium to Low	Certain	Life of Operation Decommissioning
Potential negative impacts on traffic safety and deterioration of the existing road networks.	Low	Possible	Life of Operation Decommissioning
The deterioration of sites of cultural and heritage importance.	Low	Possible	Life of Operation
Loss of agricultural/grazing potential; influx of workers to the area increases health risks and loitering (resulting in lack of security and safety); negative impact of employment loss during site closure.	Low to Medium	Certain	Short-term and Closure
Loss of trust and a good standing relationship with the IAPs.	Low to medium	Possible	Life of Operation Decommissioning
Positive socio-economic impacts during operation, upliftment of previously disadvantaged communities.	Medium to High	Certain	Life of Operation Decommissioning to residual

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)

Methodology used in determining and ranking the nature, severity, consequences, extent, duration and probability of potential environmental impacts and risks.

The Different environmental components on which the project (can) have an impact are:

1. **Geology**
2. **Topography**
3. **Soil**
4. **Land Capability**
5. **Land Use**
6. **Flora (Vegetation)**
7. **Fauna**

8. **Surface Water**
9. **Ground Water**
10. **Air Quality**
11. **Noise and vibration**
12. **Archaeological and Cultural Sites**
13. **Sensitive Landscapes**
14. **Visual Aspects**
15. **Socio-Economic Structures**
16. **Interested and Affected Parties**

The criteria used to assess the Consequence of the impacts are shown in the table 24 below/overleaf. The limits were defined in relation to mining 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 to identify and analyse the various possible impacts.

Table 24. Consequence of impacts is defined as follows.

CONSEQUENCE				
Colour Code	**Consequence rating**	**Rating**	**Negative Impact**	**Positive Impact**
	Very low	3 -16	Acceptable/Not serious	Marginally Positive
	Low	17 - 22	Acceptable/Not serious	Marginally Positive
	Low- Medium	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

Consequence 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.

Low Medium 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. Criteria used to assess the **SIGNIFICANCE** of impacts

Weight	Severity	Spatial scope (Extent)	Duration
5	Disastrous	Trans boundary effects	Permanent
4	Catastrophic / Major	National / Severe environmental damage	Residual
3	High / Critical / Serious	Regional effect	Decommissioning
2	Medium / slightly harmful	Immediate surroundings / local / outside mine fence	Life of Operation
1	Minimal/potentially harmful	Slight permit deviation / on-site	Short term / construction (6 months – 1 year)
0	Insignificant/ non harmful	Activity specific / No effect / Controlled	Immediate (0 – 6 months)

Table 26. Explanation of **PROBABILITY** of impact occurrence

Weight number		1	2	3	4	5
Frequency						
Probability	Frequency of impact	Highly unlikely	Rare	Low likelihood	Probable / Possible	Certain
		Practically impossible	Conceivable but very unlikely	Only remotely possible	Unusual but possible	Definite
	Frequency of activity	Annually or less	6 months/ temporarily	Infrequent	Frequently	Life of Operation

Table 27. Explanation of **SEVERITY** of the impact

Weight	Impact Severity	Explanation of Severity

0	Insignificant/ non harmful	There will be no impact at all – not even a very low impact on the system or any of its parts.
1	Minimal/potentially harmful	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.
2	Medium / slightly harmful	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.
3	High / Critical / Serious	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.
4	Catastrophic / Major	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.
5	Disastrous	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)

During construction and operation of the mine, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. The infrastructure and Mine Residue Dam will alter the topography by adding features to the landscape. Topsoil removal and alluvial mining will unearth the natural topography. The construction of infrastructure and various facilities in the mining area can also result in loss of soil due to erosion. Vegetation where present will be stripped in preparation for placement of infrastructure and loading, and therefore the areas will be bare and susceptible to erosion. The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The declared areas will be rehabilitated, but full restoration of soil might only occur over a number of years, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

During the construction and operation of the mine, there is a possibility that equipment might leak oil, thus causing surface spillages. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances, and loss of soil fertility; and secondly through the improper placement of infrastructure. The site has a land capability for limited grazing, but grazing activities can still be performed in areas not earmarked for mining, and with proper rehabilitation the land capabilities and land use potential can be restored.

If oil and fuel spillages occur, then it will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow.

Construction and mining activities on site will reduce the natural habitat for ecological systems to continue their operation. It is not expected that the areas of high ecological function will rehabilitate following disturbance events. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species. It is expected that protected species if present will be destroyed during the mining operation, the necessary permits will be obtained to remove any protected species.

While general clearing of the area and mining activities destroy natural vegetation, 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 mining 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.

The transformation of natural habitats to mining and associated infrastructure will result in the loss of habitat affected individual species, and ecological processes. In turn this will result in the displacement of faunal species dependent upon such habitat. Increased noise and vibration due to mining activities will disturb and possibly displace birds and other wildlife. Fast moving vehicles take a heavy toll in the form of road kills of small mammals, birds, reptiles, amphibians, and a large number of invertebrates. The

construction of the mine and associated infrastructure will result in the loss of connectivity and fragmentation of natural habitat. Fragmentation of habitat will lead to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This results in a subsequent loss of genetic variability between meta-populations occurring within the site. Pockets of fragmental natural habitats hinder the growth and development of populations.

During the mining operation the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The mine will add a certain amount of noise to the existing noise in the area. However, levels of noise generated by mining activities are low.

The impact of site generated trips on the traffic of the existing roads is experienced to be low. Nevertheless, if road safety is not administered it can have a high impact on the safety of fellow road users.

The mining operation, especially during construction, will create a number of new employment opportunities. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area will possibly impact on safety and security of local residents. During the decommissioning and at closure of the mine, staff will most likely be retrenched. This can potentially flood the job market, resulting in people being unable to find new employment for a long period of time. It is normally more difficult for people with highly specialised skills to find employment immediately. Those with fewer skills have more flexibility in the job market.

Economic slump of the local towns after mine closure is an associated potential impact, although small due to the small scale of the operation. Income streams from wage bills as well as goods and services contracts (at all geographical levels) will come to an end, reducing the monetary income of individuals and mine-related businesses. People who have derived income directly or indirectly from the project may be inclined to leave the region in search of employment or business opportunities. This could result in further decline of the economy of the region as well as the abandonment of infrastructure. The loss of the mine workforce income will also impact upon non-mine related industries within the local and regional areas, particularly the rental property market and retail and service industries who would have received income during the life of mine from the salaried workforce.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the mine, and that the economy will not decline to its original level prior to the development of this project. This is because the mine will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

It is difficult to predict the actual impact of the mine closure in advance, but it is acceptable to assume that the mine closure will have a negative impact on the local and regional economy with a high probability of occurrence, a Low severity and a Low significance.

Positive impacts include employment and training opportunities for people in the local community and local contractors; social upliftment and community development programmes; economic benefits.

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)

Geology and Mineral Resource

Level of risk: Low

Mitigation measures

- Ensure that optimal use is made of the available mineral resource through proper planning.
- The alluvial deposit should be delineated first and all infrastructure positions should be selected with the main aim of avoiding sterilization of future resources.
- No dumping of materials prior to approval by the mine manager.

Topography

Level of risk: Medium to High

Mitigation measures

- Mine all alluvial diamond gravels and rehabilitate material back up to natural ground level.
- Do controlled dumping.
- Employ effective rehabilitation strategies to restore surface topography of the area and plant site.
- Stabilise the excavations and mine residue deposits.
- All temporary infrastructures will be demolished during closure.

Soil Erosion

Level of risk: Medium to High

Mitigation measures

- At no point may plant cover be removed within the no-development zones.
- All attempts must be made to avoid exposure of dispersive soils.

- 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, wherever possible.
- The mining operation must co-ordinate different activities in order to optimise the utilisation of the alluvial mining operations and thereby prevent repeated and unnecessary dumping.
- The run-off from the exposed ground should be controlled with the careful placement of flow retarding barriers.
- The soil that is excavated during construction should be stock-piled in layers and protected by berms to prevent erosion.
- All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses.
- Excavated and stockpiled soil material are to be stored and bermed on the higher laying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.
- Stockpiles susceptible to wind erosion are to be covered during windy periods.
- Audits must be carried out at regular intervals to identify areas where erosion is occurring.
- Appropriate remedial action, including the rehabilitation of the eroded areas, must occur.
- Rehabilitation of the erosion channels and gullies.
- Dust suppression must take place, without compromising the water balance of the area.
- Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.

Soil Pollution

Level of risk: Medium to High

Mitigation measures

- Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
- Spill kits to clean up accidental spills from earthmoving 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 and machinery should be regularly serviced and maintained.

Land Capability and Land Use

Level of risk: Medium to High

Mitigation measures

- Ensure that optimal use is made of the available land through consultation with landowner and proper planning of mining activities.
- Surface agreement to be signed with landowners.
- Employ effective rehabilitation strategies to restore land capability and land use potential of the farm.
- All activities to be restricted within the demarcated areas.
- Ensure that land which is not used during construction is made available for grazing.

Groundwater

Level of risk: Low

Mitigation measures

- Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
- Spill kits to clean up accidental spills from earthmoving 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 and machinery should be regularly serviced and maintained.

Surface Water

Level of risk: Medium to High

Mitigation measures

- Sufficient care must be taken when handling hazardous materials to prevent pollution.
- Under no circumstances may ablutions occur outside the provided facilities.
- If servicing and washing of the vehicls occur on site, there must be specific areas constructed for these activities, which must have concrete foundations, bunding as well as oil traps to contain any spillages.
- A walled concrete platform, dedicated store with adequate flooring or bermed area and ventilation must be used to accommodate chemicals such as fuels, oils, paints, herbicide and insecticides.
- Oil residue shall be treated with oil absorbent and this material removed to an approved waste site.
- Spill kits must be easily accessible and workers must undergo induction regarding the use thereof.
- At all times care should be taken not to contaminate surface water resources.
- Store all litter carefully to prevent it from washing away or blown into any of the drainage channels or Kamfersdam within the area.

- Provide bins for staff at appropriate locations, particularly where food is consumed.
- The mining site should be cleared daily and litter removed.
- Conduct ongoing staff awareness programmes in order to reinforce the need to avoid littering, which contributes to surface water pollution.

Indigenous Flora

Level of risk: Low to Medium

Mitigation measures

- Minimise the footprint of transformation.
- Encourage proper rehabilitaiton of mined areas.
- Encourage the growth of natural plant species.
- Ensure measures for the adherence to the speed limit.
- Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining.
- It is recommended that these plants are identified and marked prior to mining.
- These plants should, where possible, be incorporated into the design layout and left in situ.
- However, if threatened of destruction by mining, these plants should be removed (with the relevant permits from DAFF and DENC) 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.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.

All Invasive Plants

Level of risk: Low to Medium

Mitigation measures

- Minimise the footprint of transformation.
- Encourage proper rehabilitation of mined areas.
- Encourage the growth of natural plant species.
- Mechanical methods (hand-pulling) of control to be implemented extensively.
- Annual follow-up operations to be implemented.

Fauna

Level of risk: Low to Medium

Mitigation measures

- Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall mining footprint.

- The appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.
- The extent of the mine should be demarcated on site layout plans, and no construction personnel or vehicles may leave the demarcated area except those authorised to do so. Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no go zone for employees, machinery or even visitors.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- The ECO 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.
- 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.

Habitat fragmentation

Level of risk: High

Mitigation measures

- Mining activities must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentaton of any important faunal habitat type.
- The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorised to do so.

Air Quality

Level of risk: Low

Mitigation measures

- Vegetation must be removed when soil stripping is required only. These areas should be limited to include those areas required for mining only, hereby reducing the surface area exposed to wind erosion. Adequate demarcation of these areas should be undertaken.
- Control options pertaining to topsoil removal, loading and dumping are generally limited to wet suppression.
- Where it is logistically possible, control methods for gravel roads should be utilised to reduce the re-suspension of particulates. Feasible methods include wet suppression, avoidance of unnecessary traffic, speed control and avoidance of track-on of material onto paved and treated roads.

- The length of time where alluvial dimoand mining areas are exposed should be restricted. Mining should not be delayed after vegetation has been cleared and topsoil removed where possible.
- Dust suppression methods should, where logistically possible, must be implemented at all areas that may/are exposed for long periods of time.
- For all mining activities management should undertake to implement health measures in terms of personal dust exposure, for all its employees.

Noise and Vibration

Level of risk: Low to Medium

Mitigation measures

- Restrict mining activities to daytime unless agreements obtained to do 24hr operations.
- Systematic maintenance of all forms of equipment, training of personnel to adhere to operational procedures that reduce the occurrence and magnitude of individual noisy events.
- Where possible material stockpiles should be placed so as to protect the boundaries from noise to individual operations.
- Standardised noise measurements should be carried out on individual equipment at the delivery to site to construct a reference data-base and regular checks carried out to ensure that equipment is not deteriorating and to detect increases which could lead to increase in the noise impact over time and increased complaints.
- Environmental noise monitoring should be carried out regularly to detect deviations from predicted noise levels and enable corrective measures to be taken where warranted.

Visual Impacts

Level of risk: Low

Mitigation measures

- Infrastructure should be placed to optimise the natural screening capacity of the vegetation.
- Where practical, protect existing vegetation clumps during in order to facilitate screening during the mining operation.
- Remove rubble and other building rubbish off site as soon as possible or place it in a container in order to keep the mining site free from additional unsightly elements.
- Dust suppression procedures should be implemented especially on windy days during earth works.
- Rehabilitation should aim to establish a diverse and self-sustaining surface cover that is visually and ecologically representative of naturally occurring vegetation species.

- Implement a management plan for the post-mining site in order to control the invasion of alien vegetation and to manage erosion, until the site is fully rehabilitated.

Traffic and Road Safety
Level of risk: Low

Mitigation measures
- Implement measures that ensure the adherence to traffic rules.

Heritage Resources
Level of risk: Low

Mitigation measures
- The heritage if any is encountered and cultural resources (e.g. graveyards, ruins, historic structures, etc.) must be protected and preserved by the delination of no go zones.
- Intact bedrock strata should be avoided during mining of terrace gravels where possible.
- Stone tools should be avoided where possible and fresh exposure should be recorded before destruction. All stone tool artefacts should be recorded, mapped and collected before destruction.
- Should development necessitate impact on any building structures, the developer should apply for a SAHRA Site Destruction Permit prior to commencement of construction.

Socio-Economic
Level of risk: Low to Medium

Mitigation measures
- The mine must ensure that false expectations are not created regarding job creation.
- Jobs must be allocated as advertised and in so far as is possible to local inhabitants.
- Contractors and employees should not be permitted to wander outside the mining area.
- Uncontrolled settlement of contractors and workers outside of the site will be prevented.
- The expectations of what benefits can accrue to the community must be managed from the initiation of the project.
- Commitments as set out in the SLP must be attained.

Interested and Affected Parties
Level of risk: Low to Medium

Mitigation measures

- Maintain active communications with IAPs.
- Ensure transparent communication with IAPs at all times.
- IAPs must be kept up to date on any changes in the mining operation.
- A complaints management system should be maintained by the mine to ensure that all issues raised by community members are followed up and addressed appropriately.

ix) The outcome of the site selection Matrix. Final Site Layout Plan

(Provide a final site layout plan as informed by the process of consultation with interested and affected parties)

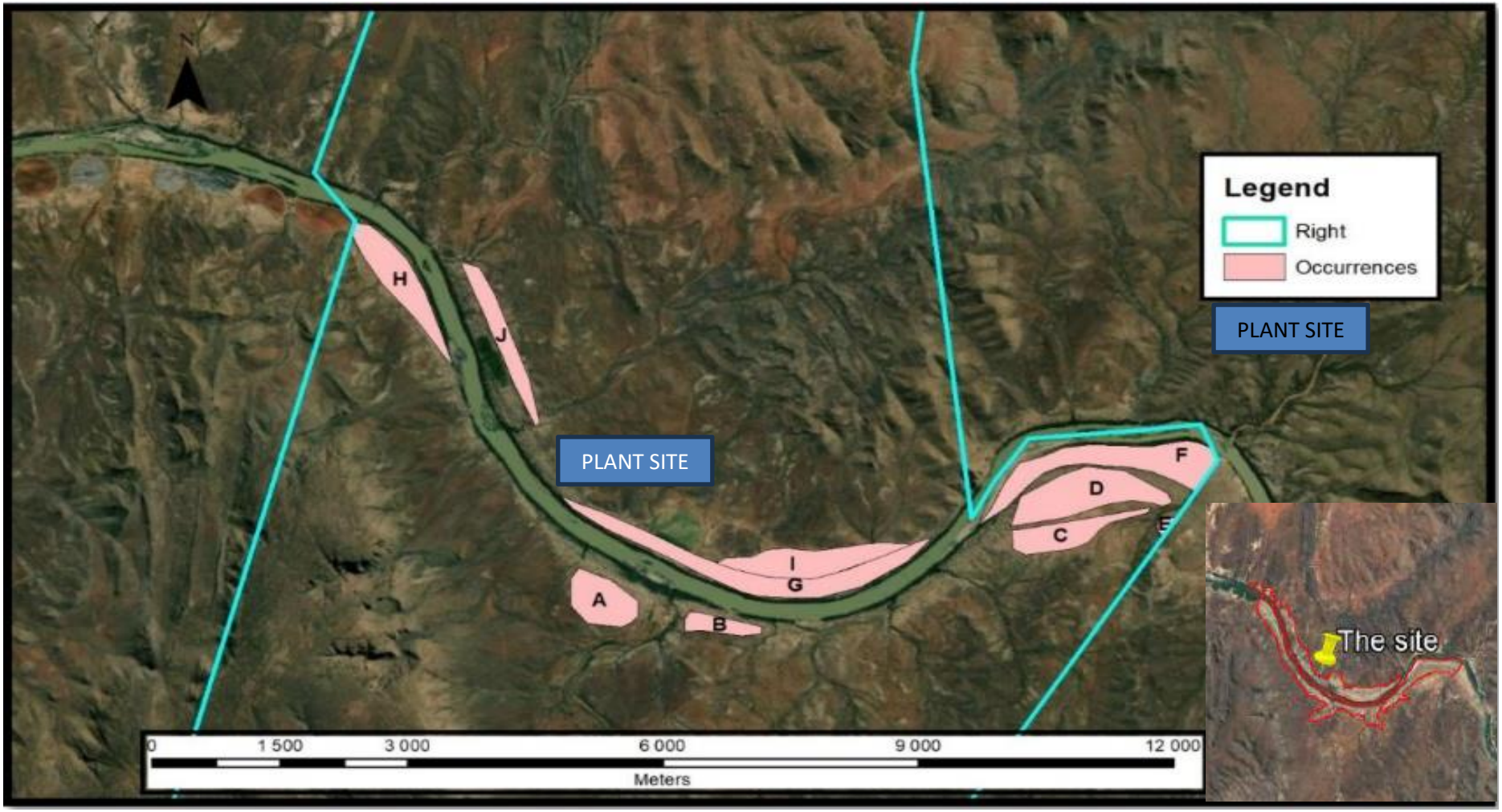


Figure 35. Final site layout plan

x) Motivation where no alternative sites were considered

No alternative location for the proposed mining operation was considered, as the alluvial diamond resources has been deposited in this area. There is therefore no other alternative regarding the overall operation footprint.

xi) Statement motivating the preferred site.

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

Not applicable. There is no alternative development location for the site as this is the area with the mineable resource that was identified with prospecting.

i) Plan of study for the Environmental Impact Assessment Process

i) Description of alternatives to be considered including the option of not going ahead with the activity

- **Land use development alternatives:**
  The site layout may vary, depending on the operational requirements. However, the final design and layout of the infrastructure will be planned and decided upon by the developer on the grounds of reserves, and placement of infrastructure based on hauling distance, environmental features such as wind direction, heritage findings, protected species, and stormwater management on the mine.

- **No-go option:**
  The following positive impacts will be lost if the proposed mining project is not developed:
  - TAX and VAT obligations to SARS as well as Royalties;
  - CAPEX spent locally and regionally;
  - Employment opportunities;
  - Payroll income;
  - Operating expenditure and maintenance (OPEX);
  - Revenue.

Mining activities are believed to be one of the economically beneficial options for the areas.

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 diamond industry. 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.

ii) Description of the aspects to be assessed as part of the environmental impact assessment process

(The EAP must undertake to assess the aspects affected by each individual mining activity whether listed or not, including activities such as blasting, Loading, hauling and transport, and mining activities such as Excavations, stockpiles, dicard dumps or dams, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control berms, roads, pipelines, powerlines, conveyers, etc..etc…)

1. The clearing of vegetation for:
   - Access roads and haul roads
   - Surface infrastructure
   - Product Stockpile area
   - Waste disposal site (domestic and industrial waste)

2. The stripping and stockpiling of topsoil.

3. Load and Haul Operation for the mining of alluvial gravels.

4. Altering the characteristics of surface water features (possible drainage channel).

5. The development of temporary stockpiles:
   - Topsoil storage area;
   - Mine Residue Dam.

6. The rehabilitation of footprint areas where the open blocks have been excavated.

7. The construction of Processing plant.

8. Loading, hauling and transporting of ROM, product and material

9. Water holding facilities, pipeline and stormwater control:
   - Clean & Dirty water system: Water storage facility;
   - Water distribution Pipeline;
   - Water tank.

10. Fuel storage and refuelling bays;
    - Fuel Storage facility (Diesel tanks);
    - Concrete bund walls and diesel depots.

11. Supporting infrastructure:
    - Temporary Offices;
    - Office Parking Bay;
    - Temporary Workshop and Wash bay;
    - Salvage yard (Storage and laydown area);
    - Ablution facilities/ Sewage facilities;
    - Generators;
    - Pipelines transporting water;

(ii) Description of aspects to be assessed by specialists:

The application area is next to the Orange River. With the prospecting right application an ecological study and heritage study was done. These studies will be revisited and reviewed to include and rate the mining impacts proposed.

(iii) Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives:

The receiving environment will be determined using a combination of on-site observations, spatial information, project description, site layout and previous studies currently available to the EAP. Based on the EAPs knowledge and experience, the receiving environment will include geological features, topography, land use, archaeological and historical sites, surface water, groundwater, terrestrial ecology, air quality, noise, etc.

The identification of potential impacts of the mining activity will be based on the legal requirements; the nature of the proposed activity; the nature of the receiving environment; and issues raised during the public participation process. Considering the factors listed above and based on the EAPs knowledge and experience, environmental impacts that could potentially result from the mining activities include impacts on air quality, noise, fauna, flora, ground water, terrestrial ecology, heritage resources, socio-economy, aquatic environments, visuals, storm water and erosion.

The consideration of alternatives is a critical component of the EIA process, where an appropriate range of alternatives require consideration whilst achieving the desired objective of the proposed project. In order to ensure that the proposed project enables sustainable mining, a number of feasible options will be explored. The various alternatives in terms of land use, project infrastructure, mining method and proceeding without the mining operation will be assessed in terms of logistical practicality, environmental acceptability and economic feasibility. Alternatives for the locality of the mining operation will however not form part of this consideration, as the location of the mining site is determined by the geological location of the mineral resource.

(iv) The proposed method of assessing duration significance:

The lifetime of the impact will be measured in the context of the lifetime of the proposed phase or activity.

Weight	Duration of Impact	Explanation of Duration
1	Very Short	Less than 1 year
2	Short	1 to 5 years
3	Medium	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

- **Short term**
  The impact will either disappear with mitigation or will be mitigated through natural process in a short time period.

- **Medium term**
  The impact will last up to the end of the mining period, where after it will be entirely negated.

- **Long term**
  The impact will continue or last for the entire operational life of the mine but will be mitigated by direct human action or by natural processes thereafter.

- **Permanent**
  The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

(v) The stages at which the Competent Authority will be consulted:

Consultation with the Competent Authority will take place throughout the application process, however more specifically; consultation will take place before submission of the Scoping Report and again before submission of the EIA/EMPR Report.

(vi) Particulars of the public participation process with regard to the Impact Assessment process that will conducted:

1. Steps to be taken to notify interested and affected parties:

(These steps must include the steps that will be taken to ensure consultation with the affected parties identified in (h)(ii) herein.)

The consultation process as described by NEMA for Environmental Authorisation was followed and is still in process. The following steps were already taken:

- Notification letters were sent to all interested and/or affected parties on the 4 July 2023. Attached to each of these letters was a Draft Scoping report, containing information relating to the proposed project for comments.
- A newspaper advert will be placed in the Kathu Gazette newspaper on 7 July 2023.
- Notices were placed at the entrances to the farms and in the library in Prieska.

Proof of notification and consultation is attached as Appendix 3. The consultation process is still in process.

2. Details of the engagement process to be followed:

(Describe the process to be 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 and record of such consultation will be required in the EIA at a later stage.)

The following procedures will be followed:

- Public meetings will be held with registered IAPs at suitable venues and on appropriate dates, depending on the feedback received during the consultation process.
- An IAP register will be compiled, and regular and ongoing follow-up sessions will be held with the IAPs to monitor those issues raised during the IAP process and that are deemed to be affected by the mining operation.
- Environmental documents will be sent to all registered IAPs and this documentation (Scoping, EMP and EMPR) will be made available in public libraries.
- Records will be kept of the complaints and the mitigation measures implemented.

3. Description of the information to be provided to Interested and Affected Parties:

(Information to be provided must include the initial site plan and sufficient detail of the intended operation and the typical impacts of each activity, to enable them to assess what impact the activities will have on them or on the use of their land.)

The following information will be provided to IAPs:

- The site plan;
- List of activities to be authorised;
- Scale and extent of activities to be authorised;
- Typical impacts of activities to be authorised;
- The duration of the activity.

The following information will be requested from the IAPs:

- To provide information on how they consider that the proposed activities will impact on them or their socio-economic conditions;
- To provide written responses stating their suggestions to mitigate the anticipated impacts of each activity;
- To provide information on current land uses and their location within the area under consideration;
- To provide information on the location of environmental features on site to make proposals as to how and to what standard the impacts on site can be remedied. They will be requested to make written proposals;
- To mitigate the potential impacts on their socio economic conditions to make proposals as to how the potential impacts on their infrastructure can be managed, avoided or remedied).

(vii) Description of the tasks that will be undertaken during the environmental impact assessment process:

Determining environmental attributes

The receiving environment will be determined using a combination of on-site observations, spatial information, project description, site layout and previous studies currently available to the EAP. Based on the EAPs knowledge and experience, the receiving environment will include geological features, topography, land use, archaeological and historical sites, surface water, groundwater, terrestrial ecology, air quality, noise, etc.

Identification of impacts and risks

The identification of potential impacts of the mining activity will be based on the legal requirements; the nature of the proposed activity; the nature of the receiving environment; and issues raised during the public participation process.

Considering the factors listed above and based on the EAPs knowledge and experience, environmental impacts that could potentially result from the mining activities include impacts on air quality, noise, fauna, flora, ground water, surface water, terrestrial ecology, heritage resources, socio-economy, aquatic environments, visuals, stormwater and erosion.

Consideration of alternatives

The consideration of alternatives is a critical component of the EIA process, where an appropriate range of alternatives require consideration whilst achieving the desired objective of the mining project. In order to ensure that the proposed project enables sustainable mining, a number of feasible options will be explored. The various alternatives in terms of land use, project infrastructure, mining method and proceeding without the mining operation will be assessed in terms of logistical practicality, environmental acceptability and economic feasibility.

Alternatives for the locality of the mining operation will however not form part of this consideration, as the location of the mining site is determined by the geological location of the mineral resource.

(viii) Measures to avoid, reverse, mitigate, or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored:

ACTIVITY Whether listed or not listed (e.g. excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water suppy dams and boreholes, accommodation, offices, ablution, stores, workshops, processing lant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc…)	**POTENTIAL IMPACT** (e.g. dust, noise, drainage, surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…etc…)	**MITIGATION TYPE** modify, remedy, control or stop (e.g. noise control measures, stormwater control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc…etc…) (e.g. modify through alternative method. Control through management and monitoring through rehabilitation.)	**POTENTIAL FOR RESIDUAL RISK**
Ablution facilities Chemical toilets	• Soil contamination • Groundwater contamination • Odours	• Maintenance of chemical toilets on regular basis. • Removal of containers upon closure.	Very low
Clean & Dirty water system	• Surface disturbance • Groundwater contamination • Soil contamination • Surface water contamination	• Maintenance of berms and trenches. • Oil traps used in relevant areas. • Drip trays used. • Immediately clean hydrocarbon spill.	Low/Medium
Diesel tanks	• Groundwater contamination • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance	• Maintenance of diesel tanks and bund walls. • Oil traps. • Groundwater quality monitoring. • Drip tray at re-fuelling point. • Immediately clean hydrocarbon spill.	Medium
Opencast Alluvial Diamond mining	• Dust • Possible Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna	• Access control • Dust control and monitoring • Groundwater quality monitoring • Noise control and monitoring • Continuous rehabilitation • Stormwater run-off control • Immediately clean hydrocarbon spill	Medium

	• Soil contamination • Surface disturbance • Surface water contamination	• Drip trays • Erosion control	
Generators	• Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance	• Access control • Maintenance of generator and bund walls • Noise control and monitoring • Oil traps • Groundwater quality monitoring • Immediately clean hydrocarbon spill	Medium
Office – Pre-fabricated office blocks on concrete	• Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance	• Immediately clean hydrocarbon spill • Rip disturbed areas to allow re-growth of vegetation cover	Low
Parking bay	• Dust • Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• Dust control and monitoring • Noise control and monitoring • Drip trays • Stormwater run-off control. • Immediately clean hydrocarbon spills • Rip disturbed areas to allow re-growth of vegetation cover	Low
Processing plant	• Dust • Noise • Groundwater contamination • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance	• Access control • Maintenance of processing plant • Dust control and monitoring • Groundwater quality and level monitoring • Noise control and monitoring • Drip trays • Stormwater run-off control. • Immediately clean hydrocarbon spills • Rip disturbed areas to allow re-growth of vegetation cover	Medium
Water distribution Pipeline	• Surface disturbance	• Maintenance of pipes.	Low

	• Possible Groundwater contamination • Soil contamination • Surface water contamination		
Roads	• Dust • Possible Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• Maintenance of roads • Dust control and monitoring • Noise control and monitoring • Speed limits • Stormwater run-off control. • Erosion control • Immediately clean hydrocarbon spills • Rip disturbed areas to allow re-growth of vegetation cover	Low
Salvage yard	• Possible Groundwater contamination • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination • Surface disturbance • Surface water contamination	• Access control • Maintenance of fence. • Stormwater run-off control • Immediately clean hydrocarbon spill	Low
Stockpile area	• Dust • Possible Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• Dust control and monitoring • Noise control and monitoring • Drip trays • Stormwater run-off control. • Immediately clean hydrocarbon spills • Rip disturbed areas to allow re-growth of vegetation cover	Low
Topsoil storage area	• Dust • Removal and disturbance of vegetation cover and natural habitat of fauna • Soil disturbance	• Dust control and monitoring • Stormwater run-off control. • Continuous rehabilitation • Rip disturbed areas to allow re-growth of vegetation cover	Low

	• Surface disturbance	• Backfilling of topsoil during rehabilitation	
Waste disposal site	• Groundwater contamination • Surface water contamination	• Storage of waste within receptacles • Storage of hazardous waste on concrete floor with bund wall • Removal of waste on regular intervals.	Low
Mine Residue Dam	• Dust • Possible Groundwater contamination • Noise • Removal and disturbance of vegetation cover and natural habitat of fauna • Surface disturbance	• Dust control and monitoring • Groundwater quality monitoring • Noise control and monitoring • Stormwater run-off control. • Rip disturbed areas to allow re-growth of vegetation cover	Low
Washbay	• Possible Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna • Soil contamination	• Groundwater quality and level monitoring • Concrete floor with oil/water separator • Stormwater run-off control • Immediately clean hydrocarbon spills	Low
Water tank: It is anticipated that the operation will establish 1 x 10 000 litre water tanks with purifiers for potable water.	• Orange river water and usage • Surface disturbance	• Monitor water quality and quantity. • Maintenance of tanks (check for leaks).	Low

(ix) Other information required by the Competent Authority:

1. 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:-

a. Impact on the socio-economic conditions of any directly affected person:

(Provide the results of investigation, assessment and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected parson including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix '7' and confirm that the applicable mitigation is reflected in 2.5.3, 2.11.6 and 2.12 herein.)

The socio-economic conditions of the local community could be affected in two ways:

- Negative impacts to the welfare of the residents and workers through general nuisance, dust generation, damages to properties and any associated potential safety risks.
- Positive impacts through job creation and local business opportunities.
- The consultation with interested and affected parties is on-going and any issues, concerns or comments will be considered and included in the EIA report and control measures will be presented in the EMP report.

b. Impact on any national estate referred to in Section 3(2) of the National Heritage Resources Act:

(Provide the results of investigation, assessment and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in Section 3(2) of the National Heritage Resources Act, 1999 (Act 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 '8' and confirm that the applicable mitigation is reflected in 2.5.3, 2.11.6 and 2.12 herein.)

A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR A PROPOSED Prospecting RIGHTS APPLICATION ON THE FARMS FOLMINK 331, KLOOFFONTEIN 332, MIDDELWATER 18 AND FARM 597, CLOSE TO PRIESKA, NORTHERN CAPE PROVINCE was done by Prof. A.C. van Vollenhoven (L.AKAD.SA.) on 26 June 2018. The report is appended as Appendix 5 to this report.

Six sites of cultural heritage significance were identified during the survey. These were all found outside of the area of impact. Background information is given in order to place the surveyed area in a historical context and to contextualize possible finds that could be unearthed during mining activities.

There is limited archaeological information available of the area around Prieska. Known information is included in the discussion below.

Stone Age

The Stone Age is the period in human history when lithic material was mainly used to produce tools (Coertze & Coertze 1996: 293). In South Africa the Stone Age can be divided in three periods. It is, however, important to note that dates

are relative and only provide a broad framework for interpretation. The division for the Stone Age according to Korsman & Meyer (1999: 93-94) is as follows:
Early Stone Age (ESA) 2 million – 150 000 years ago
Middle Stone Age (MSA) 150 000 – 30 000 years ago
Late Stone Age (LSA) 40 000 years ago – 1850 - A.D.

This geographical area is not well-known as one containing many prehistoric sites. One however must realize that this most likely only indicates that not much research has been done here before.

MSA lithic tools were found on the farm Bundu, some 30 km to the south-west (Kiberd 2002). LSA material have been excavated at Noute-se-Berg towards the south-east of the study area (Beaumont & Vogel 1989). These dated to 1650 BP (Beaumont & Morris 1990). At Prieska more LSA tools were excavated by Beaumont.

Many Middle and Late Stone Age tools have been found by Archaetnos during surveys in the Northern Cape. These include isolated MSA and LSA stone tools found at Verdoorst Kolk, close to Brandvlei and at Kanakies close to Loeriesfontein (Archaetnos' database).

At Kenhardt, approximately 150 km north-west of the surveyed area stone tools were also identified. On the farm Konkooksies 91 in the Pofadder district, five sites with Middle and Late Stone Age tools were identified (Archaetnos database). Rock engraving (rock pecking) sites are known from the nearby Putsonderwater (Archaetnos database). Rock engravings are associated with the Late Stone Age people.

The mentioned Late Stone Age sites are associated with the San people. Mitchell (2002: 126) indicates that the language group who occupied the Northern Cape is the /Xam. These people were hunters and gatherers which means that they would have moved around, leaving little trace of their existence. The Hantam, Namaqualand and Bushmanland were of the last regions of the Cape Province to be settled by early European farmers. The result was that it became a last outpost of the /Xam Bushman who still hunted and gathered there in the last decades of the 19th Century (Deacon 1986, 1997).

Isolated MSA and LSA tools were found scattered throughout the surveyed area. This indicates the presence of these people during the Stone Age.
From the above mentioned it is clear that Stone Age people did utilize the area by settling and probably hunting and gathering in it. The environment definitely would be supportive to Stone Age activities. The hills most likely would have given natural shelter and material to make stone tools from. These volcanic intrusions definitely give material suitable for the manufacture of lithic tools.

Although the large flat surrounding area would not have given shelter, it must have been a prime hunting area.

Iron Age

The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artifacts (Coertze & Coertze 1996: 346). In South Africa it can be divided in two separate phases according to Van der Ryst & Meyer (1999: 96-98), namely:

Early Iron Age (EIA) 200 – 1000 A.D.
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however, indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:
Early Iron Age (EIA) 250 – 900 A.D.
Middle Iron Age (MIA) 900 – 1300 A.D.
Late Iron Age (LIA) 1300 – 1840 A.D.

No Early or Middle Iron Age sites have been identified in the area of study. Iron Age people occupied the central and eastern parts of southern Africa from about 200 A.D., but the San and Khoi remained in the western and southern parts (Inskeep 1978: 126; see also Huffman 2007).

During the Late Iron Age (LIA), people stayed in extensive stonewalled settlements, such as the Thlaping capital Dithakong, 40 km north of Kuruman. Sotho-Tswana and Nguni societies, the descendants of the LIA mixed farming communities, found the region already sparsely inhabited by the Late Stone Age (LSA) Khoisan groups, the so-called 'first people'. Most of them were eventually assimilated by LIA communities and only a few managed to survive, such as the Korana and Griqua. This period of contact is sometimes known as the Ceramic Late Stone Age and is represented by the Blinkklipkop specularite mine near Postmasburg and finds at the Kathu Pan (De Jong 2010: 36). It is also known that Late Iron Age people did utilize the area close to the Orange River, albeit briefly, as they did mine copper in the Northern Cape (Inskeep 1978: 135).
Iron Age people therefore did not settle in the study area. It therefore is no surprise that no such sites were identified during the survey.

Historical Age

The historical age started with the first recorded oral histories in the area. It includes the moving into the area of people that were able to read and write. This era is sometimes called the Colonial era or the recent past. Due to factors such as population growth and a decrease in mortality rates, more people inhabited the country during the recent historical past. Therefore, and because

less time has passed, much more cultural heritage resources from this era have been left on the landscape.
It is important to note that all cultural resources older than 60 years are potentially regarded as part of the heritage and that detailed studies are needed to determine whether these indeed have cultural significance. Factors to be considered include aesthetic, scientific, cultural and religious value of such resources.
Such sites include the many historical buildings and structures indicated on the SAHRA database such as a British blockhouse in Prieska as well as buildings in Kakamas, Keimoes, Loeriesfontein and Brandvlei (SAHRA Database). These sites are associated with the early missionaries, travelers, first white farmers and establishment of towns during the 19th century.

From the 1880's onwards colonial settlement was promoted in the area. Government-owned land was surveyed and divided into farms, which were transferred to farmers. Surveyors were given the task of surveying and naming some of the many farms in this region. These farms were allocated to prospective farmers, but permanent settlement only started in the late 1920s and the first farmsteads were possibly built during this period. The region remained sparsely populated until the advent of the 20th century (De Jong 2010: 36).
Most of the farms in the broader geographic region were still Government farms and were leased to farmers in 1875 (Van Zyl 2010: 13). It seems as if shortly hereafter farms were sold to individuals. The above-mentioned information means that the buildings on these farms could only have been built after the mid-19th century and most likely after 1875.

As indicated six sites have been identified. None of these will directly be impacted on by the proposed prospecting activities. However, secondary impact, e.g. dust may be experienced, and the developers need to be aware of these sites in order to steer well clear thereof.

Site 1 – Terraced stone walling/ weir
The site consists of parallel stone walling forming a weir in a dry river bed, with associated stone walling along the river. The highest of the remaining walls is approximately 1 m high.
GPS: 29°22'24.3"S
22°31'37.1"E

Site 2 – Farm yard
The site consists of a house and various outbuildings and other related farm features. It is in a dilapidated condition and probably roundabout 60 years of age (dating to the 1960s).
GPS: 29°26'07.7"S
22°31'38.8"E

Site 3 – Lower grinding stone
This is not an actual site by an isolated lower grinding stone. It is similar to those used during the Iron Age for grinding sorghum. This one however also have paintings on which seems to have been done fairly recently. It may therefore be totally out of context.
GPS: 29°25'35.2"S
22°30'34.9"E

Site 4 – whetstone
This again is not an actual site by an isolated find, namely a whetstone. It was probably used during the Stone Age to sharpen arrow heads. Nothing else was noted in its vicinity and therefore it may be totally out of context.
GPS: 29°24'12.5"S
22°30'25.1"E

Site 5 – Grave yard
This is a grave yard consisting of at least three graves. These are all stone packed and two of them have headstones. No legible information is available. There is also nothing else of cultural heritage value in the vicinity. It is therefore believed to be the graves of travelers or people who died during the time the farm was used for winter grazing. All the graves are therefore unknown graves. These should be dealt with as heritage graves (older than 60 years).
GPS: 29°23'37.4"S
22°30' 29.8"E

Site 6 – farm house and stone kraal
The site consists of a house with four rooms, built from stone as well as an associated kraal. It may be the first permanent building on the farm and probably dates back to the late 19th/ early 20th century. The windows of the house have been closed up by stones, an indication that it later-on received another function, probably a store room.
GPS: 29°22'20.2"S
22°31'33.9"E

Should any other heritage features and/or objects be located or observed, a heritage specialist will be contacted immediately. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that a heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. If the prospecting operation is approved, the heritage resources if any other had been encountered will be protected through the demarcation of no-go zones and fencing off.

(x) 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 details, 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 '9'.)

As mentioned before, the specific occurrence of diamonds in the area dictates the selection of the specific mining site and there are no alternatives in terms of project location.

Site selection of the mining areas was guided by:

- Comments received during the consultation process during prospecting,
- Geological investigation / Bulk sampling results,
- Current land use,
- Proximity to historical mining sites,
- Proximity to the Orange River,
- Proximity to receptors,
- Proximity to infrastructure and
- Natural undisturbed areas.
- Careful consideration has been given to current land use. Alternative sites located on active farming lands have been excluded.

The mining operation will provide ±61 jobs and will also add to the increased economic activity and the area surrounding the farm.

Negative impacts on the area are expected to be temporary and can be mitigated to a large extent if the recommendations of the EMPR area adhered to e.g. rehabilitation.

(xi) Undertaking regarding correctness of information:

I, RH Oosthuizen, ID number 7004180037082, herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected Parties has been correctly recorded in the report.

Signature of EAP
Date: 3 July 2023

(xii) Undertaking regarding level of agreement:

I, RH Oosthuizen, ID number 7004180037082, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with Interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

Signature of EAP
Date: 3 July 2023

- END -