mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

and

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT: **David John de Smidt**
TEL NO: **(053) 203 8163**
CEL NO: **(082) 802 1333**
FAX NO: **(086) 510 7120**
POSTAL ADDRESS: **PO Box 281; Die Lande; Hopetown; 8750**
PHYSICAL ADDRESS: **Die Lande; Douglas, 8730**

FILE REFERENCE NUMBER SAMRAD: **(NC) 30/5/1/2/2/10175 MR**

1. IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act, 2002 (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, 1998 (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

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

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

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

2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

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

(b) describe 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 the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the—

  (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

  (ii) degree to which these impacts—

    (aa) can be reserved;

    (bb) may cause irreplaceable loss of resources; and

    (cc) can be avoided, managed or mitigated.

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

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

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

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3. Contact Person and Correspondence Address

a) Details of

i) Details of the EAP

Name of the Practitioner: **ROELINA OOSTHUIZEN**
Tel No.: **053 8320029**
Cell No.: **084 208 9088**
Fax No.: **086 510 7120**
E-mail address: **roosthuizen950@gmail.com**

ii) Expertise of the EAP

(1) The qualifications of the EAP

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.
Please refer to attached CV.
(with evidence attached as **Appendix 2**)

b) Description of the property

Farm Name:	Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20, Hopetown District: Hopetown Province: Northern Cape Extent: 1323,7453 ha Title Deed No: T25656/1970
Application area (Ha)	1323,7453 ha (One thousand three hundred and twenty-three comma seven four five three hectares.)
Magisterial district:	Hopetown
Distance and direction from nearest town	The farm Saxendrift 20 is situated in the Northern Cape about 80 km south west of Douglas along the R357 tar road to Prieska. The farm borders on the Orange River to the South West.
21 digit Surveyor General Code for each farm portion	C03300000000002000001

c) Locality map

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

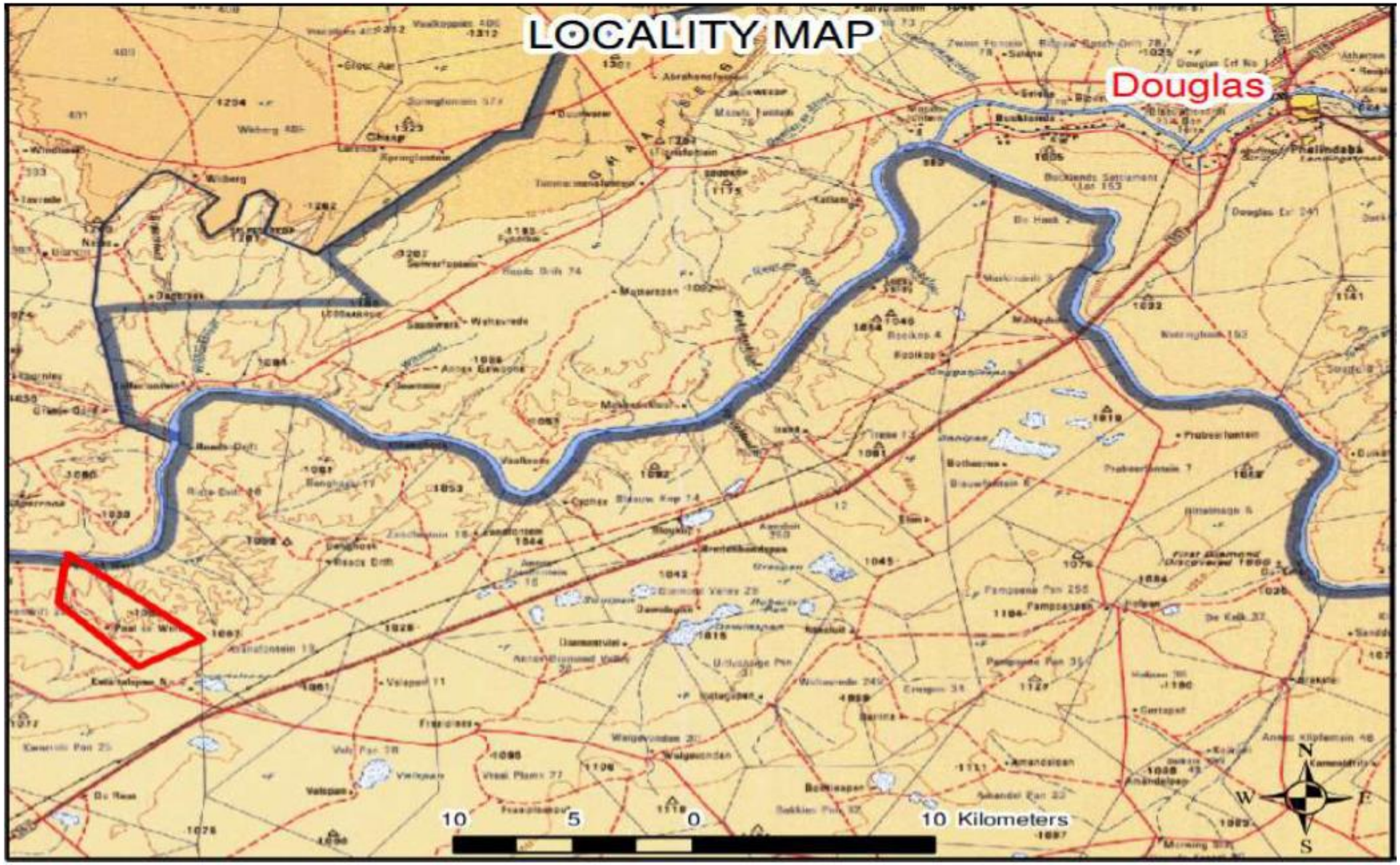

Figure 1. Locality Plan indicating the application area with a RED figure.

d) Description of the scope of the proposed overall activity

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

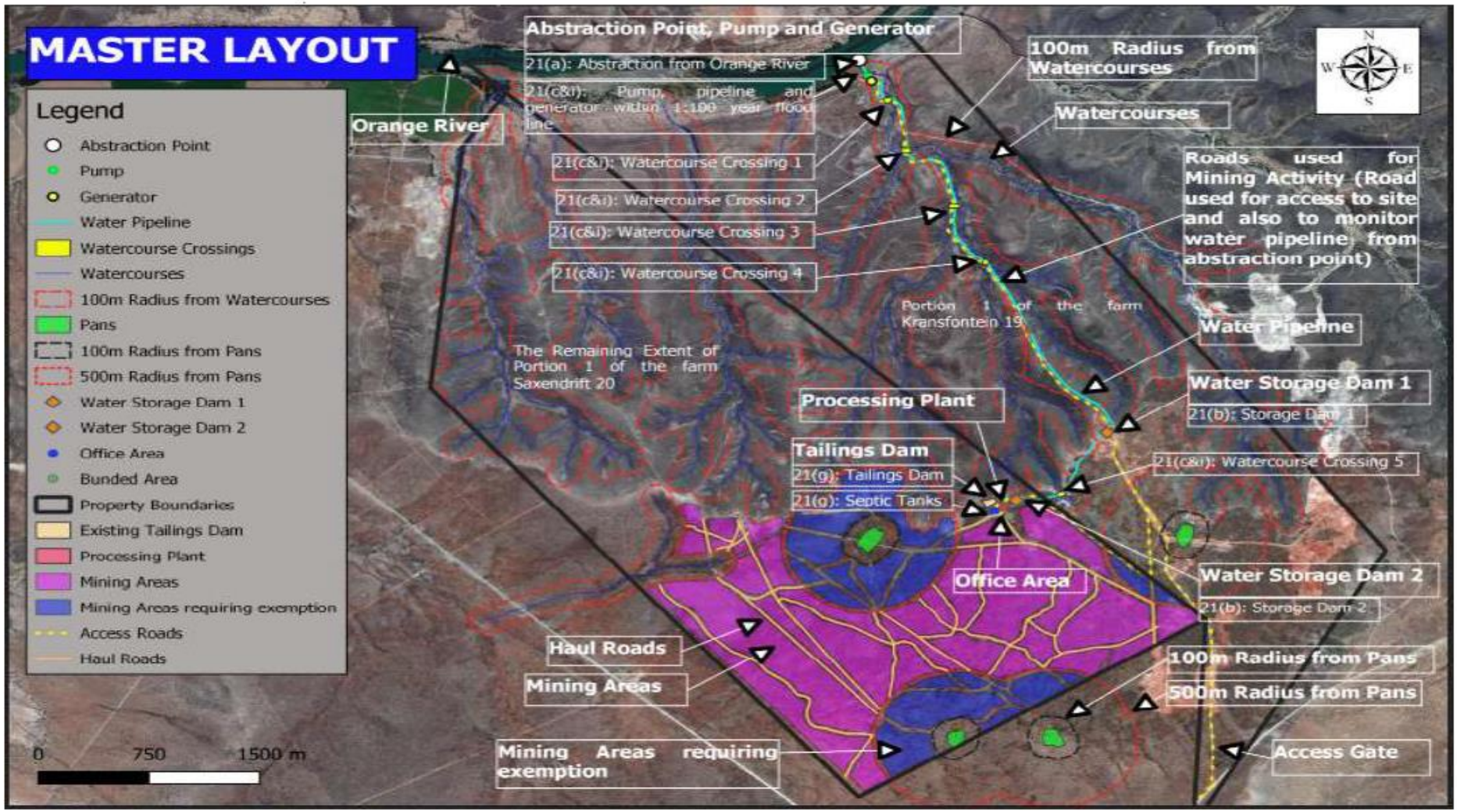

Figure 2. A map of the area indicating the overall location and extent of PROPOSED listed activities and main infrastructure on the mining site

i) Listed and specified activities

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	X	NEMA: LN1 (GNR327)

soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	received from DWA on non-perennial drainage channels.		
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 10 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 David John de Smidt operation directly relates to mining of a mineral resource (diamonds) and requires a mining right.	1323,7453 Ha	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 calculated	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.	±436 ha	X	NEMA: LN2 (GNR325)

Activity 15: The establishment of residue deposits resulting from activities which require a mining right.	0.3ha		NEMWA: Category A (GNR 633)
Office complexes Temporary workshop facilities Storage facilities Concrete bund walls and diesel depots Ablution facilities Topsoil stockpiles Overburden stockpiles Water tanks	± 200 m^2 ± 300 m^2 ± 2 000 m^2 ± 250 m^2 ± 30 m^2 ± 500 m^2 5 000 m^2 3m x 3m = 9m^2 each		Not Listed
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 = 450m^2		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 mining operation is primarily based on alluvial diamond deposits that are restricted to the alluvial terraces south of the Orange River at elevations of 1 000 and 1 100 m.a.s.l. Deposits will be sampled by means of an opencast method using heavy earthmoving machinery. Vegetated soil or overburden will be stripped, and the underlying gravels will be excavated, screened, and treated through a rotary plan plant before fed to a sorting plant for final recovery.

Screened material smaller than 100 mm will be transported to a stockpiling area via frond-end loader. From here it will be transported to a conveyor belt, which will feed it onto a wet rotary screen and then directly onto at approximately 4 X 16 feet washing pans.

The rough diamond product will then be removed for further beneficiation. No ore processing reagents are required or used in the treatment of the ore. Approximately 430 ha of surface area will be cleared for mining purposes over 10 years.

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

- The coarse gravel sifted at the grizzly screen, tailing from the pans and fine concentrate will be transported back to and dumped into open excavations.
- 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.

Process water is sourced from the Orange River. Other sources include pumping water from the slime's disposal facility and rainwater that collects within the mining excavations/blocks. The production rate of the proposed operation will be approximately 78 tph per pan.

Approximately 19 000 litres of process water will be required by the proposed mining operation per hour per pan however modern technology in de-sanding may reduce water consumption in some areas.

Waste Management

Proper sanitation facilities will be provided for employees. Acceptable hygienic and aesthetic practices will be adhered to. Nonbiodegradable refuse such as glass bottles, plastic bags, etc. will be sorted and stored in separate lockable containers at a central point. It will be disposed of at a recognised disposal facility twice a month. Biodegradable refuse will either be handled as indicated, or be buried in a pit excavated for that purpose and covered with layers of soil when almost full. A final 0,5m thick layer of topsoil will be incorporated where practicable. Provision will be made for the future subsidence of the covering. Refuse will not be dumped in the vicinity of the mining area. Waste material with regard to vehicle repairs will be kept in 200 litres steel containers in

the maintenance/farmstead area. This material will be disposed of at a recognised disposal facility once a month.

Access Roads

The farm Saxendrift 20 is situated in the Northern Cape about 80 km south west of Douglas along the R357 tar road to Prieska. The farm borders on the Orange River to the South West. Activities associated with the Mine that is expected to make use of these roads include:-

- The transportation of mining personnel to and from the site;
- Delivery of supplies and materials;
- The transportation of the product for the market.

These transport operations will make use of passenger vehicles, light delivery vehicles and very limited heavy vehicles.

Haul Roads

There will be one Haul Road to the plant area and one haul road to the mining site. No other haul roads will be constructed. Main haul roads will have a minimum width of 15m. No roads will be wider than 15m. Existing roads will be used as far as practically possible.

e) Policy and Legislative Context

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

Hazardous Substances Act (Act 15 of 1973) and Regulations read together with NEMA and NEMWA	- Definition, classification, use, operation, modification, disposal or dumping of hazardous substances.	- Noted and Considered measures are to be implemented upon the approval of the EMPR.
Intergovernmental Relations Act (Act 13 of 2005)	- This Act establishes a framework for the National, Provincial and Local Governments to promote and facilitate intergovernmental relations.	
Mine, Health and Safety Act (Act 29 of 1996) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Mineral and Petroleum Resources Development Act (Act 28 of 2002) and Regulations as amended	- Entire Act. - Regulations GN R527	- A Mining Right has been applied for (NC) 30/5/1/2/2/10175 MR. - 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)	- Control measures are to be implemented upon the approval of the EMPR.

	- Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption) - Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations) - Regulations GN R1147, published on 20 November 2015 in terms of NEMA (Financial Provision)	
National Environmental Management: Air Quality Act (Act 39 of 2004)	- Section 32: Control of dust - Section 34: Control of noise - Section 35: Control of offensive odours - Regulation GN R551, published on 12 June 2015 (amended Categories 1 to 5 of GN 983) in terms of NEM: AQA (Atmospheric emission which have a significant detrimental effect on the environment) - Regulation GN R283, published on 2 April 2015 in terms of NEM: AQA (National Atmospheric Emissions Reporting Regulations) (Group C-Mines)	- Control measures are to be implemented upon the approval of the EMPR. - This is also legislated by Mine Health and Safety from DMR and is to be adhered to.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	- Section 52 of The National Environmental Management Act: Biodiversity Act (NEMBA) (Act 10 of 2004) states that the MEC/Minister is to list ecosystems that are threatened and in need of protection. - Section 53 states that the Minister may identify any process or activity in such a listed ecosystem as a threatening process. - A list of threatened and protected species has been published in terms of Section 56(1) GG	- A permit application regarding protected plant species need to be lodged with DENC if any protected species is encountered. - Six habitats were identified on site, of which the ephemeral pans and drainage channels are the most sensitive to mining. Mining activities are however not expected to directly affect these units. The core

	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 * Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 * - Sections 65 – 69: These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species. - Sections 71 and 73: These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species. - Regulation GN R151, published on 23 February 2007 (List of Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM: BA - Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA - Regulations GN R507 to 509 of 2013 and GN 599 of 2014 in terms of NEM:BA (Alien Species)	mining activities are associated with the shrubland habitat on calcrete terraces, which harbours high densities of Boscia albitrunca and is considered of medium sensitivity. The most profound impacts expected to be related to the proposed mining operation include cumulative loss of intact habitat and biodiversity on a landscape level, as well as potential loss in soil fertility and loss of Boscia albitrunca recruits. Saplings are rarely visible during clearance operations and therefore the younger populations often get wiped out completely. - Permit applications need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any removal of protected species. Similarly, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to the Boscia albitrunca trees. - The destruction of the natural plant species and habitats is inevitable during mining operations, but the significance of the impacts will ultimately be affected by the success

		of the mitigation measures implemented during the mining operation. In my opinion, authorisation for the proposed operation can be granted. However, the applicant should commit to the strict adherence of effective avoidance, management, mitigation, and rehabilitation measures.
The National Environmental Management Act: Protected Areas Act (NEMPAA) (Act 57 of 2003) provides for the protection of ecologically viable areas that are representative of South Africa's natural biodiversity and its landscapes and seascapes.	- Chapter 2 lists all protected areas.	- The proposed mining 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. - The Orange River and its riparian zone is classified as Critical Biodiversity Area One, while a ± 1 – 2 km buffer along the river is classified as Critical Biodiversity Area Two. Most of the remaining area is classified as Ecological Support Areas, with fragments in the south-

		west being classified as Other Natural Areas. - No Protected Areas occur in or near the study area. Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) recognises the buffer along the Orange River to have Highest Biodiversity Importance, which constitute a high risk for mining. However, the remainder of the site is not considered to have any biodiversity importance. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the impacts of mining to support mainstreaming of biodiversity issues in decision making in the mining sector. - Furthermore, according to the National Web based Environmental Screening Tool the study area is considered to have sensitive environmental features. This tool is a geographically based web-enabled application which allows a proponent intending to apply for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), to screen their proposed site for any environmental sensitivity. According to the

		screening tool, the Saxendrift study area is of very high sensitivity based on the Terrestrial Biodiversity Theme. This sensitivity is a direct function of the Critical Biodiversity Areas according to the Northern Cape Critical Biodiversity Areas Map. The study area is of medium sensitivity based on the Animal Species Theme, due to the suitable habitat opportunity for the bird species Neotis ludwigii (Ludwig's Bustard). The site is however of low sensitivity based on the Plant Species- and Aquatic Biodiversity Themes. - The Spatial Development Framework for the Pixley ka Seme District Municipality (2013 - 2018) regards all areas along the river as sensitive. However, the study area is mapped to be of low sensitivity in this report.
National Environmental Management: Waste Management Act (Act 59 of 2008)	- Chapter 4: Waste management activities - Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations) - Regulations GN R921 published on 29 November 2013 in terms of NEM: WA (Categories A to C – Listed activities) - National Norms and Standards for the Remediation of contaminated Land and Soil	- To be implemented upon the approval of the EMPR.

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

	exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a forma cemetery administered by a local authority. - Section 38: This section provides for HIA which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during HIA process. - Regulation GN R548 published on 2 June 2000 in terms of NHRA	
National Water Act (Act 36 of 1998) and regulations as amended, *inter alia* Government Notice No. 704 of 1999	- Section 4: Use of water and licensing. - Section 19: Prevention and remedying the effects of pollution. - Section 20: Control of emergency incidents. - Section 21: Water uses In terms of Section 21 a licence is required for: (a) taking water from a water resource; (b) storing water; (c) impeding or diverting the flow of water in a watercourse; (f) Waste discharge related water use; (g) disposing of waste in a manner which may detrimentally impact on a water resource; (i) altering the bed, banks, course or characteristics of a watercourse; (j) removing, discharging or disposing of water found underground if it is necessary	- A water use application must be submitted and will be submitted as soon as the EIA EMP had been finalized. - Control measures are to be implemented upon the approval of the EMPR.

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

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 specify the relationship between the spatial planning and the land use management, amongst others - Regulations GN R239 published on 23 March 2015 in terms of SPLUMA	- To be implemented upon the approval of the EMPR.
Subdivision of Agricultural Land Act, 70 of 1970 and regulations	- Regulations GN R373 published on 9 March 1979 in terms of Subdivision of Agricultural Land	- To take note.
Basic Conditions of Employment Act (Act 3 of 1997)) as amended	- To regulate employment aspects	- To be implemented upon the approval of the EMPR
Community Development (Act 3 of 1966)	- To promote community development	- To be implemented upon the approval of the EMPR
Development Facilitation (Act 67 of 1995) and regulations	- To provide for planning and development	- To take note.
Development Facilitation (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 DJ de Smidt 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 Pixley Ka Seme 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 DJ de Smidt 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.

Need:

Analysis of the Diamond Industry – ALROSA(website)
The Information on the analysis of the diamond industry was obtained from the ALROSA website which 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.

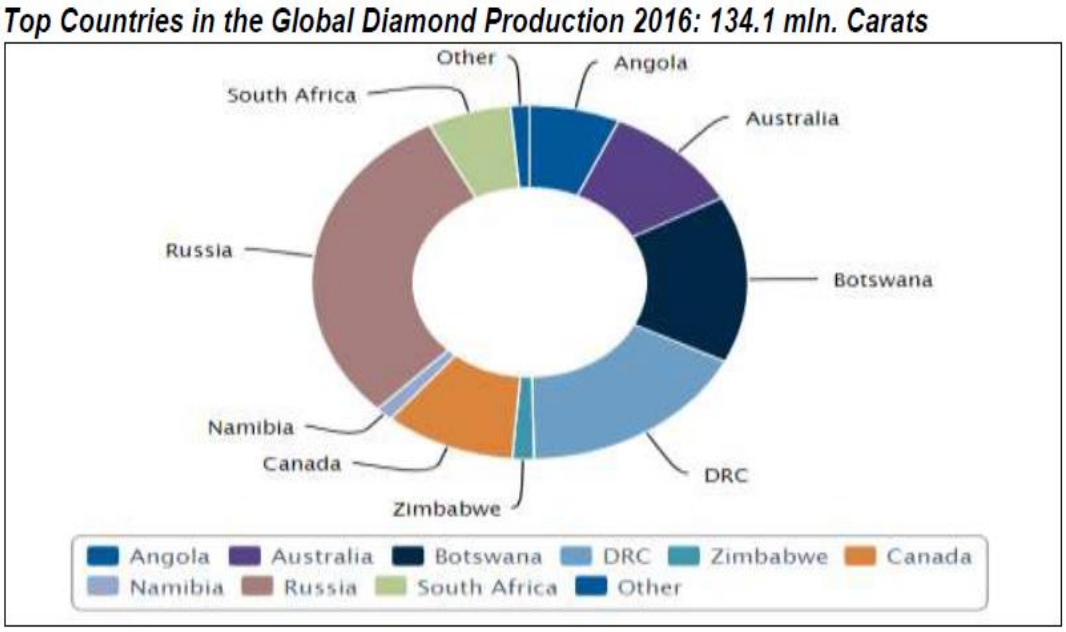

Figure 3. Kimberley Process companies' data Global Diamond Production 2011-16 (thousands carats).

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.

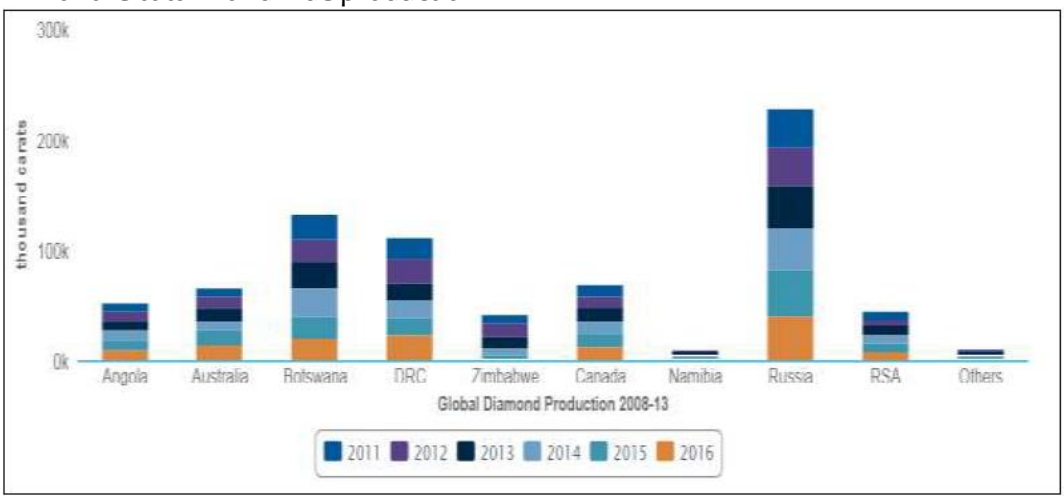

Figure 4. Global Diamond Production 2011-16 (thousands carats) Kimberley Process companies' data.

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).

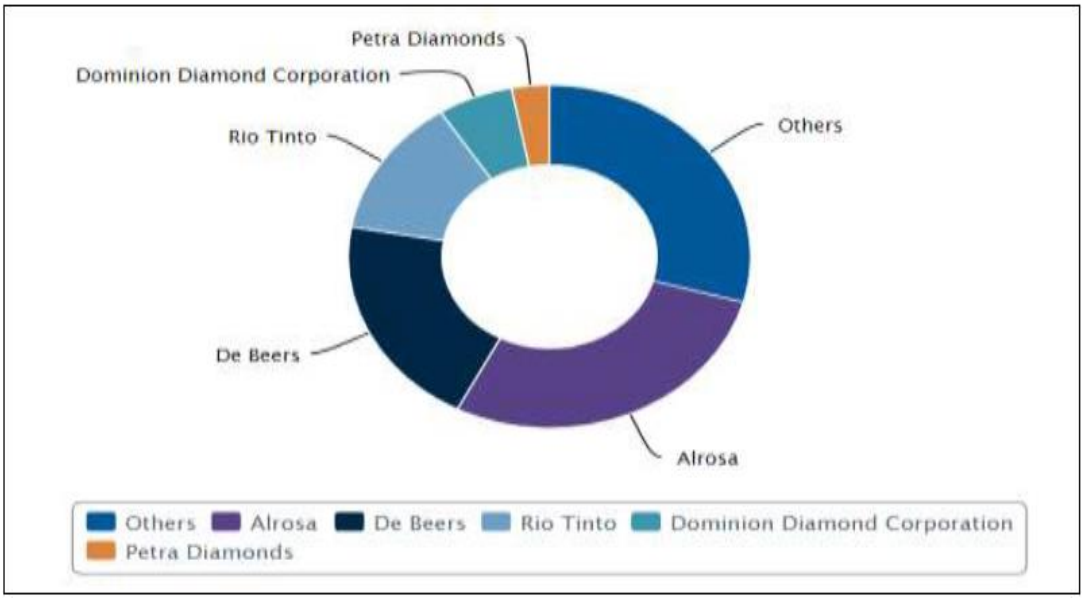

Figure 5. Diamond Production by Leading Companies, 2016 (* - including Ekati; Companies' data)

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 centers, 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
Although global financial stability has proven quite volatile over the past 4-5 years, the diamond industry appears to have stabilised somewhat, with moderate increases in diamond prices forecast for the immediate future.

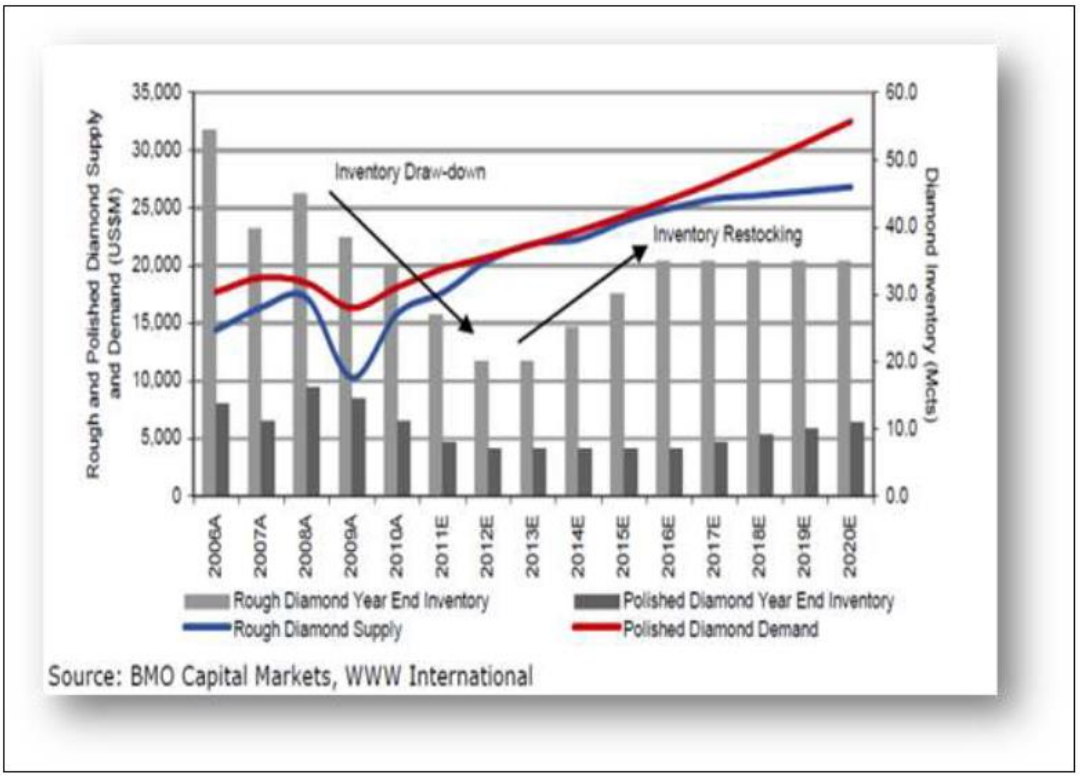

Figure 8. Inventory movements support diamond prices (USDM, Mct)

BMO Capital Markets (Sterck, 2011) estimated at the time that Chinese demand for polished diamonds accounted for 5% or USD1 billion of the market in 2010. While this represents a relatively small proportion of the market currently, growth is extremely strong.

De Beers reported that Chinese demand for polished diamonds grew at 25% in 2010, significantly ahead of GDP growth of 13%. Looking ahead, momentum into 2011 suggests that growth of 15% may be possible. From 2012 onwards, growth in household disposable

income is forecast to average 11% to 12% per annum. This translates into minimum growth in diamond demand of 13% per annum.
From 2012 onwards diamond demand is likely to grow in line with economic growth at around 10% per annum. Combining steady demand growth from the established diamond consuming nations and strong growth in demand from emerging consumer's results in a forecast of polished diamond demand almost doubling by 2020, resulting in a total market value of over USD30 billion in nominal terms.

Desirability:

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

Benefits:

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

g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site

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

Taking into consideration all the information captured in this report, the most appropriate procedure for planning and developing the proposed mining operation will involve the following:

(a) Mining Method

The location of the mine is determined by the geological location of the mineral resource. This site has proven to have alluvial diamonds as it was mined before and left. Mining for alluvial diamonds by means of the method described, with the understanding that the formulation of an effective Environmental Management Programme and the implementation thereof, as well as the obtainment of an authorisation for the abstraction of water from a resource for mining purposes from the Department of Water and Sanitation in terms of the National Water Act, 1998 (Act No. 36 of 1998, is an inseparable part of the proposed operation.

(b) Labour Force

Employing people who originate from within the boundaries of Siyancuma Municipality. This will guarantee benefits such as a positive contribution to the local economy; a decrease in local unemployment figures; a decrease in the social phenomena normally associated with unemployment, such as crime and alcohol abuse; and a positive contribution to cultural cohabitation.

(c) Rehabilitation

Making financial provision for the implementation of a rehabilitation strategy as is required by Section 41 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) amended by Government Gazette NO. R. 1147 20 NOVEMBER 2015 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) REGULATIONS PERTAINING TO THE FINANCIAL PROVISION FOR PROSPECTING, EXPLORATION, MINING OR PRODUCTION OPERATIONS.

(d) Environmental Monitoring

Carrying out environmental monitoring on a regular basis, as is required by Regulation 55 of the Regulations published in Government Notice No. 26275 under the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) and in the NEMA regulations published 20 November 2015.

(e) General

Being open to possible comments, suggestions and complaints received from neighbouring communities or members of the general public that might result from the implementation of the proposed mining operation.

i) Details of the development footprint alternatives considered

With reference to the site plan provided as Figure 2 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

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

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

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

Farm Name	Title Deed	In Extent
Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20, Hopetown	T25656/1970	1323,7453ha

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 gravel roads from different directions.

Infrastructure in the Siyancuma/ Thembelihle area is well developed with good road and rail networks, 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. Water for Processing Plant will be a crucial element that needs to be secured towards the successful operating of the project. A water application will be submitted to the Department of Water and Sanitation which may include a Section 21 (a), (b), (g), (i) and (c) applications.

Alternatives considered: -

No planned alternative to proposed mining is envisaged. Should mining not proceed the current agricultural land use will continue. Proposed site layout and opencast mining with concurrent rehabilitation where possible will minimise footprint and impact. Any alternative methodology may have greater impact.

The only other alternative would be not to continue with the operation.

(b) The type of activity to be undertaken:

The planned mining technique is that of a typical South African opencast alluvial diamond 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.

Alternatives considered: -

The application area is within the target area known to carry diamonds and therefor 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 grazing although the capability could be for agriculture; however, the applicant's main economic activity is mining and for this reason does not favour any other alternative land use.

(c) 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-perennial drainage lines, the river and wind direction), heritage resources and discussions with the relevant Departments and interested and affected parties.

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

- Processing Plant: 4 X 16 feet pans
- 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: Area applied for is an open cast mining process with oversize material from the gravel scalping and the tailings from the plant, being used as backfill material prior to final rehabilitation.

- 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 1.5 km of roads, with a width of 8 meters where no reserve exists and where the reserve exists 15 meters. The current access road is deemed adequate for a service road into the mining site.

- 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. The final location of the fuel storage tanks will be determined based on proximity to mining operations.

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

A diamond rotary plant will be established which uses (4 X 16 feet rotary pan). Water use for a 16 feet rotary pan is in the order of 18000 litres per hour. The operation will only work in daytime hours which will constitute about 8 - 10 hours per day which will bring water consumption to 144000 litres per day and 720 000 litres per week 2880000 litres per month per pan. A 16 feet pan can on capacity work about 65 tons per hour which constitutes about 117m³ per hour.

Therefore, a pipeline route will be designed based on the principle of minimum impacts to the environment.
The locality of the mine residue dam will be selected based on the following considerations, this dam will be small due to the limited material being processed and the water needed:

- The locality is already disturbed or mined out.
- It is within reach of (1 000m) of the treatment plant.
- It is situated near the access road to the mining activities.
- No underlying ore bodies or geological discontinuities.
- No geomorphological impacts.
- No structures, dwellings or other points of risk on down-stream side.
- Convenient material nearby for construction of dam.
- Top soil from the treatment process will be available for final rehabilitation.

A standard slimes dam design will be established in order to maximise the capacity of the slimes dam and to minimise the risks in terms of general safety and the DWS regulation.

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.

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

- Technique

The operational phase of the mining operation will include the mining of alluvial diamonds by means of open cast mining method with machinery.

Topsoil will be removed from the first excavation, 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 Excavation 1 will then be removed by means of a back actor and loaded onto a tipper truck, which will transport it to the central mineral processing plant. At the plant the diamondiferous gravel will be sorted by means of a grizzly screen grid and all material larger than 100 mm will be separated from the rest. This material will be used in the backfilling stage.

- Technology

The mining method being employed is an Open cast mining process 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. Gravels are then loaded onto a vibrating grizzley and the +32 mm oversize material is discarded back into the open pit (about 55% reduction). The remaining –32 mm fraction is loaded into a series of 4 X 16-foot rotary pans, each with a treatment capacity of 40 tph. Tracer tests are done regularly to ensure that the pans are operating at the correct density. Concentrate is tapped continuously from each of the pans every three hours into three ton holding bins and transported with enclosed trucks to a final recovery unit which is, which is designed to use both X-ray and grease diamond recovery methods or any other facility which is chosen by DJ de Smidt.

Alternatives considered: -

The planned mining activities include mining 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.

(e) The operational aspects of the activity:

The gravels will be loaded with an excavator on to dump trucks for conveyance to the Processing Plant. At the Processing Plant the run of mine gravels will be fed onto a grizzly for screening out oversize material. The material will be processed through a screening section for delivery to a recovery plant. Concentrate from the recovery plant will be processed through an X-Ray/Sortex plant to extract the diamonds. An area will be used for all processing and dumping operations outside the 1:100 year Flood line. The expected lifespan of the mine is 8.5 - 10 years.

Mining activities will primarily make use of existing roads created by previous mining activities, but there is a possibility for additional roads that could be created.

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.

(f) The option of not implementing the activity:

The major land uses in the area are mining and agriculture. According to AGIS, the land capability of the study site is non-arable with low to moderate potential grazing land. The grazing capacity is 32 ha/LSU, with the agricultural region being demarcated for sheep farming.

Apart from the proposed mining activities, the mining right application area is used as natural pastures for livestock grazing. An area along the river was utilised for irrigation in the 1980s and disturbances from past mining activities are also evident. Existing land use features include these old fields and mining footprints as well as roads.

Socio-Economy

The operation will make provision for 25 – 35 job opportunities. This will be lost if the mining project does not proceed. Substantial tax benefits to the State and Local Government will also be lost.

Biodiversity

The proposed mining 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. The Orange River and its riparian zone is classified as
Critical Biodiversity Area One, while a ± 1 – 2 km buffer along the river is classified as Critical Biodiversity Area Two. Most of the remaining area is classified as Ecological Support Areas, with fragments in the south-west being classified as Other Natural Areas. **No Protected Areas occur in or near the study area.**

Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) recognises the buffer along the Orange River to have Highest Biodiversity Importance, which constitute a high risk for mining. However, the remainder of the site is not considered to have any biodiversity importance. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the impacts of mining to support mainstreaming of biodiversity issues in decision making in the mining sector.

Furthermore, according to the National Web based Environmental Screening Tool the study area is considered to have sensitive environmental features. This tool is a geographically based web-enabled application which allows a proponent intending

to apply for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), to screen their proposed site for any environmental sensitivity.

According to the screening tool, the Saxendrift study area is of very high sensitivity based on the Terrestrial Biodiversity Theme. This sensitivity is a direct function of the Critical Biodiversity Areas according to the Northern Cape Critical Biodiversity Areas Map. The study area is of medium sensitivity based on the Animal Species Theme, due to the suitable habitat opportunity for the bird species Neotis ludwigii (Ludwig's Bustard). The site is however of low sensitivity based on the Plant Species- and Aquatic Biodiversity Themes.

The Spatial Development Framework for the Pixley ka Seme District Municipality (2013 - 2018) regards all areas along the river as sensitive. However, the study area is mapped to be of low sensitivity in this report.

The study area also borders the southern boundary of the Griqualand West Centre (GWC) of Endemism core (Frisby et al. 2019). A centre of plant endemism is an area with high concentrations of plant species with very restricted distributions, known as endemics (Van Wyk and Smith 2001). Relatively small disturbances in a centre of endemism may easily pose a serious threat to its many range restricted species. Endemics are specifically vulnerable due to their restricted distribution ranges.

Finally, the study area falls within a region where one of South Africa's largest economically most important alluvial diamond deposits are found, i.e. along the Orange and Vaal Rivers (Gresse 2003). The most significant crop irrigation in the Northern Cape also stretches along these rivers (Durand 2006). These factors increase the operation's cumulative impacts.

Heritage and Cultural Resources

Dr. Edward Matenga from (AHSA) Archaeological and Heritage Services Africa Pty Ltd has been appointed by DJ de Smidt to provide an Heritage Impact Assessment Report for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area.

A Heritage Impact Assessment (HIA) study was undertaken for a mine prospecting right application on the Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20 near Prieska, in the Siyathemba Local Municipality, Northern Cape. The HIA report has been prepared in accordance with Section 38(8) of the National Heritage Resources Act (25/1999) which entailed a site visit and ground survey undertaken on 10 March and 13 June 2022 to assess the heritage sensitivity of the area and to determine potential adverse impacts of the proposed activities on the heritage resources.

The findings of the heritage survey are summarised as follows:

The Stone Age
Stone Age tools occurred in all but four of the 24 recorded instances. The typology is dominated by scrapers, while there are a few blades. Handaxes were recorded in two instances; the handaxe is recognised as a type tool of the Early Stone Age period. Otherwise a majority of the finds date from the Middle Stone Age (MSA) to the Late Stone Age (LSA). No significant concentrations of artefacts were encountered.

The Iron Age
No Iron Age sites or relics were found on the property.

Modern period
A setting of stones (stones in a single file) forming a semi-circle was recorded (SXD 12, SXD23). The meaning of these features could not be ascertained. Foundations remains of a rectangular building which might have been built in the 20th century. All these features recorded and ranked as of low significance.

Burial ground
No burial grounds were found or reported on the property.

As the heritage sensitivity of the property is considered to be low, the mining application can be approved. The study is mindful that some important discoveries may occur during the prospecting and mining phases. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation to be undertaken.

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.

Palaeontology
Prof Marion Bamford, of the University of the Witwatersrand, sub-contracted by Archaeological and Heritage Services Africa (Pty) Ltd, Pretoria, South Africa has been appointed by DJ de Smidt to provide an Palaeontological Impact Assessment Report for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area.

A proposed Mining Right Application on the Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20, near Prieska, Northern Cape Province, requires a palaeontological impact assessment.

The site is on the southern side of the Orange River, approximately 50 km southwest of the town of Douglas. Irrigation and the cultivation of crops occurs close to the river but the majority of the area has indigenous sparse shrubs and eroded areas adjacent to the ephemeral stream that drain into the Orange River.

A Phase 2 (site visit) Palaeontological Impact Assessment was requested for the Saxendrift Mining Right Application project. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development and updated from the site visit, and the latter is reported herein.

To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development.

Palaeontological context

The site for mining is in the Dwyka Groups rocks (green; moderate sensitivity) and the Tertiary-Quaternary calcretes (orange, highly sensitive).

The Dwyka Group tillites and mudstones can trap fossils that were caught up in the ice sheets or glaciers and dropped when the ice melted, therefore these fossils tend to transported fragments of more robust fossils such as silicified wood, invertebrate remains and rarely Glossopteris leaves or associated flora. Two rare occurrences are mentioned by Anderson and McLachlan (1976) near Strydenburg which is to the northeast of this site. There are no other reports. According to Johnson et al. (2006), the fossils are only likely to be found in mudstone facies of the Dwyka Group.

Exploration and research along the palaeo-rivers of Southern Africa, now only present as abandoned palaeochannels, or captured by the present-day rivers, the Vaal and Orange Rivers in this case, the gravels and sands might include transported robust and fragmentary fossils. Examples of these are heavy bone fragments and silicified wood fragments, as well as diamonds (de Wit, 1999; de Wit et al., 2000).

The Tertiary calcretes can trap fossils and artefacts when associated with palaeo-pans or palaeo-springs (Partridge et al., 2006). Where deflation has occurred, for example along the west coast of South Africa, any trapped materials in the different levels can be concentrated in the depo-centre of the pan or dune and thus it can be challenging to interpret the deposit (Felix-Henningsen et al., 2003).

Palaeo-pans and palaeo-springs are visible in satellite imagery because of their topography and often are associated with lunette dunes. Vegetation changes are

also common. No such features are seen in the Google Earth images. Aeolian sediments that cover most of the region, do not preserve fossils because they have been reworked and windblown.

Site visit observations

The area was walked down in June 2022 and the surface rocks, natural cutting provided by erosion channels and ridges were targeted as they are likely to show the underlying rocks and any fossils. A selection of site photographs of representative landscapes and the GPS locations are provided in Table 3 and Figures 6 -18 in the PIA study.

No fossils of any kind were seen in the erosion channels or on the ground surface. Transported Dwyka Group pebbles were seen in places but there were only clasts and no fossils were seen amongst them.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age to contain fossils but there is no evidence of features such as palaeo-pans or palaeo-dunes to trap any fossils. Furthermore, the material to be mined is the sands for diamonds and this does not preserve fossils. However, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only if there such features as palaeo-pas or palaeo-dunes to trap any fossil plant, insect, invertebrate or vertebrate material would any occur in the area. The sands of the Quaternary period would not preserve fossils.

Recommendation

Based on the site visit and walk through there are no surface fossils and no fossils in the eroded gullies. This confirms the previous assertion and the lack of any previously recorded fossils from the area, that it is extremely unlikely that any fossils would be preserved in the Dwyka Group tillites and sandstones or the sands and calcretes of the Tertiary-Quaternary. There is a very small chance that fossils occur below ground and also may occur in features such as palaeo-pans or palaeo-dunes that could trap fossils are present as no such feature is visible in the satellite imagery. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the miners or environmental officer, or other responsible person once mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on

the palaeontological heritage would be low, therefore, as far as the palaeontology is concerned, the project should be authorised and a mining permit granted.

Chance Find Protocol

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

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

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.

Description of the consultation process: -

A copy of the relevant background document was sent by registered post on 28 October 2020 to identified persons with a cover letter. Laapse Werf Pty Ltd the

surface owner also received a registered letter and personal communication was done- confirmation letter.

Letters was also sent to various neighbouring people with adjacent farms or further away. All Government Departments identified were also notified by registered letters.

A notice was also placed in the DFA on 30 October 2020 to invite any other interested parties to come forward and to register.

Notices were put up at the gravel road towards Kwartelspan, located between Douglas and Prieska on the right-hand side when driving from Douglas. A second notice was placed on the same gravel road about 2.72 km from the R357 towards Laapse Werf. A third notice was placed 2.85 km from the R357 tar road on a farm gate to Laapse Werf. A fourth notice was placed on 39 Arnot Street in Douglas at the GWK Petrol Station.

On 10 November 2020 the Scoping Report was sent by registered post to identified persons with a cover letter. Letters was also sent to various neighbouring people with adjacent farms or further away. All Government Departments identified were also notified by registered letters with the Scoping Report attached.

On 26 April 2022 the EIA / EMP Report was sent by registered post to identified persons with a cover letter. Letters was also sent to various neighbouring people with adjacent farms or further away. All Government Departments identified were also notified by registered letters with the EIA / EMP Report attached.

Proof of consultation (attendance registers, minutes of meetings and response forms) is attached as **Appendix 3**. The consultation process is still in process.

Figure 9. The first notice was placed on the gravel road towards Kwartelspan, located between Douglas and Prieska on the right hand side when driving from Douglas (R357)

Figure 10. Notice was placed on the same gravel road as notice 1, it is located 2.72 kilometres from the R357 towards Laap se Werf.

Figure 11. Notice was placed 2.85 kilometres from the R357 tar road on a used farm gate of Laap se Werf

Figure 12. The last Notice was placed on 39 Arnot Street in Douglas at the GWK Petrol station.

iii) Summary of issues raised by I&APs

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

Please refer to 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)

(1) *GEOLOGY:*

Regional Bedrock Geology

The bedrock of the Orange River valley between the confluence of the Vaal and Orange Rivers at Douglas and Prieska is dominated by flat-lying Dwyka tillite and siltstone of the Karoo Supergroup. The Dwyka, typically, comprises matrix-supported diamictite with both local and transported pebbles and boulders as dropstones in a rock-flour matrix. Underlying the Dwyka, and exposed where the Orange River has incised through that sequence, are lavas of the Ventersdorp Supergroup, overlain (in places) by sediments of the Transvaal Supergroup, comprising shales, quartzites and dolomites. The bedrock is cut by faults and dolerite dykes, which are rarely exposed. The surface on which the Dwyka was deposited was irregular with several topographic highs.

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 more easily eroded Dwyka has been dissected by minor tributaries of the Orange River, giving rise to a trellis-type drainage pattern. To the north of the Orange River, the Ghaap Plateau represents an ancient surface of Transvaal Supergroup rocks.

Lower Terraces

Lower elevation terraces (less than about 30 m above present river bed) of the Orange River are typified by up to 30% sand matrix with a high proportion of zeolite-rich sand lenses and a high proportion of red Drakensberg basalt clasts. These gravels normally exhibit intermediate to low diamond grades. They are typically cobble-pebble gravels with occasional boulders. Clast composition is dominated by andesite (Ventersdorp lava), dolerite, shale, quartzite, and riebeckite, with a low percentage of agate and amygdales. Downstream of Lanyonvale (Wouterspan) BIF makes up +60% of the clast assemblages.

Clast-rounding is moderate and packing is moderate to poor, both of which impact negatively on diamond entrapment potential. Average

grades of 0.5-1.2ct/m3 or 0.23-0.54cpht are known with the occurrence of occasional large stones (P Gresse, Pers. Comm., 2005).

The lowest terrace does not appear to be as calcreted as the upper two terraces and mining is, therefore, easier. Lower terrace deposits are generally covered by 1 - 4 m of sand whereas the upper terrace deposits are capped by a hard calcrete layer some 2 - 3 m thick which protected the gravel deposits from erosion and prevented exploitation in the past.

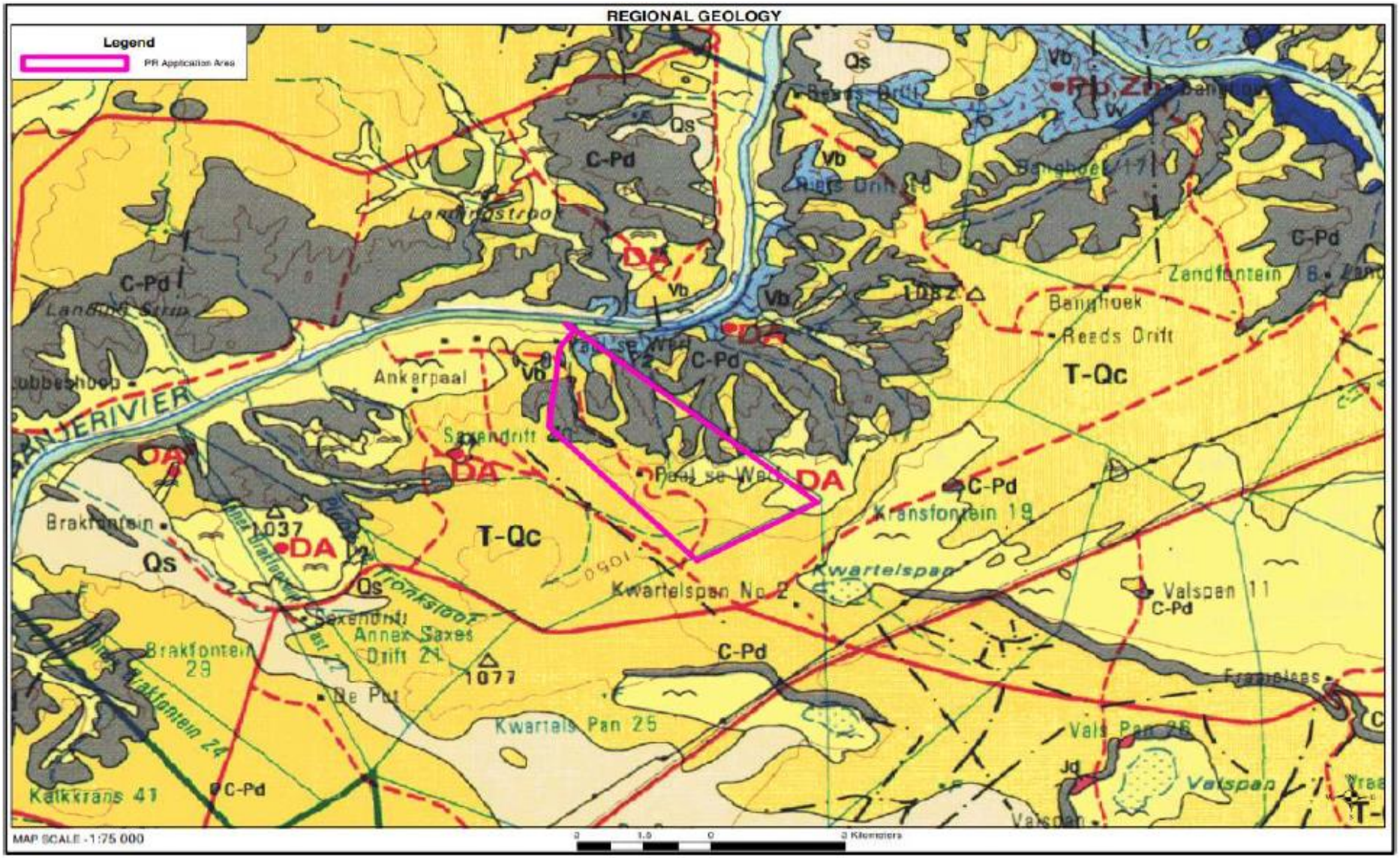

Figure 13. Geological Map of the application area (Purple Block) indicated with red arrow.

(2) *CLIMATE:*

Regional Climate

The climate of the area is described as semi-arid. The area receives between 250mm and 500mm of rain per annum whilst annual potential evaporation rates varies between 2 600mm and 2 800mm.

Rainfall events generally comprise showers and thunderstorms occurring the summer months during October to March (February and March are generally peak rainfall months). The summers are very hot with cool winters. The data from the weather stations at Kimberley will be used.

Rainfall

Average monthly and annual rainfall for the site and number of days per month with measurable precipitation is presented in the table 3 below:

MONTH	60 MINUTES	24 HOURS	24 HOURS IN 50 YEARS	24 HOURS IN 100 YEARS
January	35.8	57	65.1	73.8
February	70.1	82	58.9	66.5
March	63.7	67.8	72.1	81.4
April	25.7	51.6	65.9	75.2
May	14.6	54.6	36.8	42.4
June	19.1	67.5	26	30.4
July	12	26.7	26.6	31
August	17	58.2	23.4	27.3
September	16.3	26.7	24.1	28
October	37.6	59.2	5308	61.8
November	25.2	60.1	41.2	46.7
December	59.9	64.5	70.7	80.9

Source: Directorate: Climatology South African Weather Bureau Station: 0290468 – Kimberley 1970-2003.

Average monthly maximum and minimum temperatures are presented in the table 4 below:

MONTH	DAILY MAXIMUM °C	DAILY MINIMUM °C
January	32.8	17.9
February	31	17.3
March	28.8	15.2
April	24.8	10.9
May	21.4	6.5
June	18.2	3.2
July	18.8	2.8
August	21.3	4.9
September	25.5	8.9
October	27.8	11.9
November	30.2	14.6
December	32.1	16.6
YEAR	26.1	10.9

Source: Directorate: Climatology South African Weather Bureau © 2000Station: 0290468 – Kimberley: 1960-2000

Wind

The prevailing wind direction for the area is north to north-north-west for the months January to September and changing from north to sometimes westerly winds during October to December averaging 3.5 m/s (Kimberley 01/01/1990 - 31/08/2000, Station 0290468).

Humidity and Evaporation

The average monthly humidity is presented in the table 5 below:

MONTH	AVERAGE (%)	MAXIMUM (%)	MINIMUM (%)
January	47	91	8
February	54	94	12
March	57	96	15
April	60	96	16
May	56	96	16
June	54	97	15
July	49	97	13
August	42	94	10
September	36	91	8
October	39	89	8
November	42	92	8
December	43	90	7
Year	48	94	11

Source: Directorate: Climatology South African weather Bureau © 2000Station: 0290468 – Kimberley: 1960-2000

The average monthly evaporation is presented in the table 6 below:

MONTH	**EVAPORATION IN mm**
	SYMONS PAN
January	365.6
February	279.1
March	235.8
April	169.1
May	135.1
June	108.6
July	130.1
August	181.2
September	252.6
October	314.9
November	345.5
December	378.6
YEAR	2896

Source: South Africa Weather Bureau Station: 0290468 – Kimberley: 1957-1987

Incidents of Extreme Weather Conditions

- **Hail**

Hail is sometimes associated with thunderstorms and mainly occurs in early to late summer (November to February). It occurs on average three times a year and although these storms may sometimes be severe and cause much damage, they usually impact on a relatively small area.

- **Frost**

The period during which frost can be expected lasts for about 120 days (May to August). With extreme minimum temperatures to below -8°C at night in the winter, frost development can be severe.

- **Droughts**

Droughts are common and may vary from mild to severe. During these periods dust storms sometimes occur, depending mainly on denudation of the surface.

- **Wind**

High winds are unusual but when they do occur can uproot trees and take off roads.

(3) ***TOPOGRAPHY:***

Dr. Betsie Milne from Bocia Ecological Consulting Pty Ltd has been appointed by DJ de Smidt to provide an Ecological Assessment Report in April 2022 for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area topography was described and included in this report.

The calcrete terraces are characterised by level plains with some relief, while the slopes towards the river are characterised by open ridges. Altitude ranges from 950 m along the banks of the Orange River, 980 – 1 020 m on the slopes, and 1 040 – 1 050 m along the terraces. The terrain is indicated by a level to very gentle slope of <2 % on the terraces but increases to 3 - 12 % on the slopes (Boscia Ecological, April 2022).

The proposed mining area is situated in a region of gently undulating hills on the edge of the Karoo, an area of sparse, arid semi desert that occupies much of central South Africa. The area comprises elevated palaeo- river terraces at elevations of between 1,100m and 1,000m above mean sea level ("amsl"), some 60-70m above the present Orange River. The terraces are cut by a number of small ephemeral streams dry for most of the year they flow through the application area before they confluence and enter the Orange River. The surrounding terrain is a flat semi-desert environment with sparse grass and occasional shrubs, thorn bushes and succulents in a sandy soil. Bigger trees often line the banks of the Orange River.

Since no exploration or mining activities will be undertaken in the present river channel, bank-full discharge conditions will have no effect on operations. Even during floods, the effect on operations will be negligible, since the modern-day floodplains are not exploration targets.

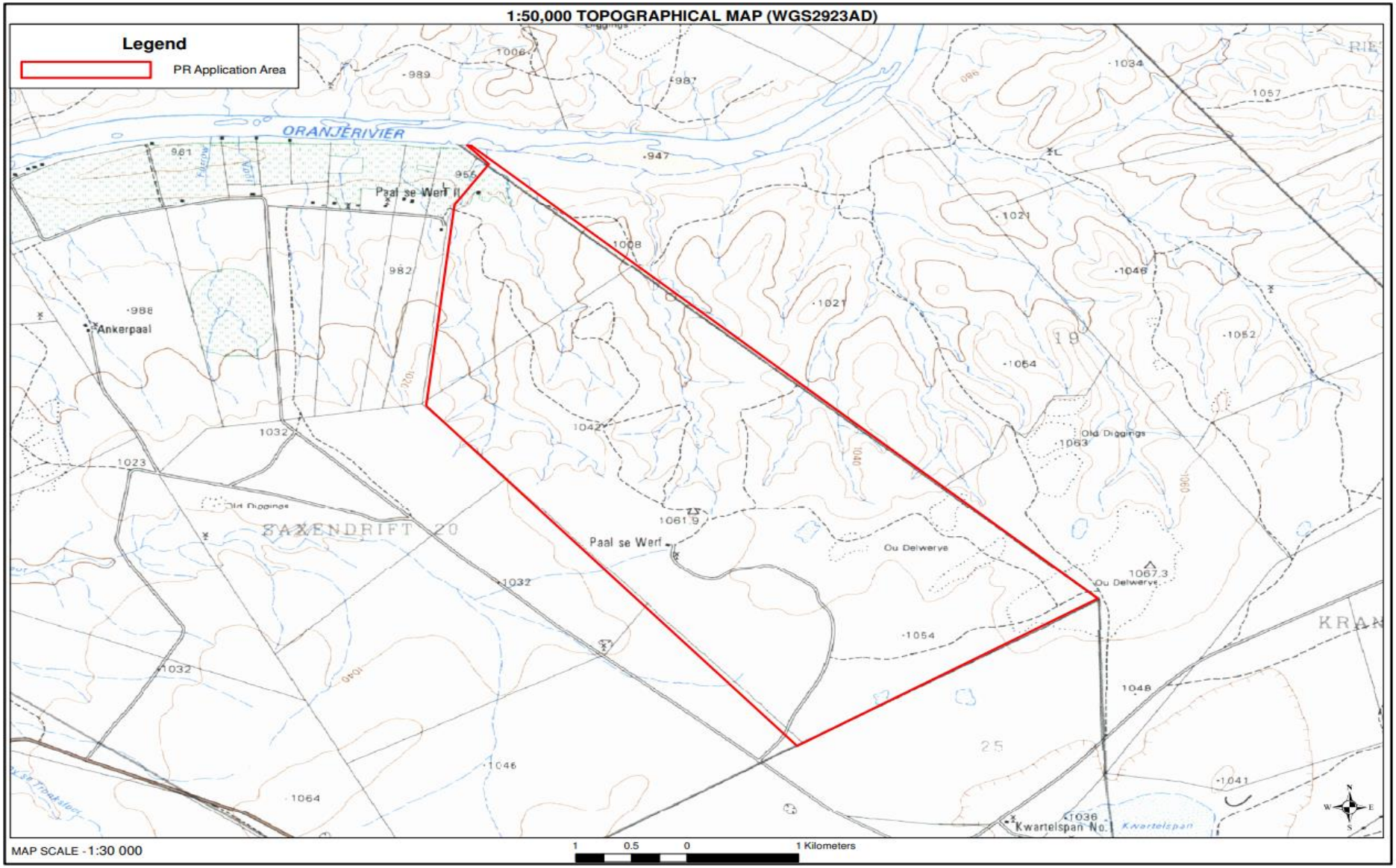

Figure 14. Topographical Map of Saxendrift in Hopetown district 1:50 000 application area indicated by RED line.

(4) ***SOILS:***

Dr. Betsie Milne from Bocia Ecological Consulting Pty Ltd has been appointed by DJ de Smidt to provide an Ecological Assessment Report in April 2022 for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area soils was described and included in this report.

According to 1:250 000 Geological Map of 2922 Prieska, published by the Council for Geoscience in 1995, the geological features on Saxendrift comprise Quaternary, Tertiary, Carboniferous and Vaalian deposits. Most of the site, especially in the south, comprise calcrete. Terrace gravel is found in the south-west, while the slopes towards the river comprise Dwyka tillites of the Karoo Supergroup (Figure 15). Isolated patches of oolitic, stromatolitic and algal-mat limestone, with interbedded flagstone and quartzite (Boomplaas formation) from the Ghaap Group (Schmidtsdrift Subgroup) of the Griqualand West Supergroup are found in the north near the river (Figure 15). Diamond deposits are mainly associated with the calcrete and terrace gravel.

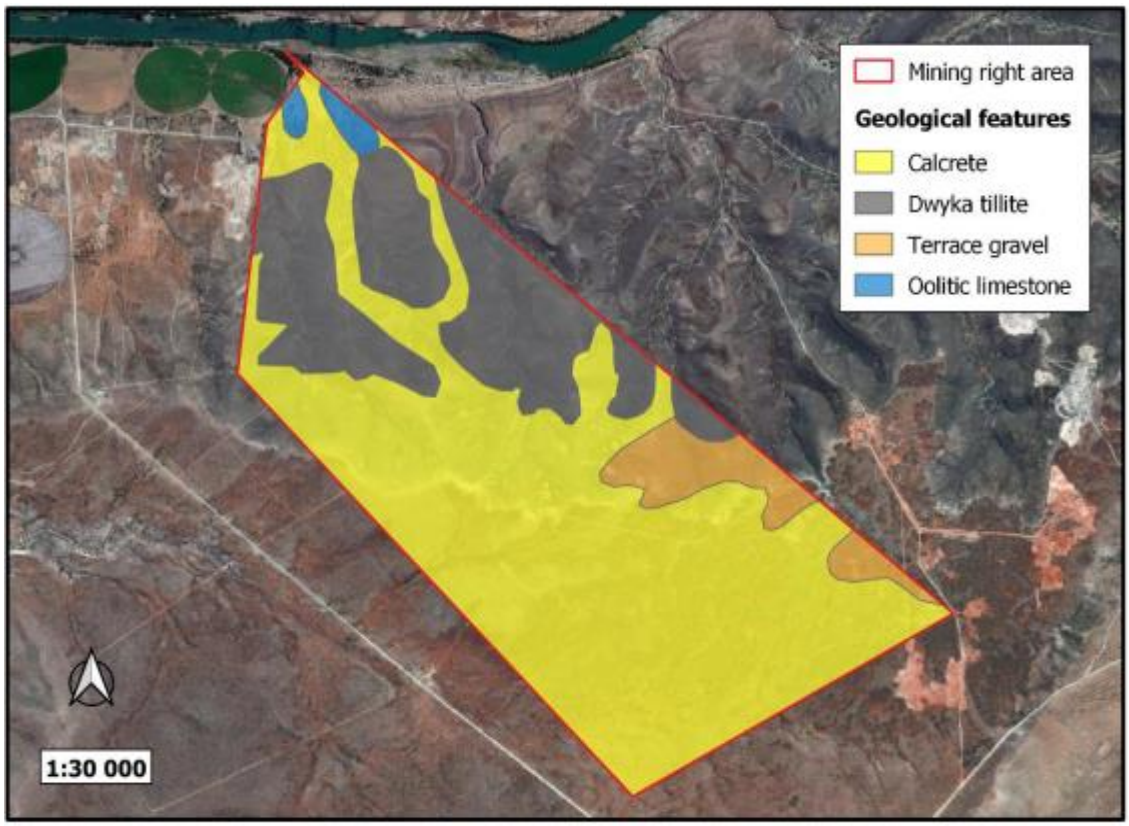

Figure 15. The distribution of geological features in the study area

The calcrete terraces are characterised by level plains with some relief, while the slopes towards the river are characterised by open ridges. Altitude ranges from 950 m along the banks of the Orange River, 980 – 1 020 m on the slopes, and 1 040 – 1 050 m along the terraces. The terrain is indicated by a level to very gentle slope of <2 % on the terraces but increases to 3 - 12 % on the slopes.

Land types found on the property include Fc565, Ag136 and Ia124 (Figure 16). The calcrete terraces, represented by the Ag136 land type, are characterised by red-yellow apedal, freely drained soils, red, with high base status, and are shallow (< 300 mm deep). The slopes, depicted by the Fc565 landtype, comprise Glenrosa and/or Mispah forms, usually shallow, on hard or weathering rock, with lime generally present. The areas along the river (Ia124 landtype) comprise undifferentiated, deep, alluvial deposits.These soils of the study area have moderately high wind- and water erosion susceptibility. Rainfall erosivity is low due to the arid climate, but the steep terrain of the slopes is most susceptible to water erosion during flooding events.

Figure 16. The distribution of land types in the study area.

(5) *LAND CAPABILITY AND LAND USE:*

Dr. Betsie Milne from Bocia Ecological Consulting Pty Ltd has been appointed by DJ de Smidt to provide an Ecological Assessment Report in April 2022 for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area Land capability and Land Use was described and included in this report.

Pre-mining Land Capability

The major land uses in the area are mining and agriculture. According to AGIS, the land capability of the study site is non-arable with low to moderate potential grazing land. The grazing capacity is 32 ha/LSU, with the agricultural region being demarcated for sheep farming.

Land Use Prior to Mining

Apart from the proposed mining activities, the mining right application area is used as natural pastures for livestock grazing. An area along the river was utilised for irrigation in the 1980s and disturbances from past mining activities are also evident. Existing land use features include these old fields and mining footprints as well as roads.

Historical Agricultural Activities and evidence of Abuse

An area along the river was utilised for irrigation in the 1980s and disturbances from past mining activities are also evident.

Existing Structures

Existing land use features include these old fields and mining footprints as well as roads.

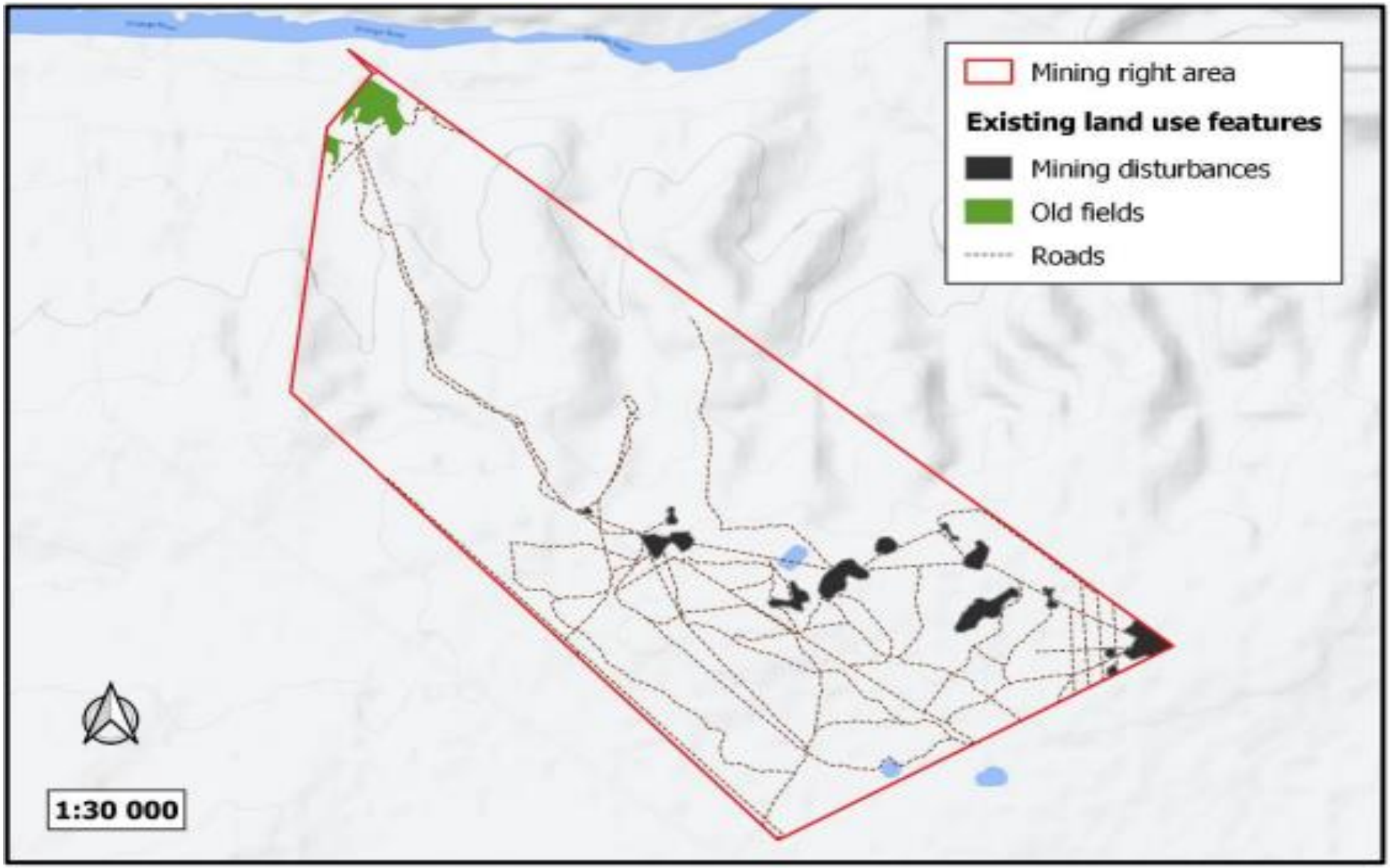

Figure 17. Evidence of existing infrastructure and past disturbance in the study area.

(6) *NATURAL FAUNA:*

Dr. Betsie Milne from Bocia Ecological Consulting Pty Ltd has been appointed by DJ de Smidt to provide an Ecological Assessment Report in April 2022 for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area Fauna was described and included in this report.

According to Section 3(a) and 4(a) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009, no person may, without a permit by any means hunt, kill, poison, capture, disturb, or injure any protected (Schedule 2) or specially protected (Schedule 1) wild animals. Furthermore, Section 12 (1) of NCNCA states that no person may, on a land of which he or she is not the owner, hunt a wild animal without the written permission from the landowner. According to the act "wild animal" means a live vertebrate or invertebrate animal, and the egg or spawn of such animal. The landscape features on Saxendrift provides a few 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 54 terrestrial mammals and nine bat species have been recorded in the region, of which nine are listed either in the IUCN or the Mammal Red List of South Africa, Lesotho and Swaziland. Virtually all mammals of the study area are protected; either according to Schedule 1, 2 or 3 of NCNCA .

Aardvark has a high probability to occur on site, especially in the deep sandy areas of the alluvial woodland. The African Straw-coloured Fruit-bat, Honey Badger, Aardwolf, African Wild Cat, Cape Fox, Bat-eared Fox and Striped Polecat have a high chance of occurring across the site, given their wide habitat tolerances. Pangolins however, are seldomly encountered due to their inconspicuous nature. Similarly, the South African Hedgehog also has a high chance of occurring on site based on their association with open, arid habitat.

Black-footed Cat has a moderate chance to be found on site. Even though they prefer arid habitat, their conspicuous nature and mining activities might cause them to avoid the site. African striped Weasel prefers grassland habitat and the Cape Clawless Otter is associated with rivers. Therefore, these species have a moderate chance to be found on site. The latter species might however migrate into the ephemeral drainage channels when flooded.

The Brown Hyaena has a low potential to be found on site mainly since farm fences are restricting their occurrences across their natural distribution range. The Dent's Horseshoe Bat also has a low chance to be found on site due to their preference for savanna habitat. The Littledale's whistling rat is also not expected to occur on site based on their restricted distribution. Problem animals with a high likelihood to occur on site include Black-backed Jackal, Vervet Monkey and Caracal.

Apart from these special species of conservation concern, Yellow Mongoose was recorded on site, as well as many burrows made by fossorial mammals.

Reptiles

The Saxendrift mining area lies within the distribution range of at least 36 reptile species. No listed species are known to occur in the area, but most reptiles of the study area are protected either according to Schedule 1 or 2 of NCNCA. Specially protected species include Karusasaurus polyzonus (Southern Karusa Lizard) and Chamaeleo dilepis dilepis (Namaqua Chamaeleon). The Karusa Lizard is a rock-dwelling species inhabiting rocky outcrops and could potentially occur along the rocky ridge slopes. The Common Flap-neck Chameleon is typically found high up in bushes or trees and could therefore potentially occur across the site.

South African endemics include Pachydactylus mariquensis (Common Banded Gecko), Lamprophis aurora (Aurora Snake) and Homopus femoralis (Greater Dwarf Tortoise). The Common Banded Gecko prefers sandy soil and sparse vegetation in a variety of habitats such as sandy plains and dry river beds. The Aurora Snake is often found near streams and under rocks and old termitaria, while the Greater Dwarf Tortoise occurs in rocky areas with dense vegetation where they take shelter among rocks or under plants. The ephemeral pans and drainage lines could potentially provide a special habitat for the Marsh Terrapin. Species observed during the field survey include Western Rock- and Variegated Skink, which were active among the rocks on the ridges.

Amphibians

Fourteen amphibian species are known from the region. No natural permanent water occurs on site that represents suitable habitat for water-dependent species, but the ephemeral pans and drainage lines will be very important during wet periods for breeding.Those frog species that are fairly independent of water (i.e. Bushveld Rain Frog, Boettger's Caco) are expected to take refuge under rocks and logs, soil cracks, sandy substrates, leaf litter and abandoned mounds of termites.

The Giant Bull Frog (Pyxicephalus adspersus) is listed as Near Threatened and is protected according to Schedule 1 of the NCNCA. They prefer seasonal shallow grassy pans, vleis and other rain-filled depressions in open flat areas of grassland or savanna, but mainly remain buried up to 1 m underground until conditions become favourable. The site lies within their known distribution and the ephemeral pans provides ideal habitat for it.

All other amphibians of the study area are protected according to Schedule 2 of NCNCA. The Raucous Toad and Southern Pygmy Toad are endemic to South Africa and occur in a variety of terrestrial habitats for most of the time. However, they use various temporary waterbodies containing rainwater to breed, including pans, pools, roadsides, farm dams and even quarries, and could therefore also potentially occur on site during the rainy season.

Avifauna

The study site does not fall within or near (< 100 km) any of the Important Bird Areas (IBA) defined by Birdlife South Africa. A total number of 261 bird species have been recorded from the region. As many as 25 listed bird species are known from the region, all of which are classified as Vulnerable, Near Threatened, Endangered or Critically Endangered. Furthermore, all birds are protected either according to Schedule 1, 2 or 3 of NCNCA.

Plants in general, from grass tufts to shrubs and trees provide important micro-habitats to birds and therefore the entire study area is expected to host a diverse avifauna community. The most common bird species of conservation concern expected to occur in the terrestrial habitats on site include Kori Bustard (Near Threatened) and Ludwig's Bustard (Endangered). They are expected to be most active in the shrubland on calcrete terraces. African Fish-Eagle was heard calling from the riparian woodland nearby during the field survey, but none of their preferred habitat occurs on site. A pair of Pale Chanting Goshawks were recorded hunting on the ridge slopes during the field survey.

The ephemeral pans could potentially attract protected water birds, such as Chestnutbanded Plover, Maccoa Duck, Marabou Stork, Lesser Flamingo, Greater Flamingo, Greater Painted-snipe and Black-winged Pratincole when wet. Many of the remaining species of conservation concern are also expected to occur on site either by occasionally passing over, foraging or nesting.

Fish

In addition to those regulations in the NCNCA pertaining to wild animals,

Section 32 and 33 of the NCNCA states that no person may, without a permit angle and not immediately release, catch, import, export, transport, keep, possess, breed, or trade in a specimen of a specially protected or protected fish.

Even though the active channels of the Orange River do not fall within the study area, the drainage network on site flows into the Orange River and therefore activities within this catchment area could potentially affect the fish species in the river.

Seven fish species are expected to be found in the Orange River, along with their conservation status and sensitivity to physico-chemical and no-flow conditions. They are all listed as least concern. However, they are all protected either according to Schedule 1 or 2 of the NCNCA. Specially protected species include the Vaalorange Smallmouth Yellowfish. Their population is highly fragmented and continuing to experience decline of mature individuals due to the continuing decline in area, extent, and quality of their habitat. They typically occur in pools, riffles and rapids and fast flowing rivers, preferring sand and gravel substrates. They migrate to suitable gravel beds and breed in spring to midsummer after major summer rains.

No fish are expected to occur in the ephemeral pans, even when filled, mainly due to their ephemerality and the fact that they are isolated from the fluvial systems.

Invertebrates

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

Eight invertebrate species of the Northern Cape appear on the IUCN Red Data list of threatened species. However, none of these species' distribution ranges overlap with that of the study area. In addition, those species that are specially protected according to Schedule 1 of the NCNCA include all Velvet worms as well as some baboon spider species, Stag Beetles and the Flightless Dung Beetle. None of these taxa are known to occur in the study region either.

All Rock- Creeping- and Burrowing Scorpions are protected according to Schedule 2 of the NCNCA, along with several beetles, butterflies, and moths. Of these, Burrowing and Rock Scorpions as well as some Gossamer-winged Butterflies, Skippers, Brush-footed Butterflies and Satyrs have the highest likelihood to be found on site.

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

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

Ephemeral wetlands
Ephemeral wetlands (pans) host aquatic invertebrate species that are specifically adapted to ephemerality, i.e., Crustaceans. Their eggs lie dormant in the soil until the pans are inundated.They then hatch and mature rapidly to produce eggs that accumulate in the top few centimetres of the sediment. These eggs are heat and drought resistant and ensure the continued existence of species in a habitat. Egg banks contains the biodiversity of the aquatic habitat during times of drought. Any disturbances to the soil will expose the eggs to erosion and crushing, which will result in species losses and possible extinction. Not much is known about the species distribution or conservation status of species in the Northern Cape, but typical taxa to be expected in the pans on Saxendrift include Notostraca (Tadpole shrimps), Anostraca (Fairy shrimps), Spinicaudata (Clam shrimps), Cladocera (water fleas), Ostracoda (Seed shrimps) and Copepoda (Copepods). Insects that are common in the pans include Notonectidae (Backswimmers), Dytiscidae (Predacious diving beetles), and Odonata (Dragonfly) nymphs.

NATURAL FLORA:

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Broad-scale vegetation patterns

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

Upper Gariep Alluvial Vegetation is found in the Northern Cape and Free State and includes the broad alluvia of the Orange River, lower Caledon as well as the lower stretches of the Vaal, Riet and Modder Rivers as far as Groblershoop. The topography is typically flat alluvial terraces that host riparian thicket vegetation (dominated by Vachellia karroo and Diospyros lycioides), flooded grasslands, reed beds and ephemeral herblands found mainly on sand banks within the river and on the river banks. The geology of this unit is presented as recent alluvial deposits underlain by Karoo Supergroup sediments and tillites. The soils are typically of the Ia group land types. This unit is subject to flooding during summer.

It is estimated that more than 20 % of the unit has been transformed for cultivation and the building of dams. Exotic woody species like Salix babylonica, Eucalyptus camaldulensis, E. Sideroxylon, Prosopis and Populus spp. dominate heavily disturbed alluvial vegetation. The unit is classified as being vulnerable and only 3 % is conserved within formal conservation areas, i.e. Tussen Die Riviere, Gariep Dam and Oviston Nature Reserves. No endemic plant species are known from this unit.

Northern Upper Karoo is found in the Northern Cape and Free State at altitudes between 1 000 and 1 500 m. It is mainly 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, with isolated hills in the Upper Karoo Hardeveld (in the south) and Vaalbos Rocky Shrubland (in the northeast). 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 include 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 to very shallow Glenrosa and Mispah forms. The most dominant landtypes are Ae, Ag and Fc. It is estimated that about 4 % of the Northern Upper Karoo 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.

Fine-scale vegetation patterns

Plant communities in the study area are delineated according to plant species correspondences and changes in soil structure. They can be divided into six distinct units, which are described below. These descriptions include unique characteristics and the dominant species found in each unit. A complete plant species list, including those species likely to occur here is presented in Appendix 1.

Figure 18. The broad-scale vegetation units (Mucina and Rutherford 2012) present in the study area.

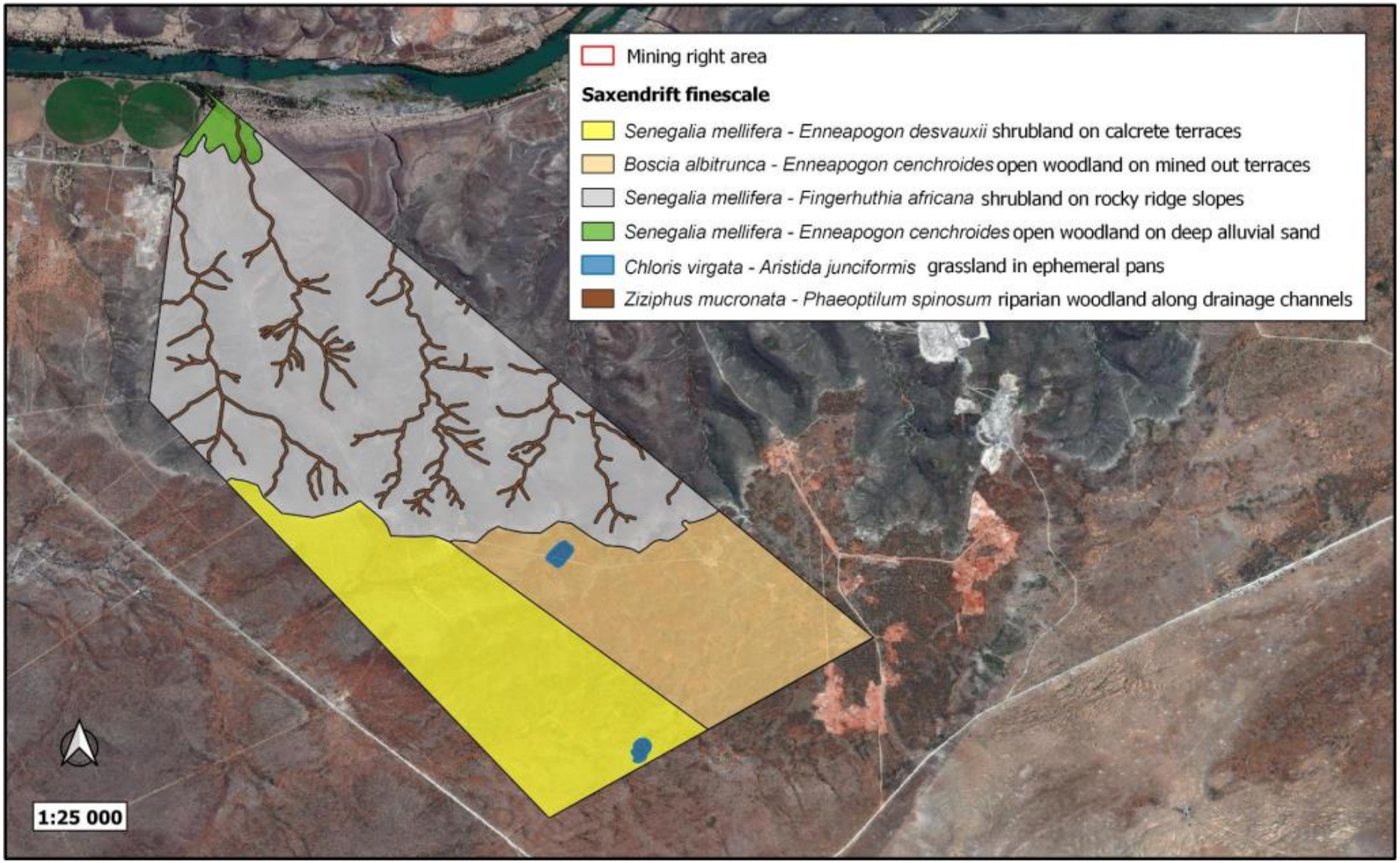

Figure 19. The distribution of fine-scale plant communities in the study area.

Senegalia mellifera - Enneapogon desvauxii shrubland on calcrete terraces This community covers the south-west corner of the study area (Figure 19). The vegetation is presented as shrubland with Senegalia mellifera dominating the tall shrub layer and Enneapogon desvauxii, the short grassy matrix. Rocky, calcareous soil covers ± 10 % of the ground surface, and biological soil crusts are prominent.

Apart from S. mellifera dominating the tall shrub layer, Boscia albitrunca is also common. The low shrub layer is more diverse and includes Hoodia gordonii, Aptosimum albomarginatum, A. spinescens, A. indivisum, Aizoon schellenbergii, Felicia muricata, Sericocoma avolans, Solanum tomentosum, Barleria rigida, Pentzia incana, Roepera lichtensteiniana, Pteronia mucronata, Melhania rehmannii, Asparagus spp. Lycium spp. and Lessertia sp.

The grass layer is predominantly short, but apart from the dominant E. desvauxii, other taller species include Eragrostis echinochloidea, E. lehmanniana, Fingerhuthia africana, Aristida adscensionis, Enneapogon cenchroides, E. scaber and Coelachyrum yemenicum.

Herbs include Geigeria ornativa, Limeum aethiopicum, Phyllanthus maderaspatensis, Ornithoglossum sp.

Boscia albitrunca - Enneapogon cenchroides open woodland on mined out terraces This community covers the south-eastern corner of the study area (Figure 19) and has already been heavily degraded by past mining practices. Much of the original shrubland has been demolished and it is currently in early successional state, but also invaded by alien species.

Boscia albitrunca adults remain scattered across this unit as the primary indigenous tall woody species, but Senegalia mellifera is also found here. The alien invasive Nicotiana glauca is scattered across this unit. Low shrubs include Sericocoma avolans, Melhania rehmannii, Aptosimum spinescens and Solanum tomentosum.

The grass layer is dominated by Enneapogon cenchroides, but Aristida junciformis is also common. Other species include Enneapogon desvauxii, Eragrostis echinochloidea, Tragus racemosus, Coelachyrum yemenicum and Schmidtia kalahariensis.

The alien herbs Chenopodium carinatum and Conyza bonariensis have vastly invaded this unit, but the indigenous herb Geigeria ornativa is also found here.

Senegalia mellifera - Fingerhuthia africana shrubland on rocky ridge slopes This community covers most of the northern half of the study area (Figure 19) and is found on shallow rocky soil along the ridge slopes. It is presented as a shubland with a moderately tall grassy matrix.

Senegalia mellifera dominates the tall shrub layer, with Boscia albitrunca also being common. Other tall to medium shrubs include Ehretia rigida, Searsia burchellii, Nymania capensis, Rhigozum trichotomum, Kleinia longiflora, Justicia incana, Opuntia engelmannii Asparagus sp., and Lycium sp. The dwarf shrub layer is diverse and include Euryops dregeanus, Pteronia mucronata, Pentzia incana, Roepera lichtensteiniana, Aizoon asbestinum, A. schellenbergii, Aptosimum albomarginatum, A. indivisum, A. spinescens, Hermannia spinosa, and Barleria rigida.

The grass layer is dominated by Fingerhuthia africana, but Aristida adscensionis is also common. Other species include Enneapogon desvauxii, Stipagrostis ciliata, and Eragrostis nindensis.

Herbs include Acanthopsis hoffmannseggiana, Polygala leptophylla, Dicoma capensis, Oxalis lawsonii, Geigeria ornativa, Cleome angustifolia, and Limeum aethiopicum. The bulb Ledebouria sp. is also found here.

Senegalia mellifera - Enneapogon cenchroides open woodland on deep alluvial sand This community occurs in the far north of the study area (Figure 19) and is found on deep alluvial sand. It has been degraded by historic agricultural activities and includes high infestation by Prosopis glandulosa. The vegetation is presented as open woodland where the tall shrub Senegalia mellifera dominates, but Phaeoptilum spinosum and Boscia albitrunca are also common. Low shrubs include Roepera lichtensteiniana, Aizoon schellenbergii and Peliostomum leucorrhizum.

The grass Enneapogon cenchroides is by far the most dominant in the grassy matrix, but other species include Eragrostis trichophora, E. echinochloidea, E. lehmanniana, Enneapogon desvauxii, Fingerhuthia africana and Setaria verticillata.
The herb Indigofera alternans and the bulb Ammocharis coranica are also found here.

Chloris virgata - Aristida junciformis grassland in ephemeral pans
This community occurs in the ephemeral pans found on the calcrete terraces in the south of the study area (Figure 19). Both pans show evidence of anthropogenic disturbances, but the pan in the east has been severely degraded by past mining activities. These pans are presented as grassland communities dominated by facultative wetland

species. Chloris virgata dominates the pans, with Aristida junciformis also being common. Other grasses include Aristida congesta, Enneapogon desvauxii, Eragrostis trichophora, E. echinochloidea, Setaria verticillata, Tragus racemosus, Panicum coloratum and Sporobolus fimbriatus.

No shrub species are found in the pans and the herb community signifies the level of disturbances, with higher densities of aliens and problem plants such as Chenopodium carinatum, Conyza bonariensis, Argemone ochroleuca and Tribulus terrestris occurring in the east. Naturally occurring speciesinclude Heliotropium lineare, Hermannia coccocarpa and Oxalis sp.

Ziziphus mucronata - Phaeoptilum spinosum riparian woodland along drainage lines The ephemeral drainage lines are found along the ridge slopes of the study area (Figure 19). Here, the channels are primarily bare, with their surfaces covered by rocks and gravel, but the grass Chrysopogon serrulatus is common here. The channel banks consist of riparian woodland dominated by trees and shrubs, including Ziziphus mucronata, Boscia albitrunca, Searsia burchellii, Phaeoptilum spinosum, Grewia flava, Olea europaea subsp. africana and Searsia lancea. The alien invasive Cylindropuntia leptocaulis is also found in places.

Population of sensitive, threatened, and protected plant species

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

Most species from the region are classified as least concern; a category which includes widespread and abundant taxa. However, two species are red listed. Acanthopsis hoffmannseggiana (Data Deficient – Taxonomically Problematic) was recorded in the rocky shrubland on the

ridge slopes. It prefers sandy plains, stony hillsides and ridges and is usually found at elevations between 650 and 1000 m. It is a widespread and variable species that possibly contains several taxa, some of which may be of conservation concern. More study is needed to find reliable distinguishing characters to separate individual taxa. Hoodia gordonii (Data Deficient – Taxonomically Problematic) was recorded in the pristine shrubland on calcrete terraces. Although it is a widespread species, it has undergone decline since 2001 because of indiscriminate harvesting for its appetite suppressant properties. Research on population recovery post harvesting and degree of impact of the harvesting over the past 10 years is required before this species can be accurately assessed.

In addition to these, specially protected species (Schedule 1) and protected species (Schedule 2) of the NCNCA known from the study are Boscia albitrunca occurs widespread across the site. Ammocharis coranica was recorded in the sandy alluvial woodland, while large Olea europaea subsp. africana trees were found along the banks of the drainage channels. Nymania capensis and Oxalis lawsonii was recorded on the ridge slopes, Lessertia sp. in the pristine shrubland on calcrete terraces, and Oxalis sp. in the ephemeral pans. Moraea simulans, previously recorded in the region, was not encountered during the field survey.

Species from the study area that are protected in terms of the National Forest Act include Boscia albitrunca. It was recorded across the site, where it occurred at fairly high densities of 3 - 4 individuals per hectare. It was however absent from the pans. On the transformed calcrete terraces, adult trees of 1.5 - 2 m in height x 2 - 3 m in diameter is scattered across a transformed landscape. No young shrubs or saplings are found here and have assumingly been removed by past mining activities. In the pristine shrubland on calcrete terraces the entire population size range is present, i.e., saplings (30 - 80 cm (h) x 20 - 80 cm (d)), young shrubs (80 cm - 1m (h) x 1 – 1.5 m (d)) and adult trees (1 – 2.5 m (h) x 2 - 3 m (d)). The same is true for the population on the ridge slopes, where saplings as small as 10 cm in height x 20 cm in diameter, to adults of 2 m in height x 4 m in diameter was recorded. Large trees and shrubs of 2 - 3 m (height) x 3 - 5 m (diameter) were recorded along the riparian banks of the ephemeral river as well as in the deep sands of the alluvial woodland. To damage or remove any protected trees (seedlings to adults) an application must be submitted to the Northern Cape Department of Agriculture, Forestry and Fisheries (DAFF) and a licence obtained from DAFF at least three months prior to such activities.

Furthermore, according to Section 51(2) of NCNCA, a permit is required from the Northern Cape, Department of Environment and Nature Conservation (DENC) for any large-scale clearance of all indigenous (Schedule 3) vegetation, before such activities commence.

Weeds and invader plant species

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

Indicators of bush encroachment

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

Table 7. Declared indicators of bush encroachment in the Northern Cape recorded in the study area.

Scientific name	Common name
Grewia flava	Velvet raisin
Rhigozum trichotomum	Three – thorn rhigozum
Senegalia mellifera	Black thorn

(7) ***SURFACE WATER AND WETLANDS***

Dr. Betsie Milne from Bocia Ecological Consulting Pty Ltd has been appointed by DJ de Smidt to provide an Ecological Assessment Report in April 2022 for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area surface water was described and included in this report.

The Saxendrift study area falls within the Boegoeberg quaternary catchment D71C of the Lower Orange Water Management Area (Figure 20). This quaternary catchment has been allocated a Present Ecological State (PES) of 'Moderately Modified' (C) by Smook et al. (2002) and information regarding its mean annual rainfall, evaporation potential and runoff is provided in Table 8.

Table 8. Catchment characteristics for the Boegoeberg quaternary catchment in which the study area falls, as presented by Smook et al. (2002).

Quaternary catchment	Catchment Area (km^2)	Mean Annual Rainfall (mm)	Mean Annual Evaporation (mm)	Mean Annual Runoff (10^6 m^3)
D71C	1 592	250	2 350	4.75

According to the South African Inventory of Inland Aquatic Ecosystems (SAIIAE), the study area falls within the Upper Karoo Bioregion, where 1.9 % (236 551 ha) of the land area is covered by inland wetlands, including depressions, floodplains, seeps and valley-bottom wetland types (Van Deventer et al. 2019). Their spatial extent according to their present ecological status is depicted in Table 9. Most of these wetlands have been moderately to severely modified.

Saxendrift comprises two depressional wetlands and several drainage lines are present (Figure 21). According to SAIIAE, these depressions are still in natural or near-natural condition.

Table 9. Percentage of inland wetland spatial extent according to the present ecological status per wetland type of the Southern Namib Desert Bioregion.

Wetland type	Total Extent (%)	% Natural or near-natural (A/B)	% Moderately modified (C)	% Heavily to severely/critically modified (D/E/F)
Depression	27.9	49	10.6	40.4
Floodplains	27.5	0.4	1.7	98
Seeps	2.8	11.9	76.2	11.9
Valley-bottom	41.8	5.5	35.1	59.4

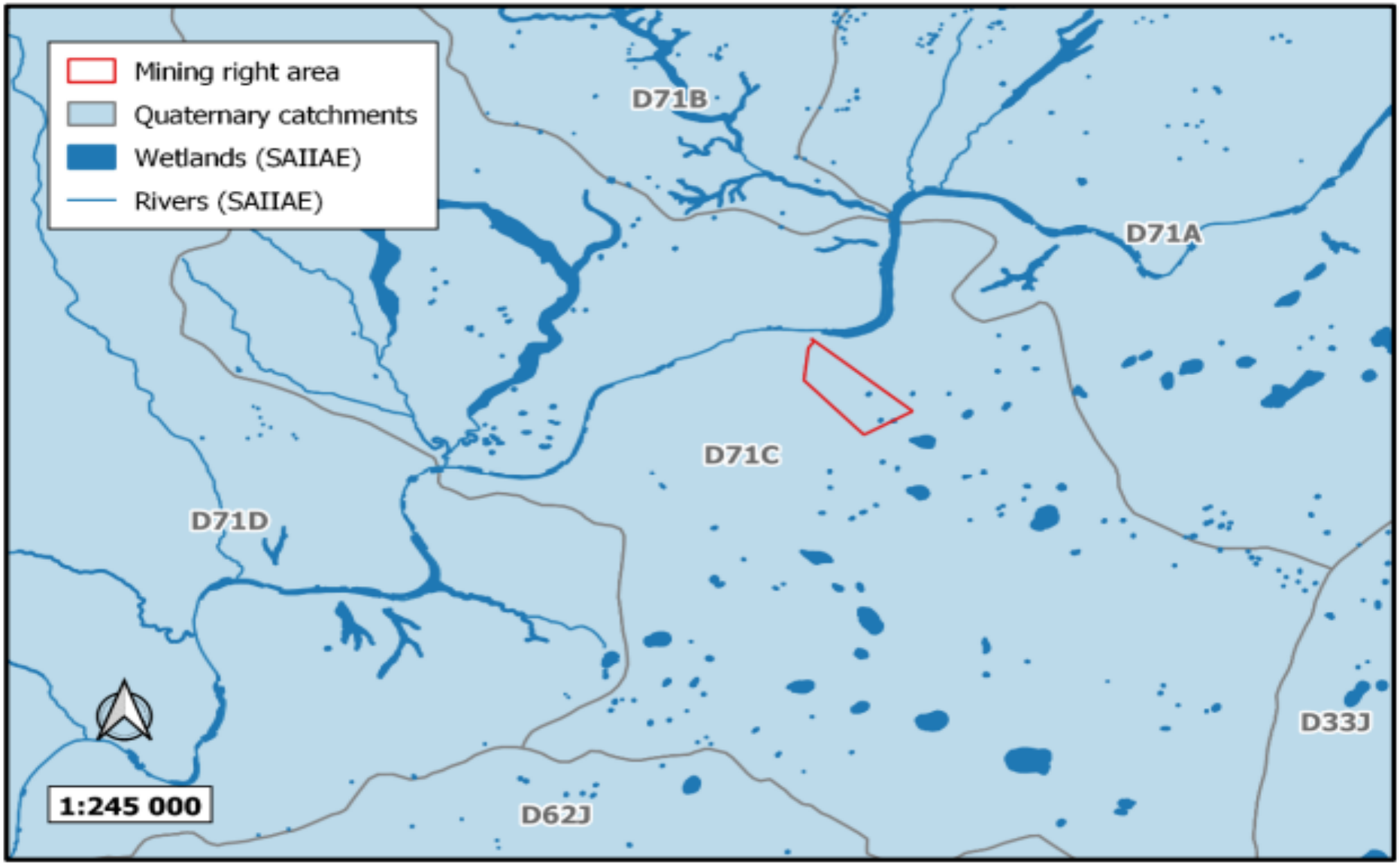

Figure 20. The locality of the proposed mining area in relation to the Boegoeberg quaternary catchment of the Lower Orange Water Management Area.

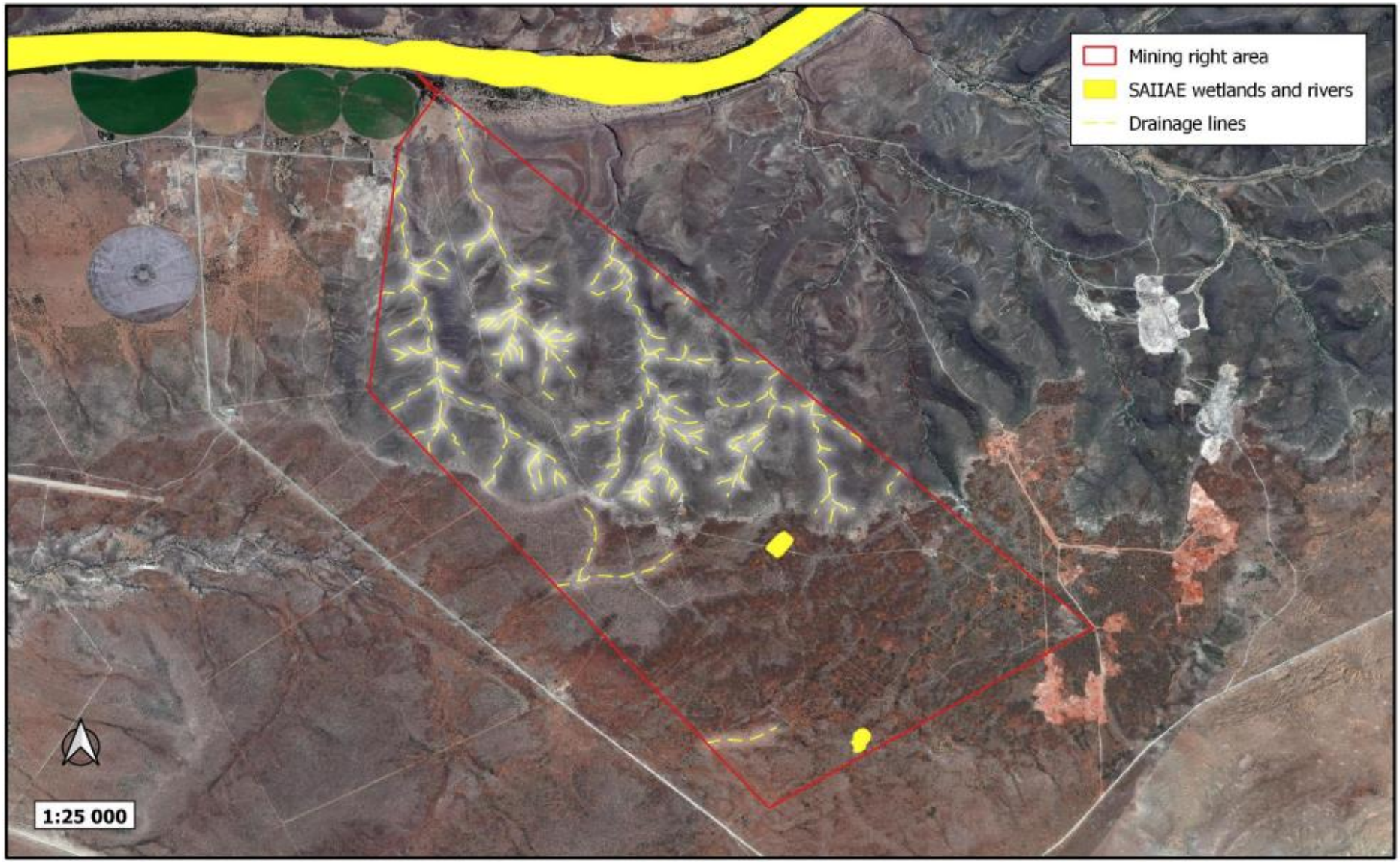

Figure 21. The location of SAIIAE wetlands and drainage lines on the proposed mining right area

(8) *GROUND WATER:*

The mean depth of the water table during summer is approximately 120 m and during winters 140 m.

Ground –Water Zone
It is not anticipated that ground water plays a significant role in the study area. The river is the primary source of water for most activities.
The area between Douglas and Prieska is criss-crossed by dolerite dykes which could act as barriers to water seepage from mine sites. These thin impersistant dykes in the proposed mine area will not affect ground–water movement significantly. The depth of the boreholes as indicated in 1.10 precludes ground water being an important factor in the area.

Operation Demand
Processed water
The processed water and mine residue deposits will form part of a closed dirty water system and will not be allowed back into the Orange River. Water for mining operations will be sourced from the Orange River.

(9) *CULTURAL AND HERITAGE RESOURCES:*

Dr. Edward Matenga from (AHSA) Archaeological and Heritage Services Africa Pty Ltd has been appointed by DJ de Smidt to provide an Heritage Impact Assessment Report for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area.

A Heritage Impact Assessment (HIA) study was undertaken for a mine prospecting right application on the Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20 near Prieska, in the Siyathemba Local Municipality, Northern Cape. The HIA report has been prepared in accordance with Section 38(8) of the National Heritage Resources Act (25/1999) which entailed a site visit and ground survey undertaken on 10 March and 13 June 2022 to assess the heritage sensitivity of the area and to determine potential adverse impacts of the proposed activities on the heritage resources.

The findings of the heritage survey are summarised as follows:

The Stone Age
Stone Age tools occurred in all but four of the 24 recorded instances. The typology is dominated by scrapers, while there are a few blades. Handaxes were recorded in two instances; the handaxe is recognised as a type tool of the Early Stone Age period. Otherwise a majority of the finds date from the Middle Stone Age (MSA) to the Late Stone Age (LSA). No significant concentrations of artefacts were encountered.

The Iron Age

No Iron Age sites or relics were found on the property.

Modern period
A setting of stones (stones in a single file) forming a semi-circle was recorded (SXD 12, SXD23). The meaning of these features could not be ascertained. Foundations remains of a rectangular building which might have been built in the 20th century. All these features recorded and ranked as of low significance.

Burial ground
No burial grounds were found or reported on the property.

As the heritage sensitivity of the property is considered to be low, the mining application can be approved. The study is mindful that some important discoveries may occur during the prospecting and mining phases. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation to be undertaken.

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.

Palaeontology
Prof Marion Bamford, of the University of the Witwatersrand, sub-contracted by Archaeological and Heritage Services Africa (Pty) Ltd, Pretoria, South Africa has been appointed by DJ de Smidt to provide an Palaeontological Impact Assessment Report for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area.

A proposed Mining Right Application on the Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20, near Prieska, Northern Cape Province, requires a palaeontological impact assessment.

The site is on the southern side of the Orange River, approximately 50 km southwest of the town of Douglas. Irrigation and the cultivation of crops occurs close to the river but the majority of the area has indigenous sparse shrubs and eroded areas adjacent to the ephemeral stream that drain into the Orange River.

A Phase 2 (site visit) Palaeontological Impact Assessment was requested for the Saxendrift Mining Right Application project. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment

(PIA) was completed for the proposed development and updated from the site visit, and the latter is reported herein.

To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development.

Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 22. The site for mining is in the Dwyka Groups rocks (green; moderate sensitivity) and the Tertiary-Quaternary calcretes (orange, highly sensitive).

The Dwyka Group tillites and mudstones can trap fossils that were caught up in the ice sheets or glaciers and dropped when the ice melted, therefore these fossils tend to transported fragments of more robust fossils such as silicified wood, invertebrate remains and rarely Glossopteris leaves or associated flora. Two rare occurrences are mentioned by Anderson and McLachlan (1976) near Strydenburg which is to the northeast of this site. There are no other reports. According to Johnson et al. (2006), the fossils are only likely to be found in mudstone facies of the Dwyka Group.

Exploration and research along the palaeo-rivers of Southern Africa, now only present as abandoned palaeochannels, or captured by the present day rivers, the Vaal and Orange Rivers in this case, the gravels and sands might include transported robust and fragmentary fossils. Examples of these are heavy bone fragments and silicified wood fragments, as well as diamonds (de Wit, 1999; de Wit et al., 2000).

The Tertiary calcretes can trap fossils and artefacts when associated with palaeo-pans or palaeo-springs (Partridge et al., 2006). Where deflation has occurred, for example along the west coast of South Africa, any trapped materials in the different levels can be concentrated in the depo-centre of the pan or dune and thus it can be challenging to interpret the deposit (Felix-Henningsen et al., 2003).

Palaeo-pans and palaeo-springs are visible in satellite imagery because of their topography and often are associated with lunette dunes. Vegetation changes are also common. No such features are seen in the Google Earth images. Aeolian sediments that cover most of the region, do not preserve fossils because they have been reworked and windblown.

Site visit observations

The area was walked down in June 2022 and the surface rocks, natural cutting provided by erosion channels and ridges were targeted as they are likely to show the underlying rocks and any fossils. A selection of site

photographs of representative landscapes and the GPS locations are provided in Table 3 and Figures 6 -18 below in the PIA study.

No fossils of any kind were seen in the erosion channels or on the ground surface. Transported Dwyka Group pebbles were seen in places but there were only clasts and no fossils were seen amongst them.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age to contain fossils but there is no evidence of features such as palaeo-pans or palaeo-dunes to trap any fossils. Furthermore, the material to be mined is the sands for diamonds and this does not preserve fossils. However, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only if there such features as palaeo-pas or palaeo-dunes to trap any fossil plant, insect, invertebrate or vertebrate material would any occur in the area. The sands of the Quaternary period would not preserve fossils.

Figure 22. SAHRIS palaeosensitivity map for the site for the proposed MRA on Portion of Farm Saxendrift 20 shown within the red rectangle. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

Recommendation

Based on the site visit and walk through there are no surface fossils and no fossils in the eroded gullies. This confirms the previous assertion and the lack of any previously recorded fossils from the area, that it is extremely unlikely that any fossils would be preserved in the Dwyka Group tillites and sandstones or the sands and calcretes of the Tertiary-Quaternary. There is a very small chance that fossils occur below ground and also may occur in features such as palaeo-pans or palaeo-dunes that could trap fossils are present as no such feature is visible in the satellite imagery. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the miners or environmental officer, or other responsible person once mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, therefore, as far as the palaeontology is concerned, the project should be authorised and a mining permit granted.

Chance Find Protocol

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

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

8. If no fossils are found and the excavations have finished then no further monitoring is required.

(10) *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 mining activtiy.

Existing Sources
The current source of air pollution in the area stems from numerous mining operations along the Orange River and from vehicles traveling on the gravel roads of the area. Farming activity, especially ploughing of the irrigation fields, may generate dust during certain periods of the year.

New Source
The source of air pollution on the farm will be nuisance dust generated by the opencast mining 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 mining roads. Gas emissions from machinery will be kept within legal limits.

Areas of Impact
The prevailing wind (occasionally slightly) is from the east (June & October) and the south-west (October - January) but the strongest winds are from the north-west. The average monthly wind speeds are generally below 6.3 m/s.

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.

If dust is generated, it is expected to be visible from the surrounding farmland or mines along the Orange River.

(11) *Noise:*

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

There are numerous mining operations on both sides of the proposed mining operation as well as across the Orange River. Although these operations do generate noise the overall impact can be described as negligible.

(12) *VISUAL ASPECTS:*

The mining area is visible from the other side of the Orange river and to the neighbour to the west of the mining area. There are no residential areas within the surrounding area. The mine is not located on any tourist route and will not be visible to the average tourist.

(13) *CRITICAL BIODIVERSITY AREAS AND BROAD-SCALE PROCESSES:*

Dr. Betsie Milne from Bocia Ecological Consulting Pty Ltd has been appointed by DJ de Smidt to provide an Ecological Assessment Report in April 2022 for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area Critical biodiversity areas and broad-scale processes was described and included in this report.

The proposed mining site falls within critical biodiversity areas (Figure 23), as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape. The Orange River and its riparian zone is classified as Critical Biodiversity Area One, while a ± 1 – 2 km buffer along the river is classified as Critical Biodiversity Area Two. Most of the remaining area is classified as Ecological Support Areas, with fragments in the south-west being classified as Other Natural Areas (Figure 24). No Protected Areas occur in or near the study area.

Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) recognises the buffer along the Orange River to have Highest Biodiversity Importance (Figure 25), which constitute a high risk for mining. However, the remainder of the site is not considered to have any biodiversity importance. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the impacts of mining to support mainstreaming of biodiversity issues in decision making in the mining sector.

Furthermore, according to the National Web based Environmental Screening Tool the study area is considered to have sensitive environmental features (Figure 26). This tool is a geographically based web-enabled application which allows a proponent intending to apply for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), to screen their proposed site for any environmental sensitivity.
According to the screening tool, the Saxendrift study area is of very high sensitivity based on the Terrestrial Biodiversity Theme. This sensitivity is a direct function of the Critical Biodiversity Areas according to the Northern Cape Critical Biodiversity Areas Map. The study area is of medium sensitivity based

on the Animal Species Theme, due to the suitable habitat opportunity for the bird species Neotis ludwigii (Ludwig's Bustard). The site is however of low sensitivity based on the Plant Species- and Aquatic Biodiversity Themes.

The Spatial Development Framework for the Pixley ka Seme District Municipality (2013 - 2018) regards all areas along the river as sensitive. However, the study area is mapped to be of low sensitivity in this report.

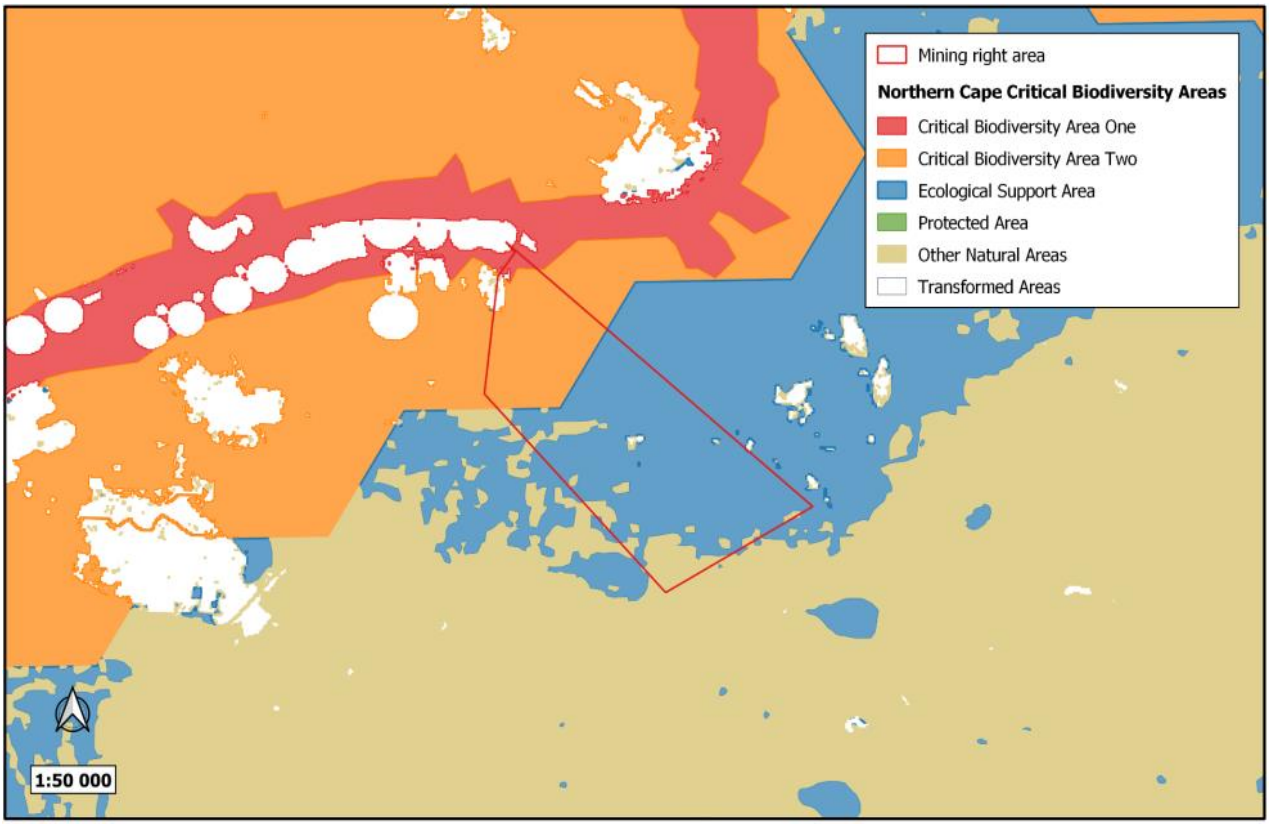

Figure 23. The study area in relation to the Northern Cape Critical Biodiversity Areas.

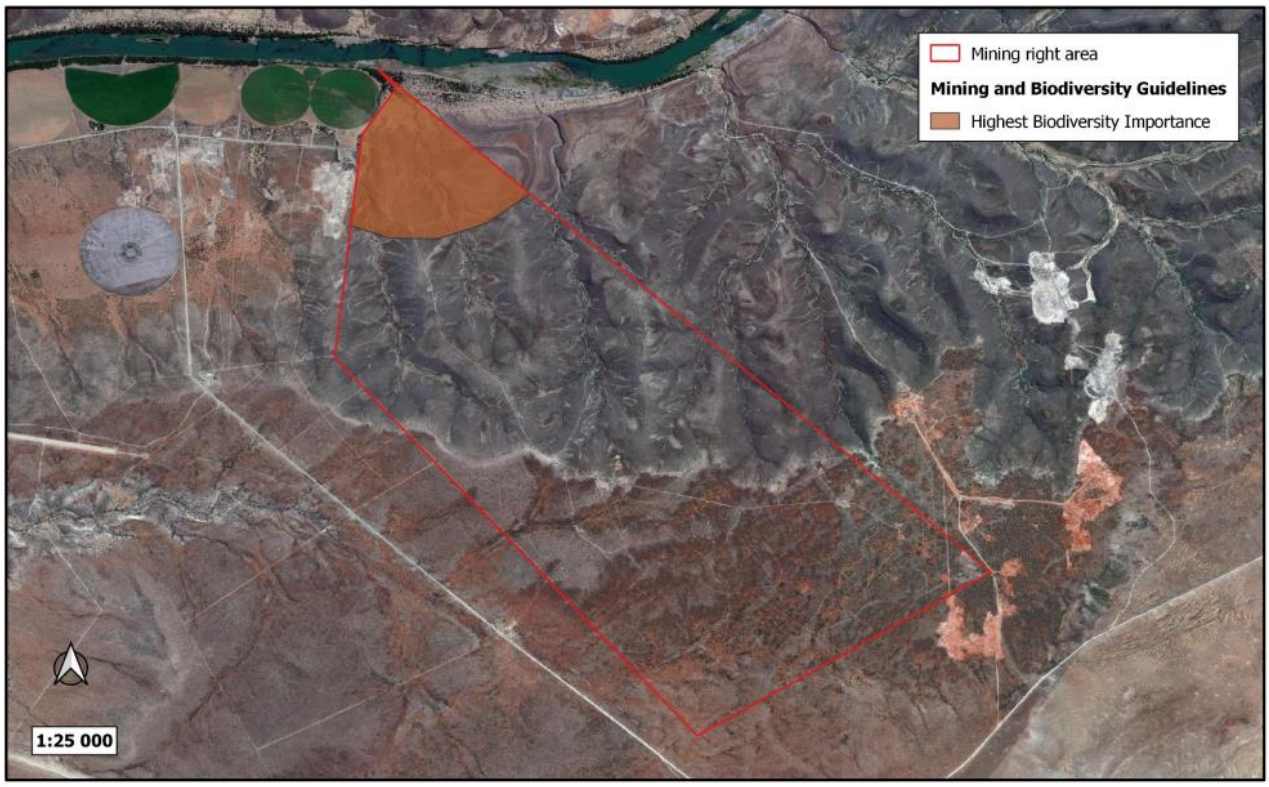

Figure 24. The study area in relation to the Mining and Biodiversity Guidelines.

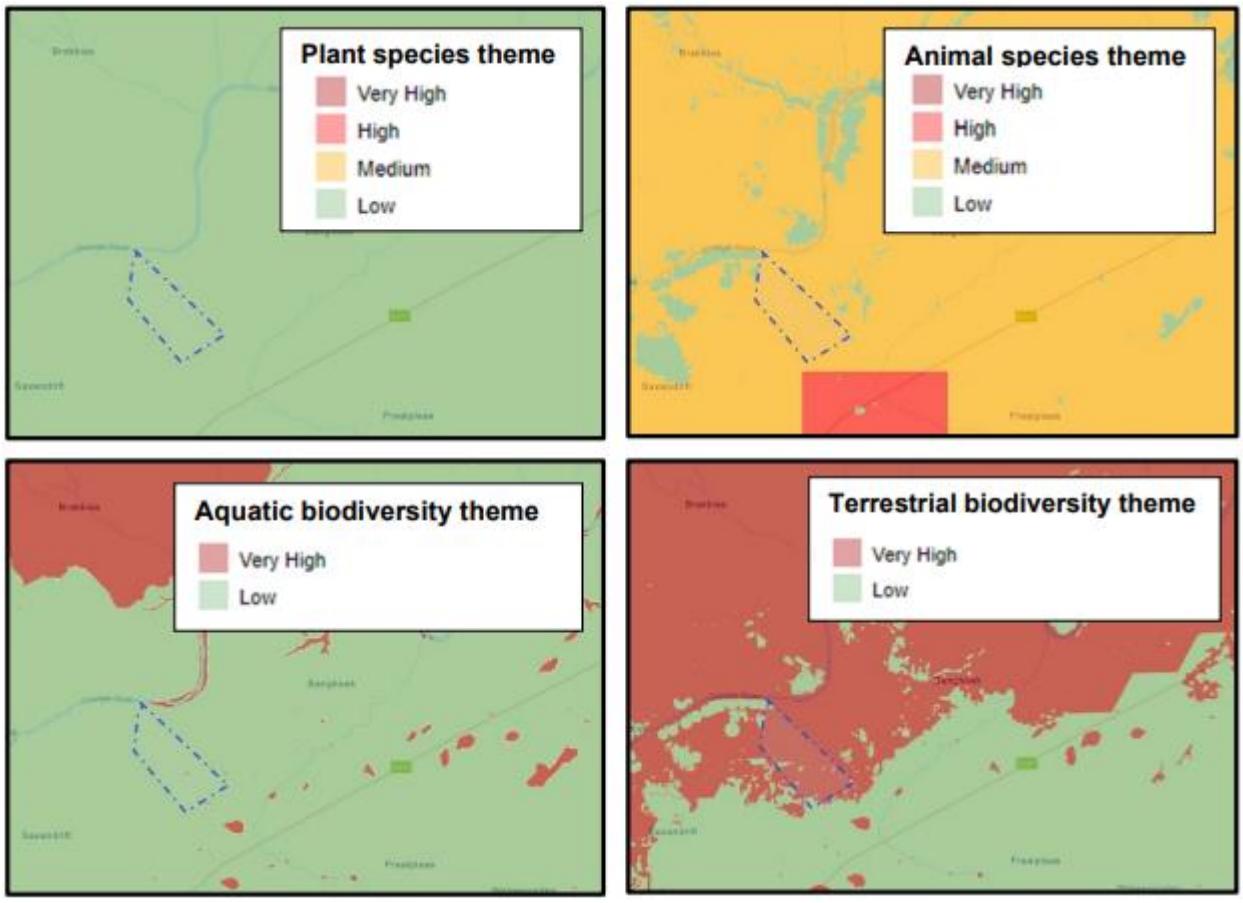

Figure 25. Environmental sensitivities in the study area, according to the National Web based Environmental Screening Tool.

The study area also borders the southern boundary of the Griqualand West Centre (GWC) of Endemism core (Frisby et al. 2019) (Figure 26). A centre of plant endemism is an area with high concentrations of plant species with very restricted distributions, known as endemics (Van Wyk and Smith 2001). Relatively small disturbances in a centre of endemism may easily pose a serious threat to its many range restricted species. Endemics are specifically vulnerable due to their restricted distribution ranges.

Finally, the study area falls within a region where one of South Africa's largest economically most important alluvial diamond deposits are found (Figure 27), i.e. along the Orange and Vaal Rivers (Gresse 2003). The most significant crop irrigation in the Northern Cape also stretches along these rivers (Durand 2006). These factors increase the operation's cumulative impacts.

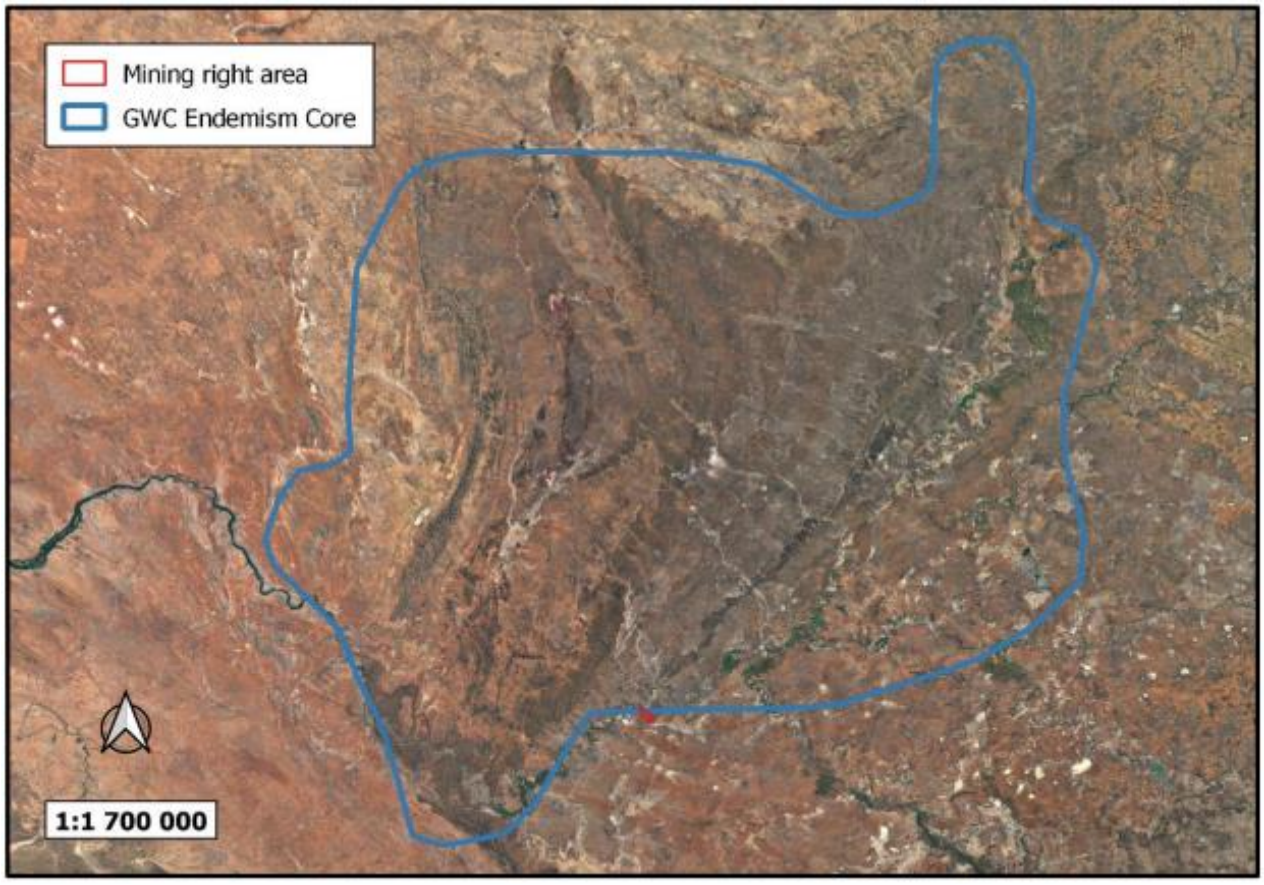

Figure 26. Saxendrift in relation to the Griqualand West Centre of Endemism (Frisby et al. 2019).

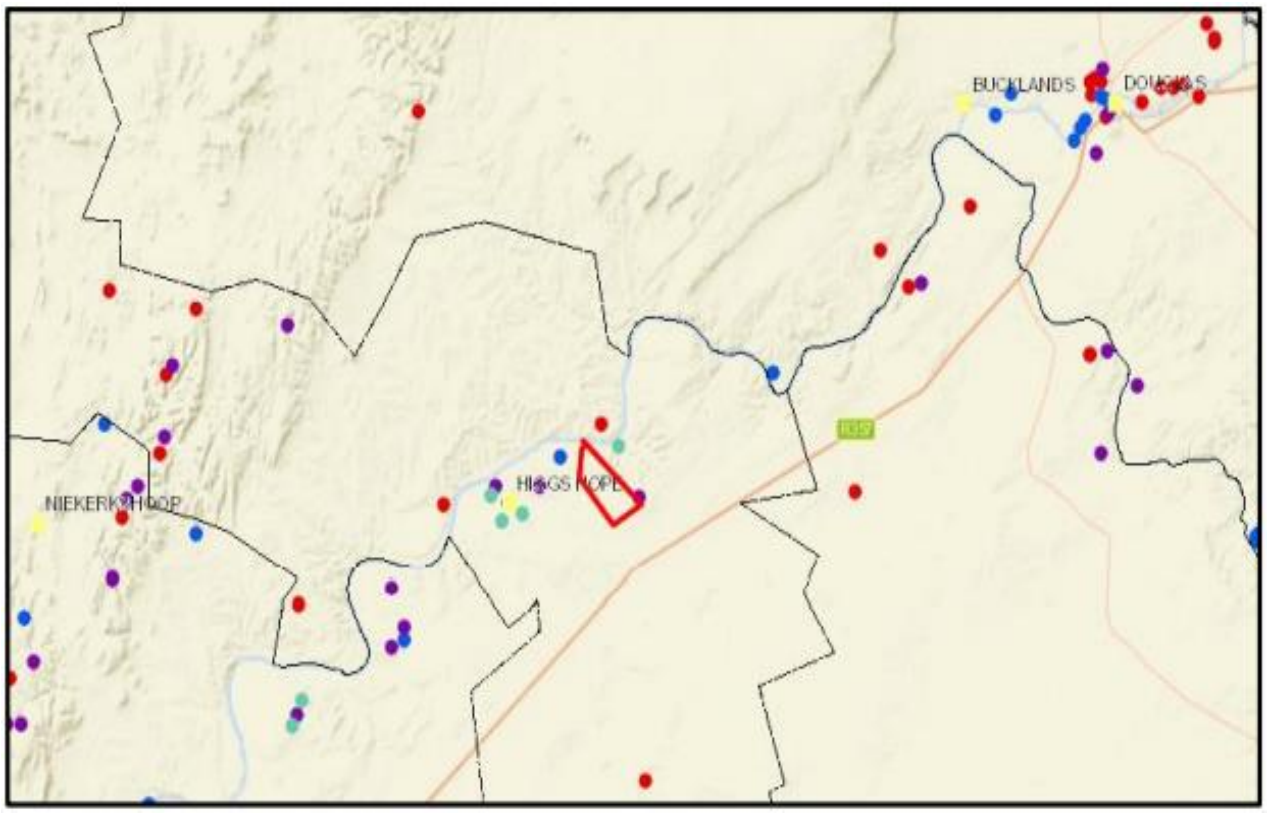

Figure 27. The extent of past and present mining along the Orange River between Douglas and Prieska.

(14) *SOCIO-ECONOMIC STRUCTURE OF THE REGION:*

Population Density, Growth and Location

The Northern Cape is geographically the largest province in South Africa having a land mass increased from 361,830 km² to 373,239 km² with the introduction of the new provincial boundaries and covers approximately one third of the country's surface area.

The Northern Cape is divided into five district councils, namely Namakwa, Siyanda, Pixley ka Seme, Frances Baard and Kgalagadi. These district councils are made up of 27 local Municipalities. The province also has five district management areas.

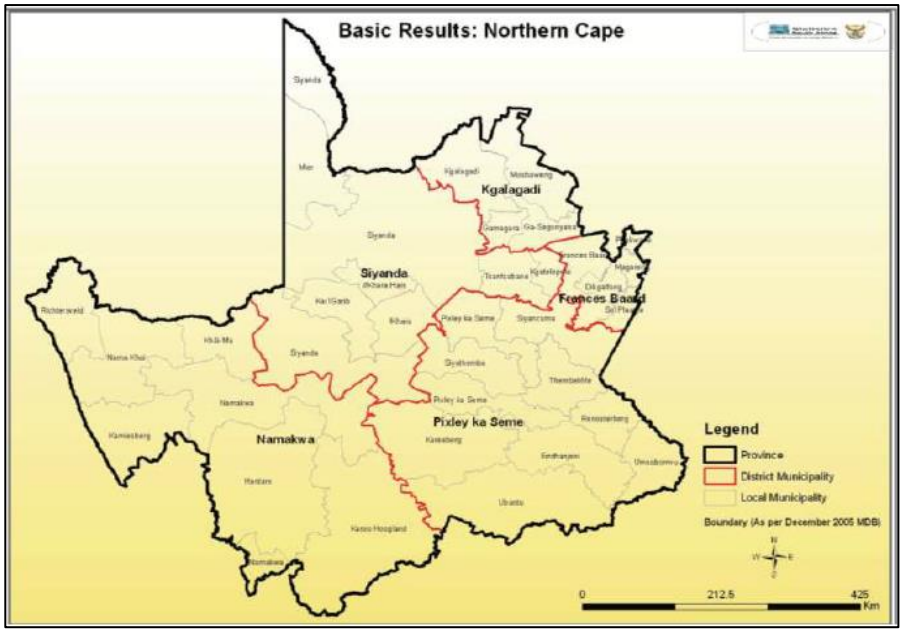

Figure 28. Local Municipal areas in the Northern Cape Province

The Thembelihle Local Municipality forms part of the Pixley Ka Seme District Municipality which is located in the south-eastern part of the Northern Cape Province.

The Thembelihle Municipality is made up of two main entities, namely incorporating two urban settlements (Hopetown and Strydenburg) commercial farming areas, small farming areas and small private game parks.

The Municipality is characterised by incorporating the confluence of South Africa's largest rivers, the Orange and Vaal Rivers, with rich mineral deposits (Semi-precious stones-Gypsum, Diamonds, Limestone, Rock salt, Clay along the Orange River).
It is one of the smaller municipalities of the eight that make up the district, accounting for only 8% of its geographical area.

This mostly agricultural landscape is rich in natural resources. The first diamond was discovered in Hopetown and a great part of the Anglo-Boer War was fought in these parts.
Thembelihle means 'a place of hope'. The new emblem depicts the diversity of Thembelihle inhabitants and its surroundings.

Hopetown was established around 1854 when a town was laid out with a Dutch Reformed Church. In 1866, a diamond, „Eureka", was found and in 1868, on the farm Zandfontein, the 83.5 carat „Star of South Africa" diamond was discovered. Today, Hopetown is a farming town. The Orange River is also situated in the Municipality and provides opportunities for leisure, adventure and eco- tourism.

One of the first diamonds in the Northern Cape (the Eureka Diamond) was discovered near Hopetown.

Hopetown and Strydenburg are located next to the N12 highway, which link the area to Kimberley and Cape Town (via its southbound connection to the N1).

Table 10. Population distribution by municipality – Census 2001 and CS 2007

Municipality	Population			% distribution	
	Census 2001	CS 2007	% change	Census 2001	CS 2007
DC6: Namakwa	**108 111**	**126 454**	**17,0**	**10,9**	**12,0**
NC061: Richtersveld Local Municipality	10 125	14 613	44,3	1,0	1,4
NC062: Nama Khoi Local Municipality	44 750	54 644	22,1	4,5	5,2
NC064: Kamiesberg Local Municipality	10 754	12 117	12,7	1,1	1,1
NC065: Hantam Local Municipality	19 813	21 234	7,2	2,0	2,0
NC066: Karoo Hoogland Local Municipality	10 512	10 420	-0,9	1,1	1,0
NC067: Khai-Ma Local Municipality	11 344	12 571	10,8	1,1	1,2
NCDMA06: Namakwa	**813**	**897**	**10,4**	**0,1**	**0,1**
DC7: Pixley ka Seme	**164 667**	**166 849**	**1,4**	**16,6**	**15,8**
NC071: Ubuntu Local Municipality	16 375	16 153	-1,4	1,7	1,5
NC072: Umsobomvu Local Municipality	23 641	21 992	-7,0	2,4	2,1
NC073: Emthanjeni Local Municipality	35 549	38 228	7,5	3,6	3,6
NC074: Kareeberg Local Municipality	9 488	9 867	4,0	1,0	0,9
NC075: Renosterberg Local Municipality	9 070	9 185	1,3	0,9	0,9
NC076: Thembelihle Local Municipality	13 987	13 218	-5,5	1,4	1,2
NC077: Siyathemba Local Municipality	17 512	20 120	14,9	1,8	1,9
NC078: Siyancuma Local Municipality	35 810	35 970	0,4	3,6	3,4
NCDMA07: Pixley ka Seme	**3 176**	**2 116**	**-33,4**	**0,3**	**0,2**
DC8: Siyanda	**202 160**	**238 063**	**17,8**	**20,4**	**22,5**
NC081: Mier Local Municipality	6 844	7 337	7,2	0,7	0,7
NC082: Kai !Garib Local Municipality	55 702	56 501	1,4	5,6	5,3
NC083: //Khara Hais Local Municipality	75 671	100 920	33,4	7,6	9,5
NC084: !Kheis Local Municipality	16 124	18 920	17,3	1,6	1,8
NC085: Tsantsabane Local Municipality	23 987	28 006	16,7	2,4	2,6
NC086: Kgatelopele Local Municipality	14 743	21 498	45,8	1,5	2,0
NCDMA08: Siyanda	**9 090**	**4 882**	**-46,3**	**0,9**	**0,5**
DC9: Frances Baard	**325 503**	**353 200**	**8,5**	**32,8**	**33,4**
NC091: Sol Plaatje Local Municipality	201 465	243 018	20,6	20,3	23,0
NC092: Dikgatlong Local Municipality	35 765	40 752	13,9	3,6	3,9
NC093: Magareng Local Municipality	21 734	20 433	-6,0	2,2	1,9
NC094: Phokwane Local Municipality	61 321	46 409	-24,3	6,2	4,4
NCDMA09: Frances Baard	**5 218**	**2 588**	**-50,4**	**0,5**	**0,2**
DC45: Kgalagadi	**191 539**	**173 454**	**-9,4**	**19,3**	**16,4**
NC453: Gamagara Local Municipality	23 202	28 054	20,9	2,3	2,7
NC451: Moshaweng Local Municipality	91 708	70 012	-23,7	9,2	6,6
NC452: Ga-Segonyana Local Municipality	70 392	69 791	-0,9	7,1	6,6
NCDMA45: Kgalagadi	**6 237**	**5 597**	**-10,3**	**0,6**	**0,5**
Northern Cape	**991 919**	**1 058 060**	**6,7**	**100**	**100**
South Africa	**44 819 778**	**48 502 063**	**8,2**	**100**	**100**

Note: All the above figures are based on the new provincial and municipal boundaries

About 33% of the Northern Cape's population are African/ Black, 52% are Coloured, 0,3% are Indian/Asian and 13% are White. The province's Coloured population is the largest after that of the Western Cape. Among people aged 20 years and above, almost 21% have had no schooling at all, whilst more than 20% have had some primary education. Only 5,8% of the province's people have tertiary qualifications. More than 11% have a matric, almost 31% have had some secondary education and around 9% have completed their primary education.
Of all the people in the Northern Cape, 2,2% have sight disabilities, 0, 7% have hearing difficulties, 1,1% have physical disabilities, 0,5% have mental disabilities and 0,3% suffer from more than one disability.

The Herbert magisterial district is one of six in the Diamantveld district council. The Herbert district have 8 communities with a total population of 21048 of which 4800 lives in Rietvale & 4600 in Motswedmose ± 14 kilometers south-east of the mine. The other communities are Plooysburg with 93 people, Bongani - 3200 people, Breipaal - 4605 people, Campbell - 2100 people, Douglas - 1200 people and Salt Lake - 450 people. The population growth rate for these towns is between 0 and 3.8%.

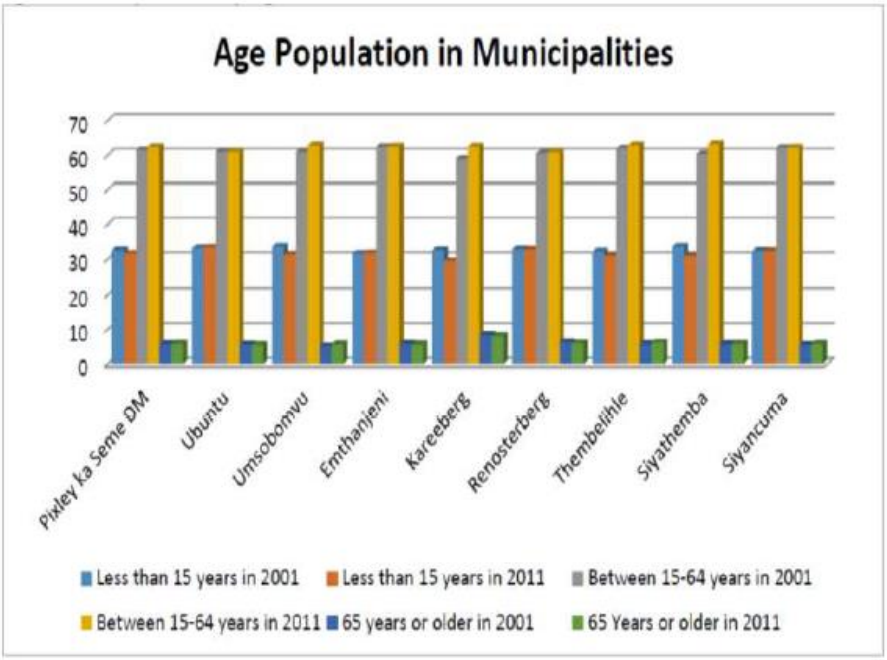

Figure 29. Population by age. Statistics SA census 2011

Major Economic Activities and Sources of Employment

The economy of this region is not well diversified. In the semi-arid areas of the region small stock and game farming predominates, with few alternative employment opportunities outside of agriculture and government. This makes the region vulnerable to the strong fluctuating conditions of the agricultural markets. The region is a long-term provider of migrant labour with young people leaving in search of work.

Most of the areas rural population is employed in the agriculture as farm workers as well as on the alluvial diamond mines along the Orange River.

Estimated Unemployment

Being a farming area, most people living in the immediate area are employed on the farms.

Housing-demand and Availability

The demand for housing in the Northern Cape Province is critical as can be seen in the number of informal settlements being built on an almost daily basis in the nearby towns and Kimberley.

Household Access to Services

There is no formal infrastructure such as schools, hospitals, sport- and recreation facilities and shops within the surrounding area. The town of Douglas is the nearest with infrastructure to the mine.

- Water
  More than 96% of household dwellings found in Thembelihle have access to piped water. The area rated on par in terms of this indicator when compared with Pixley Ka Seme (96.8%) and the Northern Cape (96.2%).
- Sanitation

Approximately 67% of local households have access to flush or chemical toilets. This indicator is in line with the District (67.8%) and Provincial (67.8%) average. Those households that do not have access to flush or chemical toilets, mainly make use of pit latrines as their main source of sanitation.

- Electricity
  More than 82% of household dwellings found in Thembelihle have access to electricity. This indicator is on par with the District and Provincial average. Since 2000, the number of households with access to electricity grew by 2.1% on average per annum.
- Solid Waste Management
  Around 64% of local households enjoyed a weekly refuse removal service by the Local Municipality, compared to 76.2% in Pixley Ka Seme and 68.8% in the Northern Cape.

Poverty Indicators

Table 11. Population living below the minimum living levels [Statistics SA Census 2011]

Local Municipality	Population	Population below MLL	% below MML
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**

Poverty

The table above shows that an average of 28.02% of the population in the Thembelihle municipal area lives below the minimum living level (MLL). This is an indication of a medium level of poverty in the region.

Social Infrastructure: Schools, Hospital, Sport- and Recreation Facilities, Shops, Police and Civil Administration

Health Overview

The sectoral approach that was adopted to analyse the present health facilities of the Pixley Ka Seme district revealed that the National Government has adopted a primary health care strategy

that includes making such services available within walking distance of communities.
The strategy also includes making such services available within walking distance.
The strategy also includes improvement in sanitation and drinking water supply, ext. Thus the health care systems that presently exist in the
District consist of:

- Provincial Hospitals
- Provincial Clinics
- Municipal health centres or clinics

Public Transport

Transport includes activities such as, providing passenger or freight transport by rail, road, water or air, auxiliary activities such as teminal parking facilities, cargo handling and activities, and postal activities , and postal activities and telecommunication.

The people in town use micro-busses, private cars as well as walking to go to their places of employment.

As far as public taxis are concerned they operate mostly during the morning hours when the workers are going to work and in the afternoons when they are going back from work to their respective homes.

Road transport comprises private users, business, commerce, farming, government, goods transport agencies and the few public transport operators.

Air Transport

Light air transport facilities are available to all the towns. The private sector, namely private doctors, business men use these facilities.

Public Utilities (Services)

Collective utilities (services) are those services consumed off-site, to satisfy either community of domestic service needs. Community service needs include movement, drainage, public safety, market trading and social interaction.

Collective services include water supply in the form of collective standpipes, sanitation in the form of public toilets, solid waste removal in the form of rubbish collection points, communications in the form of public telephones and post collection points, etc. Collective utility points (e.g. public standpipes, public telephones, post collection points, soild waste collection points and public toilets should be clustered around public markets and open

spaces, to create favourable small scale manufacturing and trading conditions. Where these utilities perform residential funcations as well, residents are enabled to satisfy several needs in a single trip.

Challenges for Growth and Development

The examination and analysis of the socio-economic indicators listed above indicate without any doubt that the most critical challenge facing the district is the reduction of poverty. Other challenges that the district must confront, but which in themselves will also address poverty, includes the following:

- Ensuring that all citizens have access to basic services such as water, sanitation, electricity and housing.
- Increasing access to services in education, health and social services.
- Stabilizing and decreasing the rate of HIV and AIDS infection, tuberculosis, FAS etc.
- Reduction in the rate of crime.
- Economic empowerment
- The shortage of critical skills – development of an attraction and retention strategy; improving skills of the labour force etc.
- Targeting special groups e.g. women, disabled and youth; and
- Sustainable job creation.

Opportunities for Growth and Development

An analysis of the economic indicators indicates opportunities for potential growth in the following:

- Agriculture and agro-processing
- Manufacturing
- Tourism
- Transport and infrastructure
- Wholesale and retail; and
- Mining and value adding – beneficiation.

The analysis is necessary to show what the current infrastructure is available and, where there are opportunities for development and exactly what the needs of the local community are.

When planning for future development, it is not only necessary to know what is needed, but also what resources such as land, buildings and other facilities are available to address these needs.

(14) ***SENSITIVE LANDSCAPES:***

Site sensitivity

The ecological sensitivity map for Saxendrift is illustrated in Figure 30. The ephemeral pans and drainage channels are of very high sensitivity. The pans and drainage channels are highly sensitive due to their vital

ecological and hydrological functionality and significance. All watercourses are unique habitats protected in terms of the National Water Act (Act No 36 of 1998). These highly sensitive areas should be considered as no-go areas.

The ridge slopes and pristine calcrete terraces are of high sensitivity. High densities of healthy Boscia albitrunca populations occur here and these areas provide potential habitat for protected fauna species, especially Ludwig's Bustard. They are not regarded as no-go areas, but activities should proceed with caution as it may not be possible to mitigate all impacts.

Areas transformed by agriculture (alluvial woodland in the north) and mining (calcrete terraces in the south-east) are of medium sensitivity. Although these areas have already been transformed, they still harbour species of conservation concern. Activities can proceed here with relatively little ecological impact provided that appropriate mitigation measures are taken.

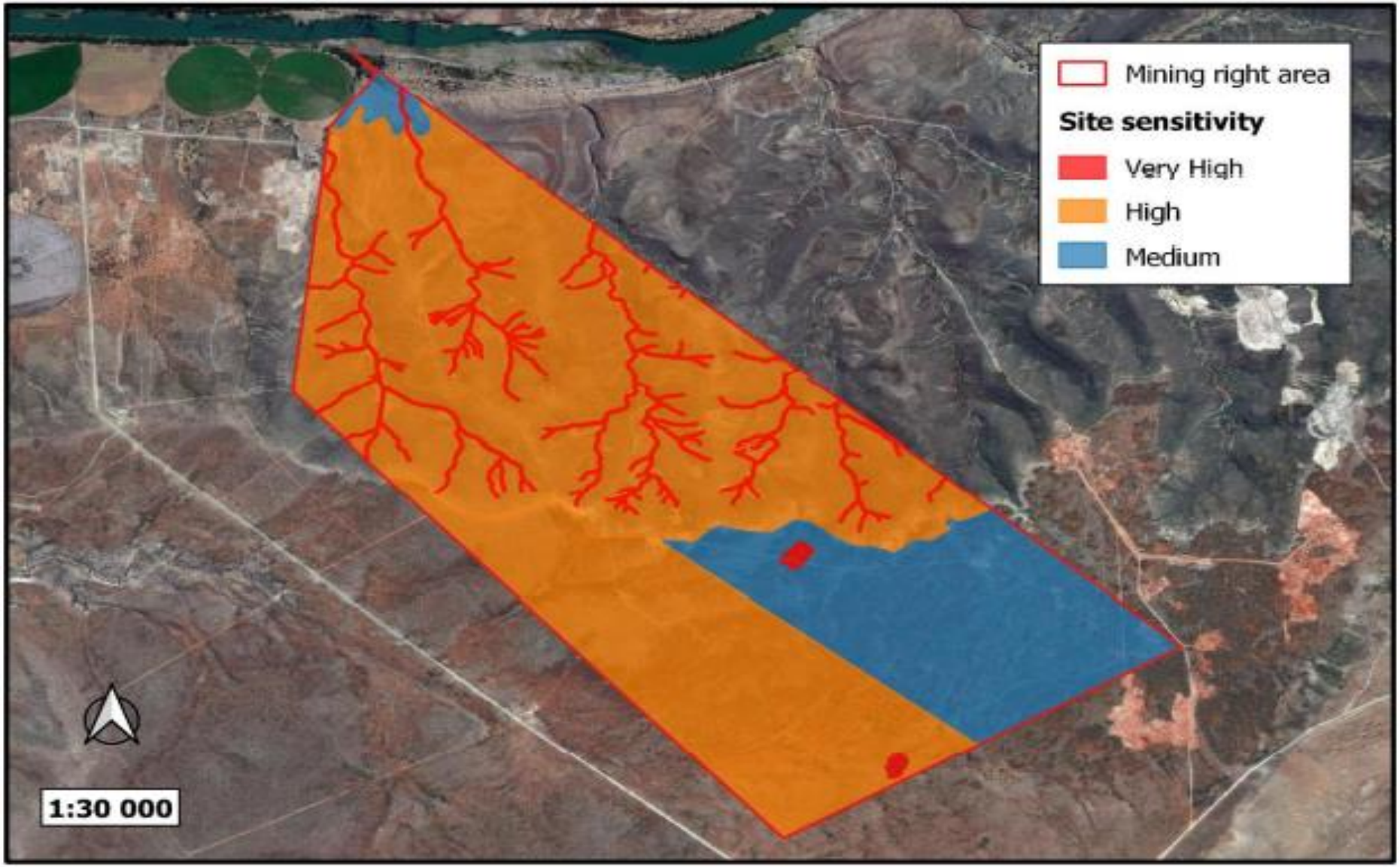

Figure 30. A sensitivity map for the Saxendrift mining area

(b) Description of the current land uses

Dr. Betsie Milne from Bocia Ecological Consulting Pty Ltd has been appointed by DJ de Smidt to provide an Ecological Assessment Report in April 2022 for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area Land capability and Land Use was described and included in this report.

Pre-mining Land Capability

The major land uses in the area are mining and agriculture. According to AGIS, the land capability of the study site is non-arable with low to moderate potential grazing land. The grazing capacity is 32 ha/LSU, with the agricultural region being demarcated for sheep farming.

Land Use Prior to Mining

Apart from the proposed mining activities, the mining right application area is used as natural pastures for livestock grazing. An area along the river was utilised for irrigation in the 1980s and disturbances from past mining activities are also evident. Existing land use features include these old fields and mining footprints as well as roads.

Historical Agricultural Activities and evidence of Abuse

An area along the river was utilised for irrigation in the 1980s and disturbances from past mining activities are also evident.

Existing Structures

Existing land use features include these old fields and mining footprints as well as roads.

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

The infrastructure on site is 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 g (iv) (A) as part of the baseline report.

(d) Environmental and current land use map

(Show all environmental, and current land use features)

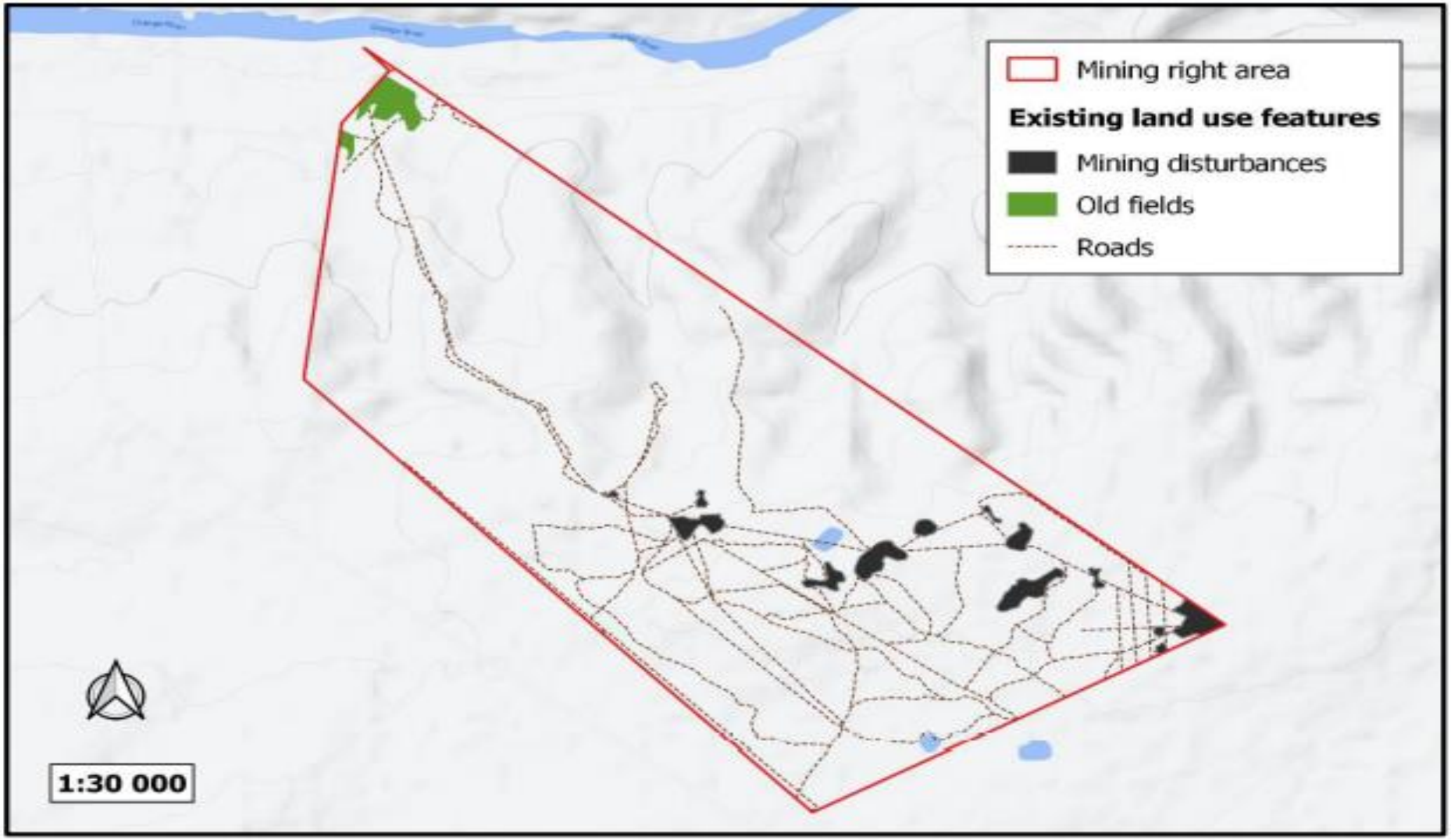

Figure 31. Environmental and current land use map with previous distubances evident

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

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

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
PHYSICAL						
Geology and Mineral Resource	Sterilisation of mineral resources	Very low	Highly unlikely	Operational and Decommissioning	insignificant Local	Ensure that optimal use is made of the available mineral resource.
Topography	Changes to surface topography Development of infrastructure; and residue deposits.	Medium	High	Construction and Operational	Low Local	• Mining of all alluvial gravels continuously, if possible and does not influence mining and safety requirements. • Employ effective rehabilitation strategies to restore surface topography of excavations, dumps and plant site. • Stabilise the mine residue deposits. • All temporary infrastructures should be demolished during closure.
Soils	**Soil Erosion** During clearing of an area for the excavation of minerals, construction of infrastructure and	Low-Medium	Possible, frequently	Decommissioning	Medium Local	• Bare ground exposure should be minimised at all times in terms of the surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible,

	roads, stockpiling, natural events. Vegetation will be stripped for construction of new roads and mining areas and these areas will be bare and highly susceptible to erosion. Any topsoil-, overburden- and ore stockpiles can be eroded by wind, rain and flooding. Exposed sediments in the watercourses can be carried away during runoff causing downstream sediment deposition. Any leaking pipes can also cause additional water erosion.					once activities in the area have ceased. • No new roads, infrastructure or mining areas should be developed over watercourses, including drainage lines. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the mining operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Loss of soil fertility During clearing of an area for the excavation of minerals,	Medium - High	Certain for life of operation	Residual	Low-medium On-Site	• Topsoil needs to be removed and stored separately during mining and the construction of roads, infrastructure and stockpile areas. • These topsoil stockpiles must be kept as small as possible in

	construction of infrastructure and roads, stockpiling. Topsoil contains living organisms that naturally regulate the ecological functioning of a habitat. Therefore, any disturbances to the intact soil profile can result in soil sterilisation which will directly affect vegetation communities. Apart from the direct disturbances caused by the mining activities, loss of soil fertility can also occur through soil compaction by dump loads as well as heavy machinery and vehicles.					order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occur, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction.

						• Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Alteration of soil character and quality During clearing of an area for the excavation of minerals, construction of infrastructure and roads, stockpiling, oil and petrochemical spills. Topsoil contains living organisms and seed banks that provide ecological resilience against disturbances, and any disturbances to the intact soil profile will change its ability to sustain natural ecological functioning. Vehicles and mining	Medium - High	Certain for life of operation	Residual	Low On-site	• Topsoil needs to be removed and stored separately during mining and the construction of roads, infrastructure and stockpile areas. • These topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing

	equipment may potentially leak hazardous fluids on the soil surface, which will cause soil pollution. Apart from the direct disturbances caused by the mining activities, soil compaction by dump loads as well as heavy machinery and vehicles will causes a decrease in large pores, and subsequently the water infiltration rate into soil.					• for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • Vehicles and machinery should be regularly serviced and maintained. • Refuelling and vehicle maintenance must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. • Drip trays must be available on site and installed under all stationary vehicles. • Spill kits to clean up accidental spills from any accidental

						spillages must be well-marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. • Any soil or area that is contaminated must be cleaned immediately by removing the soil and disposing it as hazardous waste in the correct manner.
Land Capability	Loss of land capability through topsoil removal, disturbances and loss of fertility.	Very Low	Possible	Short term	Minimal Local	Employ appropriate rehabilitation strategies to restore land capability.
Land use	Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation	Very low	Possible	Short term	Minimal Local	Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.
Ground Water Quantity	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Hydrocarbon Spills Hydrocarbon spills from construction vehicles and fuel storage areas may contaminate the groundwater resource locally	Medium	Possible	Construction	Low Local	Staff at Workshop areas, yellow metal laydown zones and fuel storage areas should be sufficiently trained in hydrocarbon spill response. Each area where hydrocarbons are stored or likely to spill should be equipped with sufficient spill

						response kits and personnel, contaminated soil should be disposed of correctly at a suitable location.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
Surface Water **Alteration / destruction of watercourses** **Siltation of surface water**	During excavation of minerals, construction of infrastructure and roads, stockpiling. During mining activities there is a possibility that the watercourses on site (i.e. pans and drainage lines) might be altered or indirectly affected. This includes direct mining within the watercourses as well as development of roads, infrastructure or stockpiles within their active zones, catchment areas, or buffer zones. Such activities can completely change the	Medium to High	Possible, infrequent	Permanent	Medium Regional	• All activities associated with the mining operation must be planned to avoid any disturbances to the watercourses and their buffer zones. • No new roads should be created across a watercourse and no mining should take place in them. If this is unavoidable, a water use license to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected watercourses. • Bare ground exposure should always be minimised in terms of the surface area and duration.

	hydrologic regime or habitat conditions of the watercourses, which will not only compromise their ecological functioning, but also have downstream effects.					• Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased. • No new roads, infrastructure or mining areas should be developed over watercourses. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the mining operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.
	During clearing of an area for the excavation of minerals, construction of infrastructure and roads, stockpiling, natural events. Vegetation will be stripped in preparation for the mining areas and associated infrastructure. These bare areas will be very susceptible to water erosion without plants to stabilise the soil, creating potential sediment source zones. High runoff					

	events could potentially cause the drainage lines and pans to be filled with silt from mining areas if the sediment source zones lie along the drainage paths towards these watercourses. This may lead to a change in hydrologic regime or character of the watercourses.					
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Indigenous Flora	**Loss of and disturbance to indigenous vegetation** During clearing of an area for the excavation of minerals, construction of infrastructure and roads, stockpiling. The Saxendrift mining activities is expected to destroy	Low to medium	Certain for life of operation	Residual	Low to Medium On site	• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Implement effective avoidance measures to limit any activities in the highly sensitive areas, by applying the no-go principles. • Ensure measures for the adherence to a maximum speed limit of 40 km/h to minimise dust fallout and

	some natural vegetation. It is expected that the ecological functioning and biodiversity will take many years to fully recover. Vehicle traffic and mining activities generate lots of dust which can reduce the growth success and seed dispersal of many small plant species in the adjacent pristine areas.					associated effects on plants in the adjacent pristine areas. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas. • Apply for permits to authorise the clearance of indigenous plants from DENC at least three months before such activities will commence.
	Loss of Red data and / or protected flora species Removal of plant species of conservation concern during clearing of an area for excavations, construction of infrastructure and roads, stockpiling. Intentional removal of these plant	Medium High	Certain for life of operation	Residual	Low to Medium On site	• The footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to any destructive activities by means of a search-and-rescue operation. • It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout and left in situ. However, due to the nature of the proposed mining

	species for non-mine related purposes, e.g. illegal plant trade, fire-wood, etc. There are several plant species of conservation concern present on the Saxendrift Mining Right area as discussed in this report. Many of the species are found in the core mining area and therefore it is likely that the mining operation will impact on their population dynamics. The most significant concern is the loss of Boscia albitrunca recruits. Saplings are rarely visible during clearance operations and therefore the younger populations often get wiped out. Furthermore, any illegal harvesting of these plants for whatever reason by					activities they will most likely all be removed or relocated if possible. The relevant permits from DAFF and/or DENC should be applied for at least three months before such activities will commence. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of all the rescued plants. • A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental

	staff, contractors or secondary land users could have devastating effects on the population of these species.					induction should occur in the appropriate languages for the workers who may require translation. Environmental induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. • All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. • Employ regulatory measures to ensure that no illegal harvesting takes place.
	Introduction or spread of alien species During clearing of an area for the excavation of minerals, construction of infrastructure and roads, stockpiling, improper rehabilitation	Low Medium-	Possible, frequently	Residual	Medium High Local	• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Mechanical methods of control should be implemented pro-actively as soon as invasive species start to emerge. • Regular follow-up monitoring of invasive control areas need to be implemented to ensure

	practises. Several invasive species occur on site, especially in the transformed habitats, which clearly indicates the effect of improper rehabilitation practises. Any anthropogenic disturbances to natural vegetation, especially the clearance of large areas of land, provide the opportunity for invasive plants to increase. This is due to their opportunistic nature of dispersal and establishing in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the mining site, because they spread easily to					effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

	neighbouring habitats where they outcompete indigenous species. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity as well as reduction in the ecological value and land use potential 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.					
	Encouragement of bush encroachment	Low	Possible, infrequently	Residual	Low-medium On site	• Mechanical methods of control should be

	During clearing of an area for the excavation of minerals, construction of infrastructure and roads, stockpiling, improper rehabilitation practises. The extent of bush encroaching species on site is high, especially regarding the densities of Senegalia mellifera. Bush encroachment is a natural phenomenon characterised by the excessive expansion of certain shrub species at the expense of other plant species. While general clearing of the area and mining activities destroy natural vegetation, bush encroaching plants can increase due to					implemented pro-actively when encroaching species form dense stands. • Regular follow-up monitoring of encroached control areas need to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

	their aggressive nature in disturbed areas. If encroaching plants establish in disturbed areas, it may lower the potential for future land use and decrease biodiversity. With proper mitigation, the impacts can be substantially reduced. In fact, the proposed mining activities is expected to reduce the extent of these shrubs significantly, as seen in the transformed shrubland on calcrete terraces, where past mining activities have cleared S. mellifera. By clearing these large stands of shrubs and subsequently effectively rehabilitating the					

	cleared areas, it can benefit biodiversity.					
Fauna	**Loss, damage and fragmentation of natural habitats** During clearing of an area for the excavation of minerals, construction of infrastructure and roads, stockpiling. Fragmentation of habitats typically leads to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This can be in the form of small-scale fragmentation for reptiles, amphibians, and invertebrates, to more large-scale fragmentation that hinder dispersal of birds and plants. It	Medium-High	Certain for life of operation	Residual	Medium-high Regional	• All activities associated with the mining operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so. • Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors. • No new roads should be created across a watercourse. • No mining should take place in the pans or in the ephemeral drainage channels. • If watercourse disturbances are unavoidable, a water use license to alter the beds and banks of these watercourses

	also includes the degradation of aquatic habitats, like pans and the ephemeral drainage channels. Fragmentation of habitats usually results in a subsequent loss of genetic variability between meta-populations occurring within the study site. Pockets of fragmented natural habitats hinder the growth and development of populations. However, the mining activities is expected to result in the loss of connectivity and fragmentation of natural habitats on a local scale.					should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected habitats.
	Disturbance, displacement and killing of fauna Vegetation clearing; increase in noise and	Low-Medium	Certain for life of operation	Decommissioning	Medium-high Local	• Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.

	vibration; human and vehicular movement on site resulting from mining activities. The transformation of natural habitats will result in the loss of micro habitats, affecting individual species and ecological processes. This will result in the displacement of faunal species that depend on such habitats, e.g. birds that nest in trees or animals residing in holes in the ground or among rocks. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles,					• The extent of the mining activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised to do so. Areas surrounding the earmarked site that are not part of the demarcated area should be considered as a no-go zone. • No mining should take place in the pans or ephemeral drainage channels and no new roads should be created across watercourses. If this is unavoidable, a water use license to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • If any of the protected wildlife species are directly threatened by habitat destruction or displacement during the mining operation, then the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits.

	amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect their local populations.					• Everyone on site must undergo environmental induction for awareness on not capturing or harming species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site. • Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. • Employ measures that ensure adherence to a maximum speed limit of 40 km/h as well as driving mindfully on site to lower the risk of animals being killed on the roads or elsewhere in the mining area.
Cumulative Compromise of Broadscale Ecological Processes	**Clearing of vegetation and disturbance during the construction of roads and mining activities; alterations to watercourse habitat characteristics.**	Medium-high	Certain for life of operation	Residual	Medium Regional	• Implement best practise principles to minimise the footprint of transformation, by keeping to • existing roads and earmarked areas where possible. • • Apply for the relevant permits from DENC and DAFF. • No new roads should be created across a watercourse

	Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The shrubland on calcrete terraces are the most vulnerable habitats on site in terms of cumulative disturbances, due to the vast extent of disturbances to these habitats in the region. The fragmentation of these habitats through loss of specialised species due to habitat					and no mining should take place in them. • If this is unavoidable, a water use license to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected habitats. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occur, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • The setup of a small nursery is advisable to maximise translocation and re-

	alterations will destroy connectivity of vital ecological corridors and it will disrupt the food web, which might have cascading effects on a landscape level over the long-term.					establishment efforts of affected areas.
Air Quality	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	Decommissioning	Low Local	Effective soil management; identification of the required control efficiencies in order to maintain dust generation within acceptable levels.
SOCIAL SURROUNDINGS						
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Noise Impacts	Clearing of footprint areas, stripping of stockpiling of topsoil Noise increase at the boundary of the mine footprint	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels Topsoil stripping should be limited to daytime only.

	Construction of internal Roads	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels Construction of internal roads should be limited to daytime only.
	Construction of the Mine Residue dump, soil stock pile and material stock pile.	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.
	Clearing of new open cast mining areas, stripping and stockpiling of topsoil.	Medium	Possible	Operational	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels. Topsoil stripping should be limited to daytime only.
	Diesel generators	Medium	Possible	Operational to closure	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels. Noise survey to be carried out to monitor the noise levels during these activities.
	Mining activities	Medium	Possible	Operational to closure	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's

						specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.
	Maintenance activities at the site.	Medium	Possible	Operational to closure	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.
	Back fill of mine footprint area	Medium	Possible	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels. Backfill of mine footprint area activities should be limited to daytime only.
Visual impacts	Potential visual impact	Medium	Certain	Construction, Operation and Decommissioning	Low Local Site	The design of the proposed mining development will determine the visual impact. As the visual impact would be low, Correct design will ensure that the development will fit into the surrounding area.
Traffic	Potential negative impacts on traffic safety and deterioration of the existing road networks.	Low	Low likelihood	Decommissioning	Low Local	Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules.

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Socio-Economic	**Population Impacts** Employment Opportunities and skills Inequities	Medium Positive	Probable	Start-up and Construction	Medium Positive Local	• A community skills audit should be undertaken by David John de Smidt. Alternatively, the existing Labour Desk could be used to determine which skills are locally available and which employees could come into consideration for employment. • Training of potential future employees, contract workers and/or community members should focus on mining related skills which would furthermore equip trainees/beneficiaries with the necessary portable skills to find employment at the available employment sectors within the study area. Multi-skilling is thus not necessarily the preferred training and skills development method. • Training courses should be accredited and certificates obtained should be acceptable by other related industries. • Guidance concerning legal requirements to which locals should adhere to, to make them employable, such as the

						standard construction industry requirements should also be attended to.
	Safety and Security Risks	Low Negative	Highly Probable	Construction	Low Negative Local	• A Fire/Emergency Management Plan should be developed and implemented at the outset of the construction phase. • Open fires for cooking and related purposes should not be allowed on site. • Appropriate firefighting equipment should be on site and construction workers should be appropriately trained for fire fighting • The construction area should be fenced or access to the area should be controlled to avoid animals or people entering the area without authorisation. • The construction sites should be clearly marked and "danger" and "no entry" signs should be erected. • Speed limits on the local roads surrounding the construction sites should be enforced. • Speeding of construction vehicles must be strictly monitored

						• Local procurement and job creation should receive preference.
	Health Impacts	Low Negative	Highly probable	Construction	Low Negative Local	• Maximise the employment of locals where possible • First aid supplies should be available at various points at the construction site • Continue and extend the current HIV/AIDS awareness and support programmes, with specific focus on those in and nearby the construction site • The general health of construction workers should be monitored on an on-going basis
Interested and Affected Parties	Loss of trust and a good standing relationship between the IAP's and the mining company.	Low to medium	Possible	Construction, Operational and Decommissioning	Low Local	Ensure continuous and transparent communication with IAP's

vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision)

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**

Impact Assessment

Before the impact assessment could be done the different project Activities/infrastructure components were identified.

1	**Processing Plant: 4 X 16 feet** pans with conveyers and recovery
2	**Ablution Facilities:** In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.
3	**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.
4	**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.
5	**Mining Area:** Opencast mining to mine for alluvial diamonds.
6	**Salvage yard (Storage and laydown area).**
7	**Product Stockpile area.**
8	**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: o Small amounts of low-level hazardous waste in suitable receptacles; o Domestic waste; o Industrial waste.
9	**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 - 4 km of roads, with a width of 6 meters.
10	**Temporary Workshop Facilities and Wash bay.**
11	**Water distribution Pipeline.**
12	**Water tank:** It is anticipated that the operation will establish 1 x 10 000 litre water tanks with purifiers for potable water.

The criteria used to assess the consequence of the impacts are shown in the **table 12** below. 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 Consequence of the impacts was calculated by using the following formula:

(Severity + Extent + Duration) x Probability weighting

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

Table 12. 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 13. 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 14. 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 15. Explanation of EXTENT of impact

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

Table 16. Explanation of DURATION of impact

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

Table 17. Explanation of SEVERITY of the impact

Weight	Impact Severity	Explanation of Severity
1	No Impact	There will be no impact at all – not even a very low impact on the system or any of its parts.
2	Very Low	Impact would be negligible. In the cast of negative impacts, almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple. In the case of positive impacts alternative

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

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

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

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 slimes 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 hydrocarbon soil contamination will render the soil unusable unless they are decontaminated. 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 after the specialist studies have been completed to confirm the presence of the 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 mining of alluvial gravels should be well planned and all infrastructure positions should be selected with the main aim of avoiding sterilization of future resources.

Topography

Level of risk: Low

Mitigation measures

- Mining of alluvial gravels continuously, if possible, otherwise when they become available;
- Employ effective rehabilitation strategies to restore surface topography of and controlled backfilling at excavations and plant site;
- Stabilise the mine residue deposit;
- All temporary infrastructures should be demolished during closure.

Soil erosion

Level of risk: Low Medium

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 mining of alluvial gravels 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 lying 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 eroded areas, must occur;
- Dust suppression should 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;
- Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions;
- Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired;
- Topsoil stockpiles must be kept separate from sub-soils;
- The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil;

Soil pollution

Level of risk: Medium 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

Mitigation measures

- Ensure that optimal use is made of the available land through consultation with land owner and proper planning of mining activities.
- Surface agreement to be signed with land owners.

- Employ effective rehabilitation strategies to restore land capability and land use potential of the area.
- All activities to be restricted within the demarcated areas.
- Ensure that land which is not used during construction is made available for grazing.

Ground water

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

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 vehicles 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.
- Provide bins for staff at appropriate locations, particularly where food is consumed.
- The mining site should be cleaned daily and litter removed.
- Conduct ongoing staff awareness programmes in order to reinforce the need to avoid littering, which can contribute to surface water pollution.
- Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment.
- Non mining waste i.e. grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated during activities should be placed and stored in a controlled manner in a proper designed area.

Indigenous flora

Level of risk: Medium

Mitigation measures

- 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.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- Minimise the footprint of transformation
- Encourage proper rehabilitation of mined areas
- Encourage the growth of natural plant species (diverse selection of natural plant species).
- Mechanical methods (hand-pulling) of control to be implemented extensively.
- Ensure measures for the adherence to speed limit.
- Maintenance of firebreaks;
- No trees felled for firewood;

Alien 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: Medium

Mitigation measures

- Mining activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance).
- Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.

- All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring 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.
- 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 Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining;
- Snares & traps removed and destroyed.

Habitat

Level of risk: Medium

Mitigation measures

- Mining activities must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the 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 open areas are exposed should be restricted. Mining should not be delayed after vegetation has been cleared and topsoil removed.

- 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:
    - Speed limits;
    - Spraying of surfaces with water;
    - Mining of alluvial gravels and rehabilitation of disturbed areas; and

Noise and vibration

Level of risk: Low

Mitigation measures

- Machinery with low noise levels which complies with the manufacturer's specifications to be used.
- Restrict construction and mining activities to take place during daytime period only unless agreements obtained to do 24hr operations.
- Vehicles to comply with manufacturers' specifications and any activity which will exceed 90.0dBA to be done during daytime only.
- 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.
- Generators to be placed in such a manner that it is not a nuisance for any other parties.
- Noise monitoring to be done along the mine footprint and noise sources within the mine boundary on a monthly basis after which the frequency can change to a quarterly basis.
- Actively manage the process and the noise management plan must be used to ensure compliance to the noise regulations and/or standards. The levels to be evaluated in terms of the baseline noise levels.
- 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.

Visual impacts

Level of risk: Low -Medium

Mitigation measures

Mitigation measures may be considered in two categories:

Primary measures that intrinsically comprise part of the development design through an iterative process. Mitigation measures are more effective if they are implemented from project inception when alternatives are being considered; and

Secondary measures designed to specifically address the remaining negative effects of the final development proposals:

- Primary measures that will be implemented should mainly be measures that minimise the visual impact by softening the visibility of the mining activities, by "blending" with the surrounding areas. Such measures will include rehabilitation of the disturbed area, such as the excavations by re-vegetation of the area and using an aesthetically pleasing design for the proposed development.

During the construction phase the following mitigation measures should be implemented to minimise the visual impact.

- Ensure that the design fits into the surrounding environment and it is aesthetically pleasing.
- Reduce the construction period through careful planning and productive implementation of resources.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter and disused construction materials are managed and removed regularly.
- Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way.
- Reduce and control construction dust emitting activities through the use of approved dust suppression techniques; and
- Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting or restrict lighting to certain areas.
- During operational phase, the following mitigation measures should be implemented to minimise the visual impact.
- Ensure that the design fits into the surrounding environment and it is aesthetically pleasing.
- Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;
- Rehabilitation of disturbed areas and re-establishment of vegetation;

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 and cultural resources (e.g. stone age sites and Mining Heritage etc.) must be protected and preserved by the delineation of a no go zone.

- 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 any further heritage or cultural resources be disturbed, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist.

Socio-economic

Level of risk: Low

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

Mitigation measures

- Maintain active communication 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) Motivation where no alternative sites were considered

No alternative location for the proposed mining operation was considered, as the alluvial gravels have been deposited in this area. There is therefore no other alternative with regard to the overall operation footprint. The applicant is the holder of a existing Prospecting Right on the same area.

x) Statement motivating the alternative development location within the overall 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.

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

Not applicable. There is no alternative development location for the site and therefore the initial site locality is considered to be the final site locality. The impact assessment provided in section g(v) is therefore sufficient and the process undertaken to identify impacts is the same as in section g(vi).

i) Assessment of each identified potentially significant impact and risk

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

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. construction, commissioning, operational, Decommissioning, closure, post closure)	SIGNIFICANCE IF NOT MITIGATED	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	SIGNIFICANCE IF MITIGATION
Processing Plant: 4 X 16 feet pan	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Medium	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints.	Medium

Ablution Facilities Chemical Toilets	Soil contamination Possible Groundwater contamination	Soil Groundwater	Construction Commissioning Operational Decommissioning Closure	Low	Maintenance of sewage facilities on a regular basis. Removal of container plants on closure	Low
Clean & Dirty water systems:	Surface disturbance Soil contamination Surface water contamination	Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Low	It will be necessary to divert storm water around excavations and dumps areas by construction of a temporary gravel cut-off berm that will prevent surface run-off into the drainage areas. Excavations for Alluvial gravel, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. Linear infrastructure such as roads and pipes will be inspected at least	Low

					monthly to check that the associated water management infrastructure is effective in controlling erosion. Maintain a buffer zone around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.	
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. 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.	Low

					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.	
Mining Area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Accelerated erosion of areas adjacent to workings that have been de-vegetated leads to increased suspended sediment loads in nearby streams and rivers. Wind-blown dusts from unprotected tailings and waste rock dumps enter aquatic environment. Soil contamination	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Medium	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays MRD stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints. Maintain a buffer zone around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland.	Low

	Surface disturbance Surface water contamination				Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible. Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo environmental induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring 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. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to minimise the overall mining footprint. The footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining Snares & traps removed and destroyed Implementation of a suitable management action plan during the operation of the proposed diamond mine, based on analysis of bi-annual water quality and biological monitoring data collected at sites upstream and downstream of all activities; Prevention of exotic vegetation encroachment;	

					Prevent further siltation within the river segment as well as downstream of activities; Unnecessary destruction of marginal and instream habitat should always be avoided during operations.	
Salvage yard (Storage and laydown area)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Low
Product Stockpile area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Air Quality Fauna Flora Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Medium	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise sensitive, to take	Low

					advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints.	
Waste disposal site (domestic and industrial waste):	Groundwater contamination Contamination of soil Surface water contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Storage of waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Low
Roads (both access and haulage road on the mine site):	Dust Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at	Low

					least monthly to check that the associated water management infrastructure is effective in controlling erosion.	
Temporary Workshop Facilities and Wash bay	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Low
Water distribution Pipeline	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Monitor pipeline for water leaks Maintenance of pipeline 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.	Low
Water tanks: 1 X 10 000 litre water tanks and purifiers for potable water.	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintain water tanks and structures	Low

j) Summary of specialist reports

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

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS HTAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
Appendix 4 **Heritage Impact Assessment (including Palaeontological Desk Assessment) for a Mining Right Application on the Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20, near Prieska, Northern Cape** **Prepared by Edward Matenga (PhD Archaeology & Heritage, MPhil, Archaeology; Uppsala/Sweden)** **31 March 2022 and June 2022**	**CONCLUSION AND RECOMMENDATIONS** As the heritage sensitivity of the property is considered to be low, the mining application can be approved. The study is mindful that some important discoveries may occur during the prospecting and mining phases. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation to be undertaken.	X	
Appendix 5 **Palaeontological Impact Assessment for the proposed Mining Right Application on the Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20, near Prieska,** **Northern Cape Province**	**Executive Summary** A Palaeontological Impact Assessment was requested for the proposed Mining Right Application on the Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20, near Prieska, Northern Cape Province. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National	X	

27 March 2022 and June 2022 **Prof Marion Bamford** **Palaeobotanist** **P Bag 652, WITS 2050** **Johannesburg, South Africa** **Marion.bamford@wits.ac.za**	Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development. SAHRA requested a site visit and this was completed in June and is reported herein The proposed site lies on the potentially fossiliferous Dwyka Group rocks, Tertiary Calcretes and Quaternary alluvium. No fossils of any kind were found on the surface or in the erosion gullies during the site visit. Nonethless, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations or mining activities have commenced. As far as the palaeontology is concerned, the impact is very low and the project should be authorised. **Recommendation** Based on the site visit and walk through there are no surface fossils and no fossils in the eroded gullies. This confirms the previous assertion and the lack of any previously recorded fossils from the area, that it is extremely unlikely that any fossils would be preserved in the Dwyka Group tillites and sandstones or the sands and calcretes of the Tertiary-Quaternary. There is a very small chance that fossils occur below ground and also may occur in features such as palaeo-pans or palaeo-dunes that could trap fossils are present as no such feature is visible in the satellite imagery. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the miners or environmental officer, or other responsible person once mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, therefore, as far as the palaeontology is concerned, the project should be authorised and a mining permit granted.		
Appendix 6 **ECOLOGICAL ASSESSMENT REPORT** **David John de Smidt**	**CONCLUSION, RECOMMENDATIONS AND OPINION REGARDING AUTHORISATION** Six habitats were identified on site, of which the ephemeral pans and drainage channels are the most sensitive to mining. Mining activities	X	

Saxendrift Diamond Mining Operation **April 2022** **Dr. Betsie Milne from Boscia Ecological Consulting Services**	are however not expected to directly affect these units. The core mining activities are associated with the shrubland habitat on calcrete terraces, which harbours high densities of Boscia albitrunca and is considered of medium sensitivity. The most profound impacts expected to be related to the proposed mining operation include cumulative loss of intact habitat and biodiversity on a landscape level, as well as potential loss in soil fertility and loss of Boscia albitrunca recruits. Saplings are rarely visible during clearance operations and therefore the younger populations often get wiped out completely. Permit applications need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any removal of protected species. Similarly, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to the Boscia albitrunca trees. The destruction of the natural plant species and habitats is inevitable during mining operations, but the significance of the impacts will ultimately be affected by the success of the mitigation measures implemented during the mining operation. In my opinion, authorisation for the proposed operation can be granted. However, the applicant should commit to the strict adherence of effective avoidance, management, mitigation, and rehabilitation measures.		

Attach copies of the Specialist Reports as appendices (All studies attached as Appendix 4 – 6)

k) Environmental impact statement

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

The site proposed for mining operations has been rated as being acceptable for the development. However, this is subject to the Orange River and associated floodplains being excluded from mining activities and that comprehensive rehabilitation is implemented.

Topsoil contains living organisms and seed banks that provide ecological resilience against disturbances, and any disturbances to the intact soil profile will change its ability to sustain natural ecological functioning. Vehicles and mining equipment may potentially leak hazardous fluids on the soil surface, which will cause soil pollution. Apart from the direct disturbances caused by the mining activities, soil compaction by dump loads as well as heavy machinery and vehicles will causes a decrease in large pores, and subsequently the water infiltration rate into soil.

Topsoil contains living organisms that naturally regulate the ecological functioning of a habitat. Therefore, any disturbances to the intact soil profile can result in soil sterilisation which will directly affect vegetation communities. Apart from the direct disturbances caused by the mining activities, loss of soil fertility can also occur through soil compaction by dump loads as well as heavy machinery and vehicles.

Vegetation will be stripped for construction of new roads and mining areas and these areas will be bare and highly susceptible to erosion. Any topsoil-, overburden- and ore stockpiles can be eroded by wind, rain and flooding. Exposed sediments in the watercourses can be carried away during runoff causing downstream sediment deposition. Any leaking pipes can also cause additional water erosion.

The Saxendrift mining activities is expected to destroy some natural vegetation. It is expected that the ecological functioning and biodiversity will take many years to fully recover. Vehicle traffic and mining activities generate lots of dust which can reduce the growth success and seed dispersal of many small plant species in the adjacent pristine areas.

There are several plant species of conservation concern present on the Saxendrift Mining Right area as discussed in this report. Many of the species are found in the core mining area and therefore it is likely that the mining operation will impact on their population dynamics. The most significant concern is the loss of Boscia albitrunca recruits. Saplings are rarely visible during clearance operations and therefore the younger populations often get wiped out. Furthermore, any illegal harvesting of these plants for whatever reason by staff, contractors or secondary land users could have devastating effects on the population of these species.

Several invasive species occur on site, especially in the transformed habitats, which clearly indicates the effect of improper rehabilitation practises. Any anthropogenic disturbances to natural vegetation, especially the clearance of large areas of land, provide the opportunity for invasive plants to increase. This is due to their opportunistic nature of dispersal and establishing in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the mining site, because they spread easily to neighbouring habitats where they outcompete indigenous species. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity as well as reduction in the ecological value and land use potential 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 extent of bush encroaching species on site is high, especially regarding the densities of Senegalia mellifera. Bush encroachment is a natural phenomenon characterised by the excessive expansion of certain shrub species at the expense of other plant species. While general clearing of the area and mining activities destroy natural vegetation, bush encroaching plants can increase due to their aggressive nature in disturbed areas. If encroaching plants establish in disturbed areas, it may lower the potential for future land use and decrease biodiversity. With proper mitigation, the impacts can be substantially reduced. In fact, the proposed mining activities is expected to reduce the extent of these shrubs significantly, as seen in the transformed shrubland on calcrete terraces, where past mining activities have cleared S. mellifera. By clearing these large stands of shrubs and subsequently effectively rehabilitating the cleared areas, it can benefit biodiversity.

Fragmentation of habitats typically leads to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This can be in the form of small-scale fragmentation for reptiles, amphibians, and invertebrates, to more large-scale fragmentation that hinder dispersal of birds and plants. It also includes the degradation of aquatic habitats, like pans and the ephemeral drainage channels. Fragmentation of habitats usually results in a subsequent loss of genetic variability between meta-populations occurring within the study site. Pockets of fragmented natural habitats hinder the growth and development of populations. However, the mining activities is expected to result in the loss of connectivity and fragmentation of natural habitats on a local scale.

The transformation of natural habitats will result in the loss of micro habitats, affecting individual species and ecological processes. This will result in the displacement of faunal species that depend on such habitats, e.g. birds that nest in trees or animals residing in holes in the ground or among rocks. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect their local populations.

During mining activities there is a possibility that the watercourses on site (i.e. pans and drainage lines) might be altered or indirectly affected. This includes direct mining within the watercourses as well as development of roads, infrastructure or stockpiles within their active zones, catchment areas, or buffer zones. Such activities can completely change the hydrologic regime or habitat conditions of the watercourses, which will not only compromise their ecological functioning, but also have downstream effects.

Vegetation will be stripped in preparation for the mining areas and associated infrastructure. These bare areas will be very susceptible to water erosion without plants to stabilise the soil, creating potential sediment source zones. High runoff events could potentially cause the drainage lines and pans to be filled with silt from mining areas if the sediment source zones lie along the drainage paths towards these watercourses. This may lead to a change in hydrologic regime or character of the watercourses.

Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The shrubland on calcrete terraces are the most vulnerable habitats on site in terms of cumulative disturbances, due to the vast extent of disturbances to these habitats in the region. The fragmentation of these habitats through loss of specialised species due to habitat alterations will destroy connectivity of vital ecological corridors and it will disrupt the food web, which might have cascading effects on a landscape level over the long-term.

Six habitats were identified on site, of which the ephemeral pans and drainage channels are the most sensitive to mining. Mining activities are however not expected to directly affect these units. The core mining activities are associated with the shrubland habitat on calcrete terraces, which harbours high densities of Boscia albitrunca and is considered of medium sensitivity. The most profound impacts expected to be related to the proposed mining operation include cumulative loss of intact habitat and biodiversity on a landscape level, as well as potential loss in soil fertility and loss of Boscia albitrunca recruits. Saplings are rarely visible during clearance operations and therefore the younger populationsoften get wiped out completely.

Permit applications need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any removal of protected species. Similarly, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to the Boscia albitrunca trees.

The destruction of the natural plant species and habitats is inevitable during mining operations, but the significance of the impacts will ultimately be affected by the success of the mitigation measures implemented during the mining operation. In my opinion, authorisation for the proposed operation can be granted. However, the applicant

should commit to the strict adherence of effective avoidance, management, mitigation, and rehabilitation measures.

(ii) Final Site Map;

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicated any areas that should be avoided, including buffers. Attach as **Appendix (Figure 13)**

The final site map below indicates the mining right application area in which all mining will take place. Existing roads are also depicted. The associated infrastructure relating to the mining site is also indicated.

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

No construction or excavation work shall be executed within 11 metres from any Eskom power line structure, and/or within 11 metres from any stay wire.

Please see Final Site Map below.

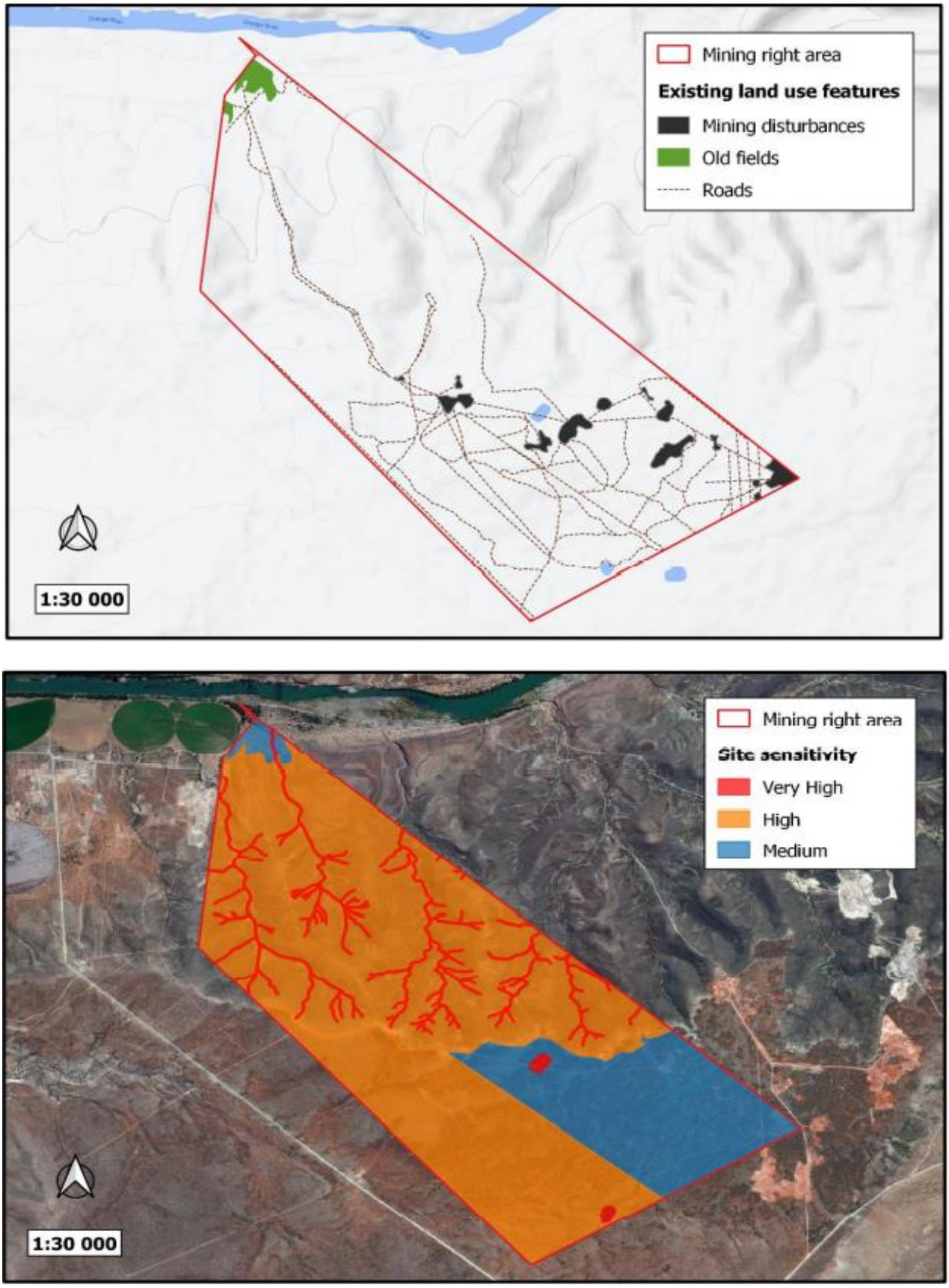

Figure 32. Final Site Surface layout map with sensitivity map.

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

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.

In terms of alternative land use, the proposed mining operation will be done in such a way that grazing will still be possible as the site will be rehabilitated in such a way that it allows the establishment of grass cover again.

The mining operation will provide 12 to 25 jobs and will also add to the increased economic activity and the area surrounding the application area.

Excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration.

During the operational stages of the mining operation, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. However, the site layout plan has been developed not to place any infrastructure where resource materials could be located. The infrastructure and excavations /dumps will alter the topography by adding features to the landscape. Topsoil removal and Mine Residue Dumps will change 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 will be stripped in preparation for placement of infrastructure and mining of alluvial gravels, 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 cleared areas will be rehabilitated, but full restoration of soils 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.

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless unless they are decontaminated. 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. Most of the site has a land capability for grazing, but grazing activities can still be performed in areas not earmarked for the operation, and with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be directly affected if any oil and fuel spillages occur during these scenarios and activities, then groundwater will be directly contaminated. Similarly, hazardous surface spillages 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. If no, or inadequate ablution facilities are available then workers might feel the need to use the veld for this purpose, which can contaminate natural resources.

Any dumping within the drainage lines will impact on the surface water environment by altering their physical characteristics. These impacts include the alteration of flow patterns, ponding and an increase in the concentration of suspended solids and sedimentation.

Mining activities on site will reduce the natural habitat for ecological systems to continue their operation. 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 operational 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.

During the 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 operation will typically have low to moderate levels of noise, along with man-influenced sounds such as traffic on the secondary road and very occasional air traffic. The proposed operation will add a certain amount of noise to the existing noise in the area.

The impact of site generated trips on the traffic and infrastructure of the existing roads is expected to be moderate. Furthermore, if road safety is not administered it can have a high impact on the safety of fellow road users.

The activities on site have the potential to impact upon heritage resources. Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon these resources will be permanent and irreversible. Any movement of vehicles, equipment or personnel through areas containing these artefacts could result in the permanent destruction of the artefacts and loss of heritage resources.

The operation will create a number of new employment opportunities and uplift the local community. 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 could possibly impact on safety and security of local residents. During the decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.

Economic slump of the local towns after site closure is not considered to be an associated potential impact, because there are numerous other mining operations in the region. However, 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 operation-related businesses.

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

In terms of the Social Impact Assessment findings derived from the information available at this stage it is concluded that the likely benefits of the proposed project outweigh the potential social risks and/or threats to the local communities. However, as indicated earlier in the report, the possible impact on the infrastructure and service needs due to the inflow of an additional workforce should be addressed. It would remain the responsibility of the Local Municipality, but considering the social framework within which the mine operates, it is important for the mine to engage with the SPM in this regard to minimise any possible negative impacts. Such engagement should also contribute to meaningful contributions to the communities situated in close proximity to the mine.

It is furthermore important to ensure that any negative impacts as a result of the mining activities on the residents should be limited.
The mining activities and associated infrastructure by itself will thus not introduce new social risks and hazards, but only increase the probability and scale of those already associated with the existing mining activities.

On a more detailed level, the following **positive** impacts are anticipated:

- The creation of job opportunities in the area, and associated local economic development;
- Economic and revenue contribution to the local municipal area, as well as the adjacent municipalities;
- The involvement of David John de Smidt with regards to training and capacity building of his employees and subsequent improvement of the livelihoods of the employees' families, as well as its efforts in sustaining the socio-economic development of the communities in close proximity to the operation;
- The involvement of David John de Smidt with regards to social development projects and support through the Integrated Development Plans (IDPs);
- The positive impact of mining activity on the regional and local economy; and
- Positive impact of extensive local procurement focus.

Negative impacts as a result of the mining activity refer to:

- Inconvenience and intrusion impacts during the start-up and construction phases of the project such as the inflow of an additional workforce to the area, the possible influx of jobseekers, possible increase in the criminal activities (safety and security issues), disruption of social networks, as well as possible health risks;
- Disruptions in the daily living and movement patterns (increased traffic and possible dust pollution);
- Additional pressure on infrastructure development and maintenance;
- General intrusion impacts such as visual and noise pollution

From a social perspective it can be concluded that the proposed David John de Smidt Project would not result in permanent damaging social impacts. The socio-economic benefits associated with the mine outweigh the negative social impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented.

Negative impacts on the area are expected to be temporary and can be mitigated to a large extent if the recommendations of the EMPR are adhered to e.g. ongoing environmental management and rehabilitation once the mine reaches its end of life.

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

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

Air Quality

- To limit the creation of nuisance, dust the following management guidelines must be followed:
- Avoidance of unnecessary removal of vegetation.
- Routine spraying of unpaved site areas and roads utilized by the mining operation with water.
- Speed limits of vehicles inside the mining area must be strictly controlled to avoid excessive dust or the excessive deterioration of the roads to be used.
- Continuous dumping and rehabilitation of disturbed areas.
- All cleared, disturbed or exposed areas must be re-vegetated as soon as practically possible to prevent the formation of additional sources of dust.

Archaeology:

- All operators of equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered:
    - All construction in the immediate vicinity (50m radius of the site) should cease.
    - The heritage practitioner should be informed as soon as possible.
    - In the event of obvious human remains the SAPS should be notified.
    - Mitigation measures (such as refilling) should not be attempted.
    - The area in a 50m radius of the find should be cordoned off with hazard tape.
    - Public access should be limited.
    - No media statement should be released until such time as the heritage practitioner has had sufficient time to analyse the finds.

Fauna

- To ensure a minimum of impact to animals the following management guidelines will be followed:
    - Speed limits of vehicles inside the application area must be strictly controlled to avoid road kills.
    - Continuous controlled dumping.
    - Operational areas must be low angled as a preventative measure to ensure an escape route for animals.
    - No hunting (snares) must be allowed at the application area or in the surrounding area.
    - All mining and access roads must be fenced.

Flora

- No trees or shrubs must be felled or damaged for the purpose of obtaining firewood.

- Management must take responsibility to control declared invader or exotic species on the site. The following control methods must be used:
    - 'The plants will be uprooted, felled or cut off and can be destroyed completely.'
    - The plants will be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide.
- Valid permits from DAFF must be obtained before any protected plant species are removed or damaged if encountered.
- Continuous controlled dumping and spreading of previously stored topsoil over the rehabilitated areas.
- All rehabilitated areas, where applicable and possible must be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to mining activities commenced if the natural succession of vegetation is unacceptably slow.
- Fires may only be allowed in facilities or equipment specially constructed for this purpose.
- The end objective of the re-vegetation program must be to achieve a stable self-sustaining habitat unit.

Groundwater

- Vehicle- and equipment maintenance must only be allowed within the maintenance area. Only emergency breakdowns may be allowed in other areas.
- The following procedure must be followed if a vehicle or piece of equipment would break down inside an excavation and outside of the maintenance area.
    - Drip pans must be placed at all points where diesel, oil or hydraulic fluid may drip and in so doing contaminate the soil.
    - All efforts must be made to move the broken-down vehicle or piece of equipment to the maintenance area.
    - If the vehicle/piece of equipment cannot be moved, the broken part must firstly be drained of all fluid. The part must then be removed and taken to the maintenance area.
- No repairs may be allowed outside the maintenance area except for emergencies.
- Equipment used as part of the proposed operation must be adequately maintained so as to ensure that the oil, diesel, grease or hydraulic fluid does not leak during the operation.
- Fuel and other petrochemicals must be stored in steel receptacles that comply with SANS 10089-1:2003 (SABS 089-1:2003) standards. An adequate bund wall, 150% of volume of the largest storage receptacle, must be provided for fuel and diesel areas to accommodate any spillage or overflow of these substances. The area inside the bund wall must be lined with an impervious lining to prevent infiltration of the fuel into the soil (and ultimately groundwater).
- Proper sanitation facilities must be provided for employees. No person may pollute the workings with faeces or urine, misuse the facilities provided or inappropriately foul the surrounding environment with faeces or urine.
- Acceptable hygienic and aesthetic practices must be adhered to.
- The workshops, washing bays and sewage tanks should be constructed far away from significant aquifer systems.
- SOP for storage, handling and transport of different hazardous materials.

- Place oil traps (drip trays) under stationary vehicles, only re-fuel al fuelling stations, construct structures to trap fuel spills at fuelling stations, immediately clean oil and fuel spills and dispose of contaminated material at licensed sites only.
- Ensure good housekeeping rules.

Noise

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

Mechanical equipment

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

Screening / Migration Control:

- Appropriate measures must be specifically installed and / or employed at the plant to act as screen and to reflect/reduce the noise.
- Appropriate non-metallic washers/insulation must be used with any joining of apparatus made from materials such as corrugated iron. Such apparatus must be maintained in a fixed position.

Safety

- No employees may reside on the mine site without permission from the surface owner.
- Access and haul roads must be maintained.
- Security access point to ensure monitoring of access to the site.

Soil

- In all places of development, the first 300mm of loose or weathered material found will be classified as a growth medium. The topsoil must be removed where possible, from all areas where physical disturbance of the surface will occur.
- In all areas where the above growth medium will be impacted on, it must be removed and stockpiled on a dedicated area. The maximum height of stockpiles may not exceed 2 meters.
- The growth medium/topsoil must be used during the rehabilitation of any impacted areas, after sloping in order to re-establish the same land capability.
- If any soil is contaminated during the life of the mining area, it must either be treated on site or be removed together with the contaminant and placed in acceptable containers to be removed with the industrial waste to a recognized facility or company.
- Erosion control in the form of re-vegetation and contouring of slopes must be implemented on disturbed areas in and around the site.
- Topsoil must be kept separate from overburden and may not be used for building or maintenance of access roads.
- The stored topsoil must be adequately protected from being blown away or being eroded.
- Compacted areas must be ripped to a depth of 300mm, where possible, during the continuous rehabilitation, decommissioning and closure phases of the operation in order to establish a growth medium for vegetation.
- Vehicle movement must be confined to establish roads for as far as practical in order to prevent the compaction of soils.

Surface water

- The disposal of oil, grease and related industrial waste must be transported to the stores area where it will be stored in steel containers supplied by an oil recycling contractor. All oil and grease must be removed on a regular basis from the operation by a registered approved contractor.
- All refuse and waste from the different sections must be handled according to NEMA Guidelines. Recycling of waste is encountered in all the consumer sections of the operation, where recyclable materials must be collected before dumping them in the domestic waste disposal area.
- All non-biodegradable (recyclable) refuse such as glass bottles, plastic bags and metal scrap must be stored in a container in the waste area and collected on a regular basis and disposed of at a recognized disposal facility.
- Erosion and storm water control measures must be implemented.
- An application for an integrated Water Use Licence must be submitted at the Department of Water Affairs for all actions to be performed which requires authorization in terms of water uses.
- Vehicle repairs must only take place within the maintenance area for vehicles. Repairs within open excavations must be limited to emergency break downs with drip trays.
- Re-fuelling must only take place in the re-fuelling area. If this is found not to be practical, drip trays must be used whenever re-fuelling takes place outside of this area.

- During rehabilitation the application must endeavour to reconstruct flow patterns in such a way that surface water flow is in accordance with the natural drainage of the area as far as practically possible.
- Implementation of a suitable management action plan during the operation of the proposed diamond mine, based on analysis of bi-annual water quality and biological monitoring data collected at sites upstream and downstream of all activities;
- Prevention of exotic vegetation encroachment;
- Prevent further siltation within the river segment as well as downstream of activities;
- Unnecessary destruction of marginal and in-stream habitat should always be avoided during operations.

Topography

- All alluvial gravel excavations must be rehabilitated if and when possible and made safe so as to reflect as far as possible the pre-mining topography of the area.
- All temporary features e.g. plant, containers and stockpiling must be removed and handled in the prescribed manner during rehabilitation.

Visual

- Security Lights must be fixed at an angle to ensure that it does not cause a disturbance to the surrounding environment at night
- Alluvial Excavations must be subject to progressive backfilling and made safe (including the re-establishment of vegetation).
- Permanent structures or features that are part of the proposed mining operation must be kept neat and well presented.
- Waste material of any description must be removed from the mining area on a regular basis and be disposed of at a recognized landfill facility.

The impact management objectives for the David John de Smidt planned mining operation should include:

- To ensure efficient extraction of the diamonds and to prevent the sterilization of any diamond reserves.
- To limit the alteration of the surrounding topography
- To manage and preserve soil types
- To prevent the loss of land capability
- To ensure the continuation of economically viable land use.
- To ensure that the surrounding ground water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quality of ground water resources.
- To ensure that the surrounding surface water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quantity and quality of ground water resources.
- Rehabilitation of disturbed areas during the mine life cycle as well as during closure phase has to be done to minimize erosion and/or pollution of natural streams.

- To contain soils and materials within demarcated areas and prevent contamination of storm water runoff.
- To minimise the loss of natural vegetation.
- To prevent the proliferation of alien invasive plants species.
- To protect the wildlife and bird species.
- To protect the natural habitat of wildlife and bird species.
- To maintain visual integrity; and to minimise the extent of the generation of dust in order to minimise the aspect of nuisance and health impacts to sensitive receptors.
- To minimise noise and vibration to a level that disturbances felt by the communities are limited.
- To reduce the impact on visual quality due to intrusive mine infrastructure, activities and facilities.
- To ensure that all traffic generated by the proposed mining development does not negatively impact on existing road networks and infrastructure; and to ensure traffic safety.
- To preserve the historical and cultural artefacts located on site in compliance with the South African Heritage Resources Act, 1999 (Act No 25 of 1999).
- To ensure that the current socio-economic status quo is improved.
- To be transparent and practise effective communication; in order to maintain good relationships with all interested and affected parties.

m) Final proposed alternatives

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

The location of the central mining site and associated infrastructure is primarily based on proximity to the access roads, proximity to the areas earmarked for mining and limited additional impact on the environment and heritage resource.

It will therefore cause additional impacts if this infrastructure is moved and render the consideration of alternative mining sites useless.
The mining activities and methodologies associated with mining of alluvial diamonds is the only economic viable method currently being used by the diamond's fraternity. There is no alternative mining method for the mining of alluvial diamonds.

n) Aspects for inclusion as conditions of Authorisation

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

The site proposed for mining operations has been rated as being acceptable for the development. However, this is subject to the Orange River and associated floodplains being excluded from mining activities and that comprehensive rehabilitation is implemented.

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and

decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

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

(Which relate to the assessment and mitigation measure proposed)

The study took place during late summer, which was an optimal time of the year for this summer rainfall habitat. It experienced high rainfall and therefore the vegetation was in good condition. Most plants were flowering or in fruit and was in a favourable state for the assessment. Due to the brief duration of the survey however, the species list obtained during the site visit cannot be regarded as comprehensive. Ideally, a site should be visited several times during different seasons to ensure that the full complement of plant species present is captured. However, this is rarely possible due to time and cost constraints related to mining right application processes. The survey was conducted in such a manner to ensure all representative communities were traversed to include most of the common and important species (Dr. Betsie Milne out of the Ecological Study, April 2022).

It was easy walking about the plain on the southern part of the farm. Black thorn (swarthaak) cover over the ridges, spurs and stream valleys on the northern part of the farm presented a challenge and slowed down the survey off the prepared tracks. During the second site visit on 13 June 2022 attempts were made to find openings between the bushes through which to penetrate deep the black thorn colonies. Little success was achieved considering the size of the area. As the heritage sensitivity of the property is considered to be low, the mining right can be approved. The study is mindful that some important discoveries may occur during the prospecting and mining phases. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation to be undertaken. (Taken out of the HIA by Dr. Edward Matenga).

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only if there such features as palaeo-pas or palaeo-dunes to trap any fossil plant, insect, invertebrate or vertebrate material would any occur in the area. The sands of the Quaternary period would not preserve fossils. (Taken out of the PIA assessment by Prof Marion Bamford).

The above mitigation measures are tried and tested over many years in the diamond mining industry. The Company must monitor the potential impacts throughout the life of operation, and mitigate any deviations detected. This has been proven to be very effective in existing operations.

The EAP who compiled this document and the specialists who compiled the respective specialist reports have extensive knowledge in their field and it is therefore assumed that the above assumptions are adequate, and that the information provided is correct.

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

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

There are no significant reasons why the activity should not be authorised, given that the applicant also has a Prospecting Right on the application area. However, if the proposed management and mitigation measures are not properly applied or if the mining operation intentionally disregards any of these measures, it will negatively affect the environment and have more long-term consequences. Therefore, the competent authority should take all the necessary steps to ensure that the mining operation complies with the conditions set out in the approval of the EMPR.

ii) Conditions that must be included in the authorisation.

(1) Specific conditions to be included into the compilation and approval of EMPr

The site proposed for mining operations has been rated as being acceptable for the development. However, this is subject to the Orange River and associated floodplains being excluded as far as possible from mining activities and that comprehensive rehabilitation is implemented.

Mining operations within 100 meters or within the floodplain of the river and within 500 meters of wetland areas will require authorisation from DWS.

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

(2) Rehabilitation requirements

A Detailed rehabilitation plan will be appended to the EMPR. The Mine had to provide to the DMR, a financial rehabilitation guarantees to the amount as calculated in terms of the financial quantum Guideline and approved by the DMR.

Infrastructure areas

On completion of the mining operation, the various surfaces, including the access road, the office area, storage areas and the plant site, will finally be

rehabilitated as follows: All other material on the surface will be removed to the original topsoil level where possible. This material will then be backfilled into any open pits. Any compacted area will then be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.

All infrastructures, equipment, plant, and other items used during the operational period will be removed from the site.

On completion of operations, all buildings, structures or objects on the office site will be dealt with in accordance with regulation 44 of the Minerals and Petroleum Resources Development Act, 2002.

Topsoil and Stockpile Deposits:
Disposal Facilities: Waste material of all description inclusive of receptacles, scrap, rubble and tyres should be removed entirely from the mining area and disposed of at a recognized landfill facility. It should not be permitted to be buried or burned on the site.

Ongoing Seepage, Control of Rain Water:
Water Quality Management in accordance with the South African Water Quality Guidelines must be adhered to in order to provide timely and accurate water data to the Department of Water and Sanitation (DWS) as well as to manage impacts caused by the activity. Specific objectives of such a program are to:

- Determine whether water quality comply with water quality standards.
- Provide timely data for intervention as and when required.
- Assess the status of water quality in the surrounding areas.
- Provide analytical water quality information describing trends (present conditions and changes).

The objectives are to limit the adverse effect of pollutants in the water resource. The setting of in-stream Resource Water Quality Objectives (RWQO) is based on the South African Water Quality Guidelines.

Water Monitoring Points
Surface water: The Orange River which may be impacted by the mining activity are perennial. Monitoring takes place by collecting surface water samples every quarter.
Implementation of a suitable management action plan during the operation of the proposed diamond mine, based on analysis of bi-annual water quality and biological monitoring data collected at sites upstream and downstream of all activities (taken out of the aquatic assessment report);

Long Term Stability and Safety: It should be the objective of mine management to ensure the long-term stability of all rehabilitated areas including the backfilled excavations. This should be done by the monitoring of all areas until a closure certificate has been issued.

Final rehabilitation in respect of erosion and dust control: Self-sustaining vegetation will result in the control of erosion and dust and no further rehabilitation is deemed necessary, unless vegetation growth is not returned to a desirable state by the time of mine closure.

Final Rehabilitation Roads:

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

Submission of Information:

- Reports on rehabilitation and monitoring should be submitted annually to the Department of Mineral Resources – Kimberley, as described in Regulation 55 and amended with new legislation promulgated in the new NEMA regulations NO. R. 1147 20 NOVEMBER 2015 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998, (ACT NO. 107 OF 1998) REGULATIONS PERTAINING TO THE FINANCIAL PROVISION FOR PROSPECTING, EXPLORATION, MINING OR PRODUCTION OPERATIONS.

Maintenance (Aftercare):

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

After-effects Following Closure:

Acid Mine Drainage: No potential for bad quality leachate or acid mine drainage development is associated with diamond mine closure.
Long Term Impact on Ground Water: No after effect on the groundwater yield or quality is expected.

Long-term Stability of Rehabilitated Land: One of the main aims of any rehabilitated ground should be to obtain a self-sustaining and stable end result. The concurrent monitoring of all material and replacement of topsoil where available should be ensured.

q) Period for which the Environmental Authorisation is required

10 years. Thus, the period required is for the Life of Mine of the Mining Right.

r) Undertaking

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

The undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme Report.

s) Financial Provision

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

i) Explain how the aforesaid amount was derived

The total cost to rehabilitate and mitigate the David John de Smidt Mine site as it stands currently (risking premature rehabilitation) is estimated to be R870 682 according to the DMR calculations.

Table 18. Financial quantum

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
Remark:							
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	900	15,68	1	1	14112
					1	1	
2 (A)	Demolition of steel buildings and structures	m2	0	218,41	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	250	321,86	1	1	80465
3	Rehabilitation of access roads	m2	10000	2,29	1	1	22900
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	379,34	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	206,91	1	1	0
5	Demolition of housing and/or administration facilities	m2	200	436,81	1	1	87362
6	Opencast rehabilitation including final voids and ramps	ha	3,5	222313,32	0,04	1	31123,8648
7	Sealing of shafts adits and inclines	m3	0	117,25	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,55	152653,61	1	1	83959,4855
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0,3	190127,32	1	1	57038,196
					1	1	
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	552219,84	1	1	0
					1	1	
9	Rehabilitation of subsided areas	ha	0	127824,41	1	1	0
10	General surface rehabilitation	ha	2	120927,41	1	1	241854,82
11	River diversions	ha	0	120927,41	1	1	0
12	Fencing	m	0	137,94	1	1	0
13	Water management	ha	0	45980,00	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	2	16093,00	1	1	32186
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum	0			1	0
					Sub Total 1		651001,3663
1	Preliminary and General		39060,08198		weighting factor 2 1,05		41013,08608
2	Contingencies				65100,13663		65100,13663
					Subtotal 2		757114,59
					VAT (15%)		113567,19
					Grand Total		870682

ii) Confirm that this amount can be provided from operating expenditure

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

It is confirmed that the amount for outstanding rehabilitation can be provided from operating expenditure.

t) Deviations from the approved scoping report and plan of study

i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation)

Not applicable – No deviations from the methodology proposed in the Scoping Report.

ii) Motivation for the deviation

Not applicable – No deviations from the methodology proposed in the Scoping Report.

u) Other information required by the competent Authority

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

(1) Impact on the socio-economic conditions of any directly affected person

(Provide the results of investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as **Appendix 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 therein)

From a social perspective the following objectives and measures should be included as part of the Social Management Plan (SMP) as part of the Environmental Management Plan (EMP).

It should be noted that the responsibility of the mitigation lies with the owner, operator, and/or with the local municipality. The mitigation measures would have to form part of the respective stakeholder's expenditure predictions or operations and management within the area; therefore, the monitoring activities cannot be expressed in financial terms.

From a social perspective it can be concluded that the proposed David John de Smidt Project would not result in permanent damaging social impacts. The socio-economic benefits associated with the mine outweigh the negative social

impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented.

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act (Provide the results of investigation, assessment, evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(*i)*(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein)

Dr. Edward Matenga from (AHSA) Archaeological and Heritage Services Africa Pty Ltd has been appointed by DJ de Smidt to provide an Heritage Impact Assessment Report for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area.

A Heritage Impact Assessment (HIA) study was undertaken for a mine prospecting right application on the Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20 near Prieska, in the Siyathemba Local Municipality, Northern Cape. The HIA report has been prepared in accordance with Section 38(8) of the National Heritage Resources Act (25/1999) which entailed a site visit and ground survey undertaken on 10 March and 13 June 2022 to assess the heritage sensitivity of the area and to determine potential adverse impacts of the proposed activities on the heritage resources.

The findings of the heritage survey are summarised as follows:

The Stone Age
Stone Age tools occurred in all but four of the 24 recorded instances. The typology is dominated by scrapers, while there are a few blades. Handaxes were recorded in two instances; the handaxe is recognised as a type tool of the Early Stone Age period. Otherwise a majority of the finds date from the Middle Stone Age (MSA) to the Late Stone Age (LSA). No significant concentrations of artefacts were encountered.

The Iron Age
No Iron Age sites or relics were found on the property.

Modern period
A setting of stones (stones in a single file) forming a semi-circle was recorded (SXD 12, SXD23). The meaning of these features could not be ascertained. Foundations remains of a rectangular building which might have been built in the 20th century. All these features recorded and ranked as of low significance.

Burial ground
No burial grounds were found or reported on the property.

As the heritage sensitivity of the property is considered to be low, the mining application can be approved. The study is mindful that some important discoveries may occur during the prospecting and mining phases. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation to be undertaken.

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.

Palaeontology

Prof Marion Bamford, of the University of the Witwatersrand, sub-contracted by Archaeological and Heritage Services Africa (Pty) Ltd, Pretoria, South Africa has been appointed by DJ de Smidt to provide an Palaeontological Impact Assessment Report for alluvial diamond mining on Remaining Extent of Portion 1 (Paals Werf) of Saxendrift 20, Hopetown near Douglas, and to determine the possible impact of mining on the application area.

A proposed Mining Right Application on the Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20, near Prieska, Northern Cape Province, requires a palaeontological impact assessment.

The site is on the southern side of the Orange River, approximately 50 km southwest of the town of Douglas. Irrigation and the cultivation of crops occurs close to the river but the majority of the area has indigenous sparse shrubs and eroded areas adjacent to the ephemeral stream that drain into the Orange River.

A Phase 2 (site visit) Palaeontological Impact Assessment was requested for the Saxendrift Mining Right Application project. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development and updated from the site visit, and the latter is reported herein.

To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development.

Palaeontological context

The site for mining is in the Dwyka Groups rocks (green; moderate sensitivity) and the Tertiary-Quaternary calcretes (orange, highly sensitive).

The Dwyka Group tillites and mudstones can trap fossils that were caught up in the ice sheets or glaciers and dropped when the ice melted, therefore these fossils tend to transported fragments of more robust fossils such as silicified wood, invertebrate remains and rarely Glossopteris leaves or associated flora. Two rare occurrences are mentioned by Anderson and McLachlan (1976) near

Strydenburg which is to the northeast of this site. There are no other reports. According to Johnson et al. (2006), the fossils are only likely to be found in mudstone facies of the Dwyka Group.

Exploration and research along the palaeo-rivers of Southern Africa, now only present as abandoned palaeochannels, or captured by the present day rivers, the Vaal and Orange Rivers in this case, the gravels and sands might include transported robust and fragmentary fossils. Examples of these are heavy bone fragments and silicified wood fragments, as well as diamonds (de Wit, 1999; de Wit et al., 2000).

The Tertiary calcretes can trap fossils and artefacts when associated with palaeo-pans or palaeo-springs (Partridge et al., 2006). Where deflation has occurred, for example along the west coast of South Africa, any trapped materials in the different levels can be concentrated in the depo-centre of the pan or dune and thus it can be challenging to interpret the deposit (Felix-Henningsen et al., 2003).

Palaeo-pans and palaeo-springs are visible in satellite imagery because of their topography and often are associated with lunette dunes. Vegetation changes are also common. No such features are seen in the Google Earth images. Aeolian sediments that cover most of the region, do not preserve fossils because they have been reworked and windblown.

Site visit observations

The area was walked down in June 2022 and the surface rocks, natural cutting provided by erosion channels and ridges were targeted as they are likely to show the underlying rocks and any fossils. A selection of site photographs of representative landscapes and the GPS locations are provided in Table 3 and Figures 6 -18 below in the PIA study.

No fossils of any kind were seen in the erosion channels or on the ground surface. Transported Dwyka Group pebbles were seen in places but there were only clasts and no fossils were seen amongst them.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age to contain fossils but there is no evidence of features such as palaeo-pans or palaeo-dunes to trap any fossils. Furthermore, the material to be mined is the sands for diamonds and this does not preserve fossils. However, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only if there such features as palaeo-pas or palaeo-dunes to trap any fossil plant, insect, invertebrate or vertebrate material would any occur in the area. The sands of the Quaternary period would not preserve fossils.

Recommendation

Based on the site visit and walk through there are no surface fossils and no fossils in the eroded gullies. This confirms the previous assertion and the lack of any previously recorded fossils from the area, that it is extremely unlikely that any fossils would be preserved in the Dwyka Group tillites and sandstones or the sands and calcretes of the Tertiary-Quaternary. There is a very small chance that fossils occur below ground and also may occur in features such as palaeo-pans or palaeo-dunes that could trap fossils are present as no such feature is visible in the satellite imagery. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the miners or environmental officer, or other responsible person once mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, therefore, as far as the palaeontology is concerned, the project should be authorised and a mining permit granted.

Chance Find Protocol

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

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

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

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

There are no alternatives, as the application area applied for is the area where the applicant has proven diamonds and has found potential for a diamond mining operation. The applicant is the holder of an existing Prospecting Right on the property.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft environmental management programme

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

I hereby confirm that the requirement for the provision of the details and expertise of the EAP is already included in Part A as required.

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

I hereby confirm that the requirement for the aspects of the activity is already included in Part A as required.

c) Composite Map

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

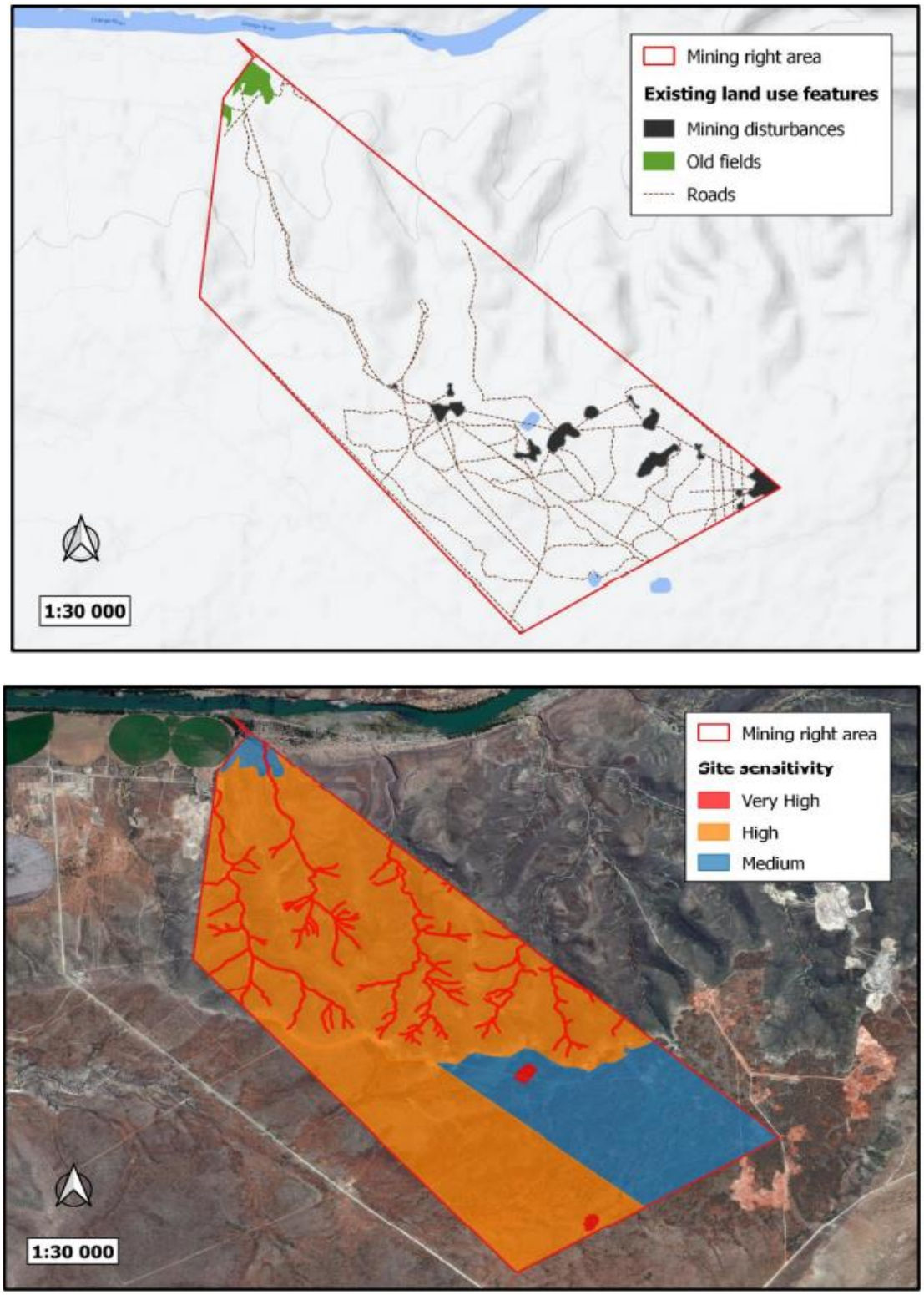

Figure 33. A sensitivity map for the proposed mining area, indicating the SITE SENSITIVITY in red taken out of the ecological study by Boscia Ecological Services.

d) Description of impact management objectives including management statements

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

The main closure objectives of the planned mining operation are:

- To restore the site to its current land capability in a sustainable manner.
- To prevent the sterilization of any diamond reserves.
- To prevent the establishment of any permanent structures or features.
- To manage and limit any impact to the surface and groundwater aquifers in such a way that an acceptable water quality and yield can still be obtained when a closure certificate is issued.
- To establish a stable and self-sustainable vegetation cover.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability.
- To limit and manage the visual impact of the mining activities.
- To safeguard the safety and health of humans and animals on the site.
- To close the mining operation efficiently, cost effectively and in accordance with Government Policy.

The key aim decommissioning and closure is to ensure that all the significant impacts are ameliorated. All rehabilitated areas should be left in a stable, self-sustainable state. Proof of this should be submitted at closure. Specific objectives include:

Rehabilitation of infrastructure areas

The objectives for the removal of infrastructure and the subsequent rehabilitation of the areas they occupied include:

- To ensure that infrastructure identified for removal is successfully demolished and removed.
- To ensure that infrastructure identified to remain after mine closure is maintained until the issue of a closure certificate.
- The removal, decommissioning and disposal of all mining infrastructure, will comply with all conditions contained in the MPRDA. To this end, decommissioning and rehabilitation of all infrastructure areas will follow the following principles:
- The plant and associated disused infrastructure will be dismantled or demolished. Any building foundations will be removed and land exposed to the demolition and dismantling of infrastructure and all other disturbed land will be rehabilitated.
- Rubble will be disposed of at a suitable site. The site will be selected in consultation with DENC.

- Any surface water management infrastructure will be maintained to ensure they are stable and functional.
- Just before closure, when disturbed land has been rehabilitated and erosion is controlled by vegetation cover, all disused surface water management facilities will be decommissioned.

Mine Residue Dump (Porrel Dam)

The objectives pertaining to the effective management and rehabilitation of the Mine Residue Dump include:

- To ensure that the Mine Residue Dump deposit are stable and that there is an acceptably low risk of failure of these deposits during the decommissioning phase and following mine closure;
- To establish self-sustainable vegetation cover on the Mine Residue dump so that the visual impact of the Mine Residue dump is improved and in order to prevent erosion.

Management principles pertaining to Mine Residue dump include:

- The Mine Residue dump will continuously be inspected by a suitable qualified professional engineer to ensure their stability. If they are unstable, the appropriate remedial measures will be implemented.
- Inspection and monitoring should continue until a suitable qualified profession engineer has confirmed the long-term stability of the Mine Residue dump.
- Any infrastructure or facilities that serve the Mine Residue dump will be maintained to ensure that they are both stable and functional.

Maintenance

The necessary agreements and arrangement will be made by David John de Smidt to ensure that all natural physical, chemical and biological processes for which a closure condition were specified are monitored until they reach a steady state or for three (3) years after closure or as long as deemed necessary at the time.

- Such processes include erosion of the Mine Residue dump, rehabilitated surfaces, surface water drainage, air quality, surface water quality, ground water quality, vegetative re-growth, weed encroachment.
- The closure plan will be reviewed yearly.
- Rehabilitation of the land will be maintained until a closure certificate is granted or until the land use is regarded as sustainable.
- All rehabilitated areas will be monitored and maintained until such time as required to enable the mine to apply for closure of these different areas.

Performance assessments

As per the MPRDA and associated Regulations, as well as NEMA and associated Regulations, this Environmental Management Programme will be continually assessed in terms of its appropriateness and adequacy. In order to achieve this, David John de Smidt will undertake the following:

- Implement the necessary monitoring programmes, as discussed as part of this EMPR;
- Conduct performance assessments of this EMPR; and
- Compile and submit the afore-mentioned performance assessment reports to the DMR. The frequency of the performance assessments will be annually. An independent and competent person will undertake all performance assessments.

Decommissioning and closure objectives

The key aim of decommissioning and closure is to ensure that all the significant impacts are ameliorated. All rehabilitated areas will be left in a stable, self-sustainable state. Proof of this will be submitted at closure. Specific objectives include:

- To identify potential post-closure land uses in consultation with the surrounding land owners and land users. This should be done during the operational phase of the mine;
- Rehabilitate disturbed land to a state suitable for its post-closure uses;
- Rehabilitate disturbed land and mine residue deposits to a state that facilitates compliance with applicable environmental quality objectives;
- Limit the impact on staff whose positions become redundant at the time of mine closure, as addressed in the SLP;
- Keep relevant authorities informed of the progress of the decommissioning phase;
- Submit monitoring data to the relevant authorities;
- Maintain required pollution control facilities and rehabilitated land until closure.

Negative economic impacts

The objective is to alleviate the negative socio-economic impacts that will result from mine closure. Management principles to achieve this include:

- David John de Smidt will undertake a carefully planned step-wise decommissioning process.
- Closure planning will form an integral part of mine planning.
- Strategies for sustainable development have been and will continue to be developed by the project in collaboration with district and local authorities, local businesses and other interested parties. Early warning of impending closure will be given to IAPs.
- In conjunction with long-term closure planning, the mine will actively participate in regional and local planning to enhance the economic

benefits of the project through development of alternative forms of income generation.

- David John de Smidt will initiate and participate in regional planning exercises that will mitigate the impacts of closure of the mine, the local and regional economies and associated abandonment of community infrastructures surrounding the mine.
- The mine will fulfil the requirements for closure.

ii) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity

There won't be a need for this, as based on the specialist reports (Ecological study by Boscia Ecological Services).

The National Water Act (36 of 1998) (NWA) provides a framework to protect water resources.
According to this Act, a water resource includes a watercourse, surface water, estuary, or aquifer; whereas a water course includes:
a) a river or spring,
b) a natural channel in which water flows regularly or intermittently,
c) a wetland, lake or dam into which, or from which, water flows, and
d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse.

Any reference to a watercourse includes its bed and banks and a water resource does not only include the water within the system, but also the entire water cycle; i.e. evaporation, precipitation, the habitats and processes.
The purpose of this Act (Section 2) is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors - (g) protecting aquatic and associated ecosystems and their biological diversity and (h) reducing and preventing pollution and degradation of water resources.

No activity may take place within a watercourse unless authorised by the Department of Water and Sanitation (DWS). Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

The Saxendrift study area falls within the Boegoeberg quaternary catchment D71C of the Lower Orange Water Management Area. This quaternary catchment has been allocated a Present Ecological State (PES) of 'Moderately Modified' (C) by Smook et al. (2002).

According to the South African Inventory of Inland Aquatic Ecosystems (SAIIAE), the study area falls within the Upper Karoo Bioregion, where 1.9 % (236 551 ha) of the land area is covered by inland wetlands, including depressions, floodplains, seeps and valley-bottom wetland types (Van Deventer et al. 2019). Most of these wetlands have been moderately to severely modified.

Saxendrift comprises two depressional wetlands and several drainage lines are present. According to SAIIAE, these depressions are still in natural or near-natural condition.

No mining will take place close to the river or in any wetlands. No pumping of water except for taking of water from the Orange river for processing.

Six habitats were identified on site, of which the ephemeral pans and drainage channels are the most sensitive to mining. Mining activities are however not expected to directly affect these units. The core mining activities are associated with the shrubland habitat on calcrete terraces, which harbours high densities of Boscia albitrunca and is considered of medium sensitivity. The most profound impacts expected to be related to the proposed mining operation include cumulative loss of intact habitat and biodiversity on a landscape level, as well as potential loss in soil fertility and loss of Boscia albitrunca recruits. Saplings are rarely visible during clearance operations and therefore the younger populations often get wiped out completely.

Permit applications need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any removal of protected species. Similarly, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to the Boscia albitrunca trees.

The destruction of the natural plant species and habitats is inevitable during mining operations, but the significance of the impacts will ultimately be affected by the success of the mitigation measures implemented during the mining operation. In my opinion, authorisation for the proposed operation can be granted. However, the applicant should commit to the strict adherence of effective avoidance, management, mitigation, and rehabilitation measures (Taken out of the Ecological study done by Dr. Betsie Milne April 2022).

iii) Potential risk of Acid Mine Drainage (Indicate whether or not the mining can result in acid mine drainage)

No potential risk for Acid Mine Drainage exists.

iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage

Not applicable, there is no potential risk of acid mine drainage.

v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage

Not applicable, there is no potential risk of acid mine drainage.

vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage

There is no residual or cumulative impact that may result from acid mine drainage.

vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation

The only activity relating to the cost of water in the mining operations relates to dust suppression in the mining area and on the roads when hauling and transporting material to the processing plant and doing continuous backfilling as part of the rehabilitation process.

It must however be noted that the water supply to the activities will be sourced from the nearby Orange River. There will be an industrial rate applied for water used and the cost will be the pumping cost.

The processing plant (diamond pan), scrubbers and final recovery will have an impact on the cost of water used. The cost of water will have an upward trend over time as a result of the national capacity and demand situation. Water are however recycled as far as possible and redirected to the processing plants. It must however be noted that the water supply to the activities will be sourced from the Orange River.

viii) Has a water use licence been applied for?

A WULA application has been prepared and are in the final stages to be submitted. The EIA EMP is a minimum requirement for the application and therefor the application will be submitted shortly after the EIA EMP had been submitted to the competent authority. The Proof of submission will be sent onto the competent authority as soon as it is received.

ix) Impact to be mitigated in their respective phases

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

ACTIVITY Whether listed or not listed. (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.).	**PHASE** of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**SIZE AND SCALE** of disturbance (volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when Required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Processing Plant 4 X 16 feet pan	Construction Commissioning Operational Decommissioning Closure	0.5 ha Steel, concrete, electric wires	Access control Maintenance of processing plant Dust control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills		Removal of processing plant upon closure of mining right.

			Rip disturbed areas to allow re-growth of vegetation cover		
Ablution facilities Chemical toilets	Construction Commissioning Operational Decommissioning Closure	25m² or 0.0025ha	Maintenance of container Plants Removal of container plants upon closure		Removal of container plant upon closure of the Mining Right.
Clean & Dirty water systems: Berms	Construction Commissioning Operational Decommissioning Closure	This area also includes the re-fuel and lubrication station, wash bay and office area.	Maintenance of berms and trenches Oil traps used in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.		Upon cessation of the individual activity (continuous rehabilitation)
Fuel Storage facility (Diesel tanks)	Construction Commissioning Operational Decommissioning Closure	250m² Concrete, bricks, and steel	Maintenance of diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point Immediately clean hydrocarbon spill.		Removal of diesel tanks upon closure of Mining Right.
Mining Area	Commissioning Operational Decommissioning Closure	Provision is made for a maximum footprint of ±436 hectares of alluvial diamond target areas for excavations.	Proper planning of excavations Access control Dust control and monitoring Noise control and monitoring Continuous rehabilitation		Upon cessation of the individual activity (continuous rehabilitation)

			Stormwater run-off control Immediately clean hydrocarbon spill Drip trays Dump control and monitoring Erosion control		
Salvage yard (Storage and laydown area)	Construction Commissioning Operational Decommissioning Closure	1000m² or 0.1 ha No construction material, area to be levelled with a grader and fenced with a gate and access control	Access control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill		Removal of fence around salvage yard and ripping of salvage yard area upon closure of the mining right.
Waste disposal site (domestic and industrial waste):	Construction Commissioning Operational Decommissioning Closure	15m x 30m = 450m²	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals		Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right.
Roads (both access and haulage road on the mine site):	Construction Commissioning Operational Decommissioning Closure	Additional mine haul road = 10 000m²	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control		Upon cessation of the individual activity (continuous rehabilitation) Ripping of roads upon closure of the mining right.

			Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		
Workshop and Wash bay	Construction Commissioning Operational Decommissioning Closure	300m² Concrete and Steel	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills		Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right
Water distribution Pipeline	Construction Commissioning Operational Decommissioning Closure	HDPE Pipes	Maintain water pipeline and structures		Removal of pipeline upon closure of the mining right.
Water tanks:	Construction Commissioning Operational Decommissioning Closure	3m X 3m = 9m²	Maintain water tanks and structures		Removal of water tank and steel structure upon closure of the mining right.

e) Impact Management Outcomes

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

ACTIVITY **Whether listed or not listed.**	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** **(e.g. construction, commissioning, operational, Decommissioning, closure, post closure)**	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	**STANDARD TO BE ACHIEVED** **(impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Processing Plant 4 X 16 feet pan	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints. Maintain a buffer zone around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.	
Ablution facilities Chemical Toilets	Soil contamination	Soil Groundwater	Construction Commissioning Operational	Maintenance of sewage facilities on a regular basis.	Minimize the potential for a chemical spill on soil,

	Possible Groundwater contamination		Decommissioning Closure	Removal of container on closure	which could infiltrate to groundwater.
Clean & Dirty water systems:	Surface disturbance Groundwater Contamination Soil contamination Surface water contamination	Soil Groundwater Surface Water	Construction Commissioning Operational Decommissioning Closure	The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. 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.	Safety ensured. Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.

				Maintain a buffer zone around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.	
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.	Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.

	Surface disturbance			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.	
Mining Area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Accelerated erosion of areas adjacent to workings that have been de-vegetated leads to	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays Dump stability control and monitoring Erosion control Noise control	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

	increased suspended sediment loads in nearby streams and rivers. Wind-blown dusts from unprotected tailings and waste rock dumps enter aquatic environment. Soil contamination Surface disturbance Surface water contamination			Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints. Maintain a buffer zone around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible. Mining activities must be planned, where possible in order to encourage	

				(faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type. The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls	

				which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring 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. 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 footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Snares & traps removed and destroyed; and Maintenance of firebreaks. It will be necessary to divert storm water around dump areas by construction of a temporary gravel cut-off berm that will prevent surface run-off into the drainage lines. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.	

				Implementation of a suitable management action plan during the operation of the proposed diamond mine, based on analysis of bi-annual water quality and biological monitoring data collected at sites upstream and downstream of all activities; Prevention of exotic vegetation encroachment; Prevent further siltation within the river segment as well as downstream of activities; Unnecessary destruction of marginal and in-stream habitat should always be avoided during operations.	
Salvage yard (Storage and laydown area)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Minimize potential for hydrocarbon spills to infiltrate into groundwater Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

	Surface disturbance Surface water contamination				
Product Stockpile area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Air Quality Fauna Flora Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer;	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				Develop a mechanism to record and respond to complaints.	
Waste disposal site (domestic and industrial waste):	Groundwater contamination Contamination of soil Surface water contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met.
Roads (both access and haulage road on the mine site):	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air quality Fauna Flora Noise and vibration Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives met. Erosion potential minimized.

				sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. 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.	
Workshop and Wash bay	Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

Water distribution Pipeline	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Monitor pipeline for water leaks Maintenance of pipeline 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.	Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water tanks:	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Maintain water tanks and structures	Safety ensured. Rehabilitation standards and closure objectives to be met.

f) Impact Management Actions

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

ACTIVITY **Whether listed or not listed.**	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.**	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Processing Plant: 4 X 16 feet pan	Dust Noise 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 Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise sensitive, to take advantage of	Removal of processing plant upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto.

		distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Maintain a buffer zone around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.		• Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Ablution Facilities Chemical Toilets.	Soil contamination Groundwater contamination	Maintenance of sewage facilities on a regular basis. Removal of container plants on closure	Removal of container plant upon closure of the Mining Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations

				• COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Clean & Dirty water systems: Berms	Surface disturbance Groundwater Contamination Soil contamination	It will be necessary to divert storm water around dump areas by construction of a temporary gravel cut-off berm that will prevent surface run-off into the mining area.	Upon cessation of the individual activity (continuous rehabilitation) Levelling of storm water berms upon closure of Mining Right	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts;

	Surface water contamination	Excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. 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. Maintain a buffer zone around the streams. Note that these buffer zones are essential to		• Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.		
Fuel Storage facility (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 Drip tray at re-fuelling point. 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.	Removal of diesel tanks upon closure of Mining Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto.

		All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.		• Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Mining Area.	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Accelerated erosion of areas adjacent to workings that have been de-vegetated leads to increased	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays Dump stability control and monitoring Erosion control Noise control Well maintained equipment	Upon cessation of the individual activity (continuous rehabilitation)	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the

	suspended sediment loads in nearby streams and rivers. Wind-blown dusts from unprotected tailings and waste rock dumps enter aquatic environment. Soil contamination Surface disturbance Surface water contamination	Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Maintain a buffer zone around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible. Mining activities must be planned, where possible in order		contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		to encourage (faunal dispersal) and should minimise dissection or fragmentation 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). Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance and must ensure that all contractors and workers undergo environmental induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring 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. 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 footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Snares & traps removed and destroyed; and Maintenance of firebreaks. Excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion		

		and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Implementation of a suitable management action plan during the operation of the proposed diamond mine, based on analysis of bi-annual water quality and biological monitoring data collected at sites upstream and downstream of all activities; Prevention of exotic vegetation encroachment; Prevent further siltation within the river segment as well as downstream of activities;		
Salvage yard (Storage and laydown area)	Surface Water contamination Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Removal of fence around salvage yard and ripping of salvage yard area upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the

	Surface disturbance Surface water contamination			contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Product Stockpile area	Surface Water contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance		Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels;	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

	Surface water contamination		Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	
Waste disposal site (domestic and industrial waste):	Groundwater contamination Surface Water contamination Contamination of soil Surface water contamination	Storage of Waste within receptacles Storm water control Ground water monitoring Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan.

				• Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Roads (both access and haulage road on the mine site):	Dust Surface Water contamination Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer;	Upon cessation of the individual activity (continuous rehabilitation) Ripping of roads upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees.

		Develop a mechanism to record and respond to complaints. 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.		• The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Workshop and Wash bay	Surface Water contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto.

				• Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Water distribution Pipeline	Surface disturbance	Monitor pipeline for water leaks Maintenance of pipeline 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.	Removal of pipeline upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the

				contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Water tanks:	Surface disturbance	Maintain water tanks and structures	Removal of water tank and steel structure upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's

				Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

i) Financial Provision

(1) Determination of the amount of Financial Provision

(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22(2)(d) as described in 2.4 herein.

Closure:

The main closure objective of this mine is to rehabilitate the mined areas in such a way to ensure that the rehabilitated topographical landscape would blend in with the surrounding landscape, would not pose a safety hazard for human and animal, but at the same time allow a certain alternative land use. Establish a self-sustaining and stable vegetation cover in order to mitigate the visual impact, to control erosion and to create some habitat for animals. The rehabilitated environment also needs to be aesthetically acceptable according to the principle of BPEO.

David John de Smidt will ensure that the mine site is:

- Neither a danger to public health and safety nor to animal health and safety.
- Not a source of any pollution.
- Stable (ecological and geophysical).
- Rehabilitated to the state that is suitable for the predetermined and agreed land use.
- Compatible with the surrounding biophysical environment.
- A sustainable environment.
- Aesthetically acceptable.
- Not an economic, social or environmental liability to the local community or the state now or in the future.

David John de Smidt will ensure that the physical and chemical stability of the rehabilitated mining site will be such that risk to the environment is not increased by naturally occurring forces to the extent that such increased risk cannot be contended with by the installed measures.

David John de Smidt will subscribe to the optimal exploitation and utilization of South Africa's mineral resources (diamonds).

David John de Smidt will ensure that the mining site is closed efficiently and cost effectively.

David John de Smidt will ensure that the operation is not abandoned but closed in accordance with the relevant requirements.

David John de Smidt will ensure that the interest of all interested and affected parties will be considered.

David John de Smidt will ensure that the all-relevant legislation regarding mine closure will be adhered to, and all relevant application procedures followed.

The management of environmental impacts:

With regard to the extension, the mitigation of all environmental impacts on all applicable aspects uses BPEO (Best practical environmental option) principles.

- Optimal utilization and maintenance of existing mine facilities in a well-planned manner.
- To take care that no new land surface, habitats of vegetation and animals are destroyed, disturbed or alienated unnecessarily.
- To contain and prevent any pollution (physical and chemical) from the mining operation within structures, facilities provided therefore.
- To ensure an effective surface run-off control system in order to deal with the separation of clean and dirty water environment.
- The sustainable and responsible utilization (re-use) of all water resources and the prevention of pollution thereof.
- The sustainable rehabilitation of the mining site (excavations, topsoil- & overburden stockpiles, rest of terrain) in order to address all environmental impacts as far as practical.

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

Mr. DJ de Smidt is the landowner of the proposed mine site therefore there is no need to notify other landowners.

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

The rehabilitation of land disturbed by the operation during the life of the mining right will be accompanied by ongoing monitoring of the

environment, until a stable state is reached. The main objectives are to have an uncontaminated, rehabilitated and safe environment, and to restore the area and habitats to a condition acceptable for obtaining a closure certificate.

Final rehabilitation of the site is expected to be within 10 years after the right has been granted and all deposits mined. Final rehabilitation will be executed systematically and will consist of the elements and procedures as listed below. More realistic closure elements will be fully determined by a Professional Mine Surveyor once the operation is active.

Dismantling of processing plant and related structures:

- The processing plant in total is expected to cover an area of ± 900 m^2, of which all should be dismantled and removed. This includes related infrastructures, equipment, machinery, screening plant, and other items used during the processing activities, such as conveyor belts, pipelines and power lines.
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition of steel buildings and structures:

- All steel buildings and structures are expected to amount to 0 m^2. These include mobile stores, workshops, offices, ablutions, water tanks, etc. Those in disuse and which cannot be sold, donated, or used for future purposes should be dismantled and removed or demolished.
- Any associated foundations associated with dismantled steel buildings and structures should also be demolished to 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition of reinforced concrete buildings and structures

- All brick buildings and concrete structures are expected to amount to ± 250 m^2. These include French drains, wash bays, refuelling depots and concrete floors. Those in disuse and which cannot be donated or used for future purposes should be demolished.

- The foundations of these buildings should also be demolished and to a depth of 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Rehabilitation of access roads

- Mine roads in total, is expected to cover an area of 10 000 m^2. After general site rehabilitation has been completed, all redundant roads should be ripped or ploughed.
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition and rehabilitation of electrified railway lines

- There are no electrified railway lines associated with the mining activities.

Demolition and rehabilitation of non-electrified railway lines

- There are no non-electrified railway lines associated with the mining activities.

Demolition of housing and/or administration facilities

- There are no other housing or administration facilities associated with the mining activities, other than those in the form of mobile containers. These were however included in the section for demolition of steel buildings and structures.

Opencast rehabilitation including final voids and ramps

- Opencasts and ramps associated with the mining activities are expected to cover 3.5ha at any time.
- In-filling of the pits should take place concurrently and by obtaining material from the closest adjacent excess material heaps;
- The topography should then be shaped to the natural contours;
- The prepared surfaces should finally be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Sealing of shafts, adits and inclines

- There are no shafts associated with the mining activities.

Rehabilitation of overburden and spoils

- The total final overburden and spoils are estimated to amount to 2 ha and includes waste dumps as well as earth walls. Pre-planning should be conducted in order decide the fate of these features. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.
- The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

Rehabilitation of processing waste deposits and evaporation ponds with pollution potential

- No processing waste deposits and evaporation ponds with pollution potential are associated with the mining activities.

Rehabilitation of processing waste deposits and evaporation ponds with no pollution potential

- The processing waste deposits on the mining area is estimated to cover an area of ± 0.3 ha. Pre-planning should be conducted in order decide the fate of this feature. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.
- The toe trenches should be backfilled by obtaining material from the closest adjacent heaps deemed appropriate for such purpose;

The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;

- For backfilled trenches the topography should be shaped to be in line with the natural contours, but where compaction occurred, the areas should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

Storm water management

Storm water runoff arising from the upper and outer slopes of the rehabilitated residue deposit should be managed to

(1) prevent uncontrolled runoff from the residue deposit, which in turn creates surface erosion and resultant damage to the cover material and could also expose deposited material;
(2) route the runoff arising from the rehabilitated residue deposit into the surrounding surface water drainage regime in a manner that would limit the creation of secondary erosion in the receiving surface water environment and/or possible damage to downstream surface infrastructure; and
(3) allow for the control routing of the runoff collected on the rehabilitated residue deposit across cut-off, seepage or solution trenches provided to handle excess contaminated seepage from the residue deposit.

Rehabilitation of subsided areas

The EAP is not currently aware of any areas of subsidence on site. However, any potential for such occurrences should be actively investigated and should be included in the rehabilitation plan, if and when such areas are identified.

General surface rehabilitation

- Final surface rehabilitation of areas disturbed by mining and related activities should be aligned to the selected final land use. General surface rehabilitation encompasses the reinstatement of natural topography, the top soiling and the re-vegetation of all those areas where infrastructure have been dismantled and removed or demolished. It also includes any industrial waste or scrap material that need to be removed from site. The total area that will need general surface rehabilitation at the time mine closure is estimated to be ± 2 ha.

River diversions

No river diversions are planned.

Fencing

It is not known at this stage if any fencing is planned.

Water management

No treatment of water will be necessary for the mining activities.

Maintenance and aftercare

Maintenance and aftercare should be planned for two to three years after mine production have ceased and should include the following:

- Annual fertilising of rehabilitated areas.

- Monitoring of surface and subsurface water quality,
- Control of alien plants, and
- General maintenance, including rehabilitation of cracks and subsidence.
- Erosion control and monitoring of the slopes of the slime's dams;

Specialist study

A screening level risk assessment should be completed by a specialist environmental practitioner during mine closure in order to ensure that all of the rehabilitation objectives have been met and that all of the potential risks have been eliminated and/or are controlled. This assessment should specifically emphasise those risks relating to river disturbances, groundwater quality and slope stabilities, but should not neglect progress made in natural vegetation restoration or success in alien invasive eradications. The current average specialist fees are estimated at R 50 000.

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

The rehabilitation plan was primarily designed with the closure objectives in mind and therefore it relates to all the various objectives as set out above in Section 1) g) 1) a) of this EMPR. In general, the main objectives are to have an uncontaminated, rehabilitated and safe environment, and to restore the mining area to a condition acceptable for obtaining a closure certificate. Each and every element in the rehabilitation plan was designed in order to meet these closure objectives.

The ultimate rehabilitation of the mining site that involves the sloping, levelling, replacement of topsoil and the seeding of an grass seed mix in areas that does not recover acceptably as agreed to by the land owner will ensure that the site could be regarded as safe for humans and animals and will also ensure that the site is stable from an erosion point of view and also ensuring that the site could be used for grazing again.

The removal of waste material of any description from the mining area and the disposal thereof at a recognised landfill facility.

- ❖ The removal of infrastructure, equipment, plant and other items from the site.

- ❖ The ripping of compacted areas to a level of 300mm and the levelling of such areas in order to re-establish a growth medium for plants (such areas will furthermore be seeded with a

vegetation seed mix adapted to reflect the local indigenous flora that was present prior to the prospecting operation, if the re-establishment of vegetation is unacceptably slow.

- The mining of alluvial diamonds and the backfilling and covering thereof with previously stored topsoil (where-after this area will also be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to the proposed operation, and seedlings protected for a period of one) if the re-establishment of vegetation is unacceptably slow.

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

The total cost to rehabilitate and mitigate the David John de Smidt Mine site as it stands currently (risking premature rehabilitation) is estimated to be R870 682 according to the DMR calculations. The detailed calculation DMR quantum is presented in Table 18. The total rehabilitation costing is based on the assumption that the mining operation will do continuous concurrent rehabilitation throughout the project.

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

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

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

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

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

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Noise and Vibration	To ensure that the legislated noise and ground vibration levels will be adhered to at all times. To control the incidence of unacceptable noise levels on site.	The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant and that which may migrate outside the plant area.	The manager during the construction phase and the responsible person (Manager / Environmental Department) during the Operational phase of the project.	Quarterly reports on fall-out noise monitoring will be conducted as required by legislation. If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.
Surface Water	To conserve water; and To eliminate the contamination of run-off.	The Orange River are the nearest source in the vicinity of the mine. The Orange River will be monitored by collecting surface water samples quarterly.	Site Manager/Water Supply	The Orange River which may be impacted by the mining activity. Monitoring takes place by collecting surface water samples every quarter. Implementation of a suitable management action plan during the operation of the proposed diamond mine, based on analysis of bi-annual water quality and biological monitoring data collected at sites upstream and downstream of all activities (measure taken out of the aquatic study by DPR); .

l) Indicate the frequency of the submission of the performance assessment report

Auditing of compliance with environmental authorisation, the environmental management programme and the closure plan should be conducted annually by an independent EAP and an Environmental Audit Report should be compiled in such a way that it meets the requirements in terms of Regulation 34 of the National Environmental Management Act 107 of 1998): Environmental Impact Assessment Regulation, 2014.
The rehabilitation plan should also be reviewed annually in order to fulfil the requirements of Section 41(3) of the MPRDA and should be conducted by an independent EAP. Subsequently, an Annual Rehabilitation Plan should be developed to meet the various requirements set out in the National Environmental Management Act (No 107 of 1998) (NEMA) Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).
These reports should be submitted annually to the Northern Cape DMR offices in Kimberley.

m) Environmental Awareness Plan

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

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

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

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

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

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

General environmental awareness training as part of the induction at the David John de Smidt operation should focus on the following:

- General environmental awareness
- The mine policies and vision concerning environmental management
- Legal requirements
- Mine activities and their potential impacts
- Different management measures to manage identified impacts
- Mine personnel's role in implementing environmental management objectives and targets

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

It is the responsibility of management to ensure that all employees, contractors and visitors are trained to understand the impacts of their tasks on the environment and to reduce them wherever possible. Environmental awareness should be part of the existing training and development plan. Key personnel with environmental responsibilities should be identified and the following principles should be applied:

- Procedures should be developed to facilitate training of employees, on-site service providers and contractors;
- Environmental awareness should focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;
- Top management should build awareness and motivate and reward employees for achieving environmental objectives;
- There should be an ongoing system of identifying training needs.
- An environmental, health and safety induction programme should be provided to all employees, contractors and visitors prior to commencing work or entering the site, and they should sign acknowledgement of the induction. An attendance register and agenda/programme should be filed for each induction.
- A daily "toolbox talk" should be held prior to commencing work, which will include discussions on health, safety and environmental considerations. The toolbox talks should be led by the site manager or the appointed supervisor/s.
- Refresher training should also be given to permanent employees and long-term contractors on an annual basis, to ensure that all are competent to perform their duties, thereby eliminating negative impacts on their safety, health and environment.

General environmental awareness training as part of the induction at the David John de Smidt project should focus on the following:

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

Environmental awareness topics to be covered in training should include:

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

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

Environmental incident reporting will be a vital part of communication in order to deal with risks and ultimately avoid pollution or the degradation of the environment. Such communication should take place through the management, administrative and worker sectors of the operation, as well as contractors and visitors. Employees should be required to report any and all environmentally related problems, incidents and pollution, so that the appropriate mitigation actions can be implemented timeously. In the event of an environmental incident, the reporting procedure as indicated in the table below should be followed.

ENVIRONMENTAL INCIDENT REPORTING STRUCTURE	ACTIONS REQUIRED
Person causing or observing the incident	The first person causing or observing the incident shall report the incident to an immediate supervisor where the environmental incident is observed.
Line management in the relevant area of responsibility where the incident occurred	Line management in the relevant area of responsibility where the incident occurred shall: • Investigate the incident and record the following information: - How the incident happened; - The reasons the incident happened; - How rehabilitation or clean up needs to take place; - The nature of the impact that occurred; - The type of work, process or equipment involved; - Recommendations to avoid future such incidents and/or occurrences; • Inform the environmental manager/ECO and the Operations Manager on a daily basis of all incidents that were reported on site; • Consult with the relevant department/person for recommendations on actions to be taken or implemented where appropriate (e.g. clean-ups). • Assist the Environmental Manager and/or Operations Manager with applicable data in order to accurately capture the incident into the reporting database; • Ensure that remediation measures are implemented as soon as possible.

Site managers	The site managers shall: • Forward a copy of the incident form to other line managers; • Forward a copy of the incident form to the Environmental manager/ECO; • Inform the relevant department/person on a weekly basis of the incident by e-mail or by submitting a copy of the incident report. Once a High Risk Incident (any incident which results from a significant aspect and has the potential to cause a significant impact on the environment) occurred it must be reported immediately to the Environmental Manager and the Operations Manager by telephone or email to ensure immediate response/action. • Forward a copy of the completed Incident Reporting Form (and where applicable a copy of the incident investigation) to the relevant department/person.
Environmental manager/ECO	The appointed environmental manager or ECO shall: • Complete an incident assessment form to assess what level of incident occurred; • Make recommendations for clean-up and/or appropriate alternate actions; • Enter actions necessary to remediate environmental impacts into the database in conjunction with the responsible line manager; • Enter the incident onto the database in order to monitor the root causes of incidents; • Include the reported incidents in an appropriate monthly/quarterly report; • Highlight all incidents for discussion at HSEC meetings.

n) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually)

According to Section 41(3) of the MPRDA the holder of a Mining right must annually assess (and revise, if necessary) the total quantum of environmental liability for the operation and ensure that financial provisions are sufficient to cover the current liability (in the event of premature closure) as well as the end-of-operation liability.

An Annual Rehabilitation Plan should be developed to match the various requirements set out in the NEMA regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).

Officials in the DMR Regional Offices are required to assess, review and approve the quantum of financial provision submitted (that is, the monetary value of the financial provision that has been computed by the holder of a prospecting right, mining right or mining permit during the annual review) as being sufficient to cover the environmental liability at that time and for closure of the site at that time.

It is hereby confirmed that the financial provision shall be reviewed annually.

2) UNDERTAKING

The EAP herewith confirms

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

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

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

d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

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Signature of the Environmental Assessment Practitioner:

Wadala Mining and Consulting (Pty) Ltd

_____

Name of Company:

Date: 29 June 2022

- END –

APPENDIX 1

DIE UNIVERSITEIT VAN DIE ORANJE-VRYSTAAT

THE UNIVERSITY OF THE ORANGE FREE STATE

HIERMEE WORD VERKLAAR DAT DIE GRAAD THIS IS TO CERTIFY THAT THE DEGREE

Magister in Omgewingsbestuur
Master in Environmental Management

TOEGEKEN IS AAN
HAS BEEN CONFERRED UPON

ROELINA HENRIËTTE OOSTHUIZEN

NADAT AAN DIE STATUTE EN REGULASIES VAN DIE UNIVERSITEIT VOLDOEN IS. AS BEWYS DAARVAN PLAAS ONS ONS ONDERSKEIE HANDTEKENINGE EN DIE SEël VAN DIE UNIVERSITEIT HIERONDER.

IN ACCORDANCE WITH THE STATUTES AND REGULATIONS OF THE UNIVERSITY. AS WITNESS OUR RESPECTIVE SIGNATURES AND THE SEAL OF THE UNIVERSITY BELOW.

VISEKANSELIER/VICE-CHANCELLOR

DEKAAN/DEAN

REGISTRATEUR/REGISTRAR

BLOEMFONTEIN
2000-09-16

APPENDIX 2

CURRICULUM VITAE

Roelina Henriette Oosthuizen

Cell: 084 208 9088

E-Mail: roosthuizen950@gmail.com

1. PERSONAL INFORMATION

Name: Roelina Henriette Oosthuizen

Surname: Oosthuizen (Maiden: Alberts)

Identity number: 7004180037082

Date of birth: 18 April 1970

Gender: Female

Marital status: Married (26 years) with 3 children

Driving license: Yes, Code EB

Languages: Fluent in Afrikaans and English

Nationality: South African

Criminal offences: None

Health: Excellent, fit

2. SYNOPSIS OF PROFESSIONAL CAREER

Roelina Henriette Oosthuizen has 22 years of experience in the environmental management field. She started her career in the area of Environmental Management and Environmental Impact Assessment (EIA) evaluation in 1997 at the Department of Minerals and Energy. After moving to industry in 2005, Roelien became involved in the practical aspects of environmental management. A major project during her early years outside of government was that of the EIA for a Game Reserve and Lodge development near Barkly-Wes, she did this project together with a consultancy firm from Kimberley AWS water solutions (Mr. Adriaan du Toit). In 2007 the Company she worked for was bought by a Canadian Group of Companies and she became more involved in practical aspects of the operations and worked closely with operations personnel in dealing with ongoing management of environmental impacts at the Mine (e.g. monitoring, auditing, operating procedures). She was also centrally involved in liaison with the authorities and with stakeholders in neighbouring areas.

During her time at the Canadian Group of Companies, Roelien was the environmental manager overseeing operations in the Barkly-West, Prieska and Douglas areas. She was responsible for preparing the environmental compliance documents for each operation which included Performance Assessments (Audit reports) and Financial Quantum submissions as well as new applications for Prospecting Rights and Mining Rights with the relevant Scoping, EIA / EMP documents. Her activities included liaison with stakeholders and also with the relevant Departments. During this time, Roelien became increasingly involved in environmental policy and strategy work, as well as the environmental aspects of corporate governance.

She has assisted a range of clients with Environmental Due Diligence audits and compliance audits. Roelien has also undertaken numerous environmental audits, particularly compliance and due diligence audits for clients in the mining industry. Thus, she is familiar with best practice standards in environmental auditing.

Roelien have also represented the South African Diamond Producers Organisation (SADPO) on the Environmental Policy Committee (EPC) at the Chamber of Mines between 2005 and 2011.

In a nutshell, Roelien has wide ranging experience and is thus well-positioned to assist clients in any matter related to sustainability and environmental management. This is achieved through her own skills base and on drawing on specialists.

3. QUALIFICATIONS

MEM (Master in Environmental Management) University of the Orange Free State (2000)
B – Comm NWU (1991)

4. TRAINING COURSES

Roelien have attended various mining and environmental conferences and seminars to stay abreast with the latest changes in legislation, legal compliance and policy positions in the sector.

October 1997	Mineral Laws Administration & Environmental Management (University of Pretoria)
July 2002	Project Management for Environmental Systems (University of the Orange Free State)
August 2004	Environmental and Sustainability in Mining Minerals and Energy Education and Training Institute (MEETI)
September 2005	Converting Old Order Rights to New Order Rights in Mining International Quality & Productivity Centre Johannesburg)
November 2006	Mine waste disposal and Achievement of Mine Closure
February 2007	Introduction to ArcGis 1
April 2010	Mining Law Update Conference (IIR BV South Africa)
November 2010	Social Labour Plans for Mining Workshop (Melrose Training)
August 2011	Mineral Resources Compliance and Reporting (ITC)
May 2012	Enviro Mining Conference 2012 (Sustainability and Rehabilitation) (Spectacular Training Conferences)
August 2012	Mineral Resources Compliance and Reporting 4th Annual (ITC)
March 2013	1st EnviroMining-Ensuring Environmental Compliance and reporting
March 2014	4th Annual EnviroMining Conference
March 2015	5th Annual EnviroMining Conference
February 2018	Seminar by the Department of Environmental Affairs on knowledge sharing workshops on the Screening Tool
October 2020	IAIAsa National symposium Webinar
August 2021	IAIAsa 2021 Virtual Conference

5. PROFESSIONAL REGISTRATION

Registered Environmental Assessment Practitioner: Number 2019/1467 at EAPASA (Environmental Assessment Practitioners Association of South Africa).
Registered as a professional at IAIAsa (International Association for Impact Assessment South Africa). IAIAsa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisations code of ethics.

6. PROFESSIONAL EXPERIENCE

Projects are listed below by area of expertise.

Environmental Management Systems (EMS) and Environmental Auditing

Development of EMS and Compilation of INCIDENT REPORT AND INVESTIGATION FORMS for the EMS of the Canadian group of Companies on various sites.

Undertaking of a range of due diligence and performance audits for operations, including those listed below:

Performance Assessment reports for a mining company with various infrastructure and mining operations near Barkly-West and Windsorton.

Performance Assessment reports for a mining company near Douglas.

Preparation of an environmental auditing checklist / protocol for a Community project with restitution ground in assisting the community to determine environmental legal compliance at their operations.

Environmental audit as part of a closure with Dr. Betsie Milne another specialist. This Annual Rehabilitation Plan has been developed to match the various requirements set out in the National Environmental Management Act (No 107 of 1998) (NEMA) Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).This project had the objective of ensuring that this company are accounting for environmental liabilities and risks adequately. The plan distinguishes between (a) those environmental rehabilitation liabilities pertaining to drilling, for which the Company was legally responsible and (b) those environmental rehabilitation liabilities pertaining to historic mining activities, for which the Company is not legally responsible, but consider performing as part of their best practice environmental principals. Three costing scenarios were explored in order to evaluate the most feasible rehabilitation plan, i.e. (1) Total cost (worst-case scenario) including risks, (2) legally required cost and (3) features currently available that do not involve any risks.

Sustainability projects: policies, guidelines, strategies and performance reporting

Involved in the compilation of 43-101 technical documents for listed companies which included information on sustainability and performance in rehabilitation and sustainable mining.

Alien species eradication project guideline and strategy near Barkly-Wes in terms of Regulations that have been promulgated in terms of the Conservation of Agricultural Resources Act, No. 43 of 1983 further make it unlawful to allow various species of weeds and invader plants to grow. The target species was Wild tobacco (declared weed), Pink Tamarisk (declared weed) and Mexican poppy, it also involved the community for job creation and training (2008).

Investigations for a Company near Prieska on Development of a biodiversity offsets policy for the applications for forestry tree licences for protected tree species.

Strategic Environmental Studies and Environmental Impact Assessment (EIA)

Undertaking of a Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2006 for a Private Individual which involved the proposed extension of a roof over an existing deck with two wood pillars by means of the excavating of 0.5m X 0.5m X 1m X 2 (½m^2) OF SOIL WITHIN 100M OF THE HIGH WATER MARK OF THE SEA. A Positive Record of Decision (ROD) Granted (2010).

Undertaking of an ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENTAL MANAGEMENT PROGRAMME SUBMITTED FOR AN APPLICATION FOR A MINING RIGHT IN

TERMS OF SECTION 39 & OF REGULATION 50 & 51 OF THE MPRDA, 2002 (ACT NO. 28 OF 2002) near Boshof for a kimberlite Diamond Mining Company (2015)

Undertaking of a strategic environmental review and amendment for a Chinese group of Companies near Postmasburg. The study provided baseline environmental information and a high-level review of the potential impacts of various components of the development (2014 – 2016). Roelien worked as a member (EAP) of a large team consisting of a project Coordinator, attorneys, water specialists, other specialist and an engineer.

Environmental Impact Assessments for various developments including the proposed mining project for the former retrenchees of De Beers in Kimberley. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialist with contributions of specialist reports to compile the EIA EMP report (2017). Roelien worked as a member (EAP) of a team consisting of De Beers (attorneys and environmentalists), the retrenchees, the appointed contractor, EKAPA, and specialist appointed for the studies.

Environmental Impact Assessments for a Salt operation near Upington. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialists with contributions of specialist reports to compile the EIA EMP report (2019). Roelien also worked as part of a team with the Company and another consultant that started with the Water Use Licence application. The public participation was done to include the water use activities.

Environmental Impact Assessment for a change in scope of a prospecting right application consisting of the sole and exclusive right to prospect for iron, silver, zinc, copper and sulphur ore. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialists with contributions of specialist reports to compile the EIA EMP report (2019). Roelien also worked as a member (EAP) of a team consisting of the directors of the company and specialists appointed for the studies

7. CAREER PATH

01 April 1997 to 28 February 2005
DEPT OF MINERALS & ENERGY
Senior Environmentalist - Assistant Director Environment

MAIN JOB FUNCTIONS

- Collect analyse and interpret information regarding the measurement of impacts of mining operations on the environment, the rehabilitation of land surfaces.
- The prevention, control and combating of pollution.
- Co-ordinate and prioritise the rehabilitation of derelict and ownerless mines.
- Co-ordinate, investigate, audit and resolve environmental problems in conjunction with the Department of Water Affairs and Forestry, Department of Agriculture and the provincial Department of Tourism, Environment and Conservation.
- Address complaints and inquiries received from the public and mining industry.
- Consult with relevant authorities and interested and affected people regarding the approval of Environmental Management Programmes.

- Ensuring that rehabilitation standards are applied.
- Ensuring that the requirements stated in Environmental Management Programme Reports are adhered to.
- Conduct inspections and recommendations on mines that apply for closure.
- Evaluate mining licences and prospecting applications and recommend site-specific conditions according to legislative requirements.
- Constant liaison with the public, the mining industry and other government authorities on environmental matters, legislation and agreements.
- Influence new development processes through participation in the EMPR and EIA processes and give guidance through education and awareness programmes.
- Calculate and verify financial provision for outstanding rehabilitation.

01 March 2005 – 30 September 2012
Appointed as professional Mineral Law Administration and Environmental Manager for HC van Wyk Diamonds which was bought over in 2007 by a **Canadian group of Companies.**

MAIN JOB FUNCTIONS

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.
Undertaking of environmental reviews, audits and management plans:
Formulation of an environmental policy and guidelines for the Group.
Participation in the development of the budget for environmental expenditure.
Co-ordination of technical studies (e.g. monitoring of groundwater quality).
Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. Forestry Licences and water sampling for Water Use Licences).
Development of environmental guidelines for contractors on sites.
Liaison with regulatory authorities on compliance with environmental legislation.
Documentation of environmental incidents.
Environmental awareness and training.
Development of a public participation strategy.
Formulation of a complaint's procedure.

01 October 2012 to 29 February 2020
Appointed as professional Mineral Law Administration and Environmental Manager for **Mentor Trade and Investments Pty Ltd**

MAIN JOB FUNCTIONS

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.
Undertaking of environmental reviews, audits and management plans.
Formulation of an environmental policy and guidelines for the Mine.
Co-ordination of technical studies (e.g. monitoring of groundwater quality) as well as updating of the Mine's IWWMP.
Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. as water sampling and effluent).

Development of environmental guidelines for contractors.
Liaison with regulatory authorities on compliance with environmental legislation.
Documentation of environmental incidents.
Environmental awareness and training.
Development of a public participation strategy.
Formulation of a complaint's procedure.

01 March 2020 to Present full time
Appointed as EAP on projects for ***Wadala Mining and Consulting Pty Ltd***

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.
Undertaking of environmental reviews, audits and management plans.
Liaison with regulatory authorities on compliance with environmental legislation.
Environmental awareness and training.

APPENDIX 3

PUBLIC PARTICIPATION

APPENDIX 4

HERITAGE IMPACT ASSESSMENT REPORT

APPENDIX 5

PALAEONTOLOGICAL ASSESSMENT REPORT

APPENDIX 6

ECOLOGICAL ASSESSMENT REPORT