WASTE MANAGEMENT LICENSE

BASIC ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PROGRAMME

NCS 30/5/1/3/2/ (10646) MEM

May 2018

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BRAAF
ENVIRONMENTAL PRACTITIONERS

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GLOSSARY

Phrase	Definition
Air pollution	Any change in the composition of the air caused by smoke, soot, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances.
Aquifer	A geological formation which has structures or textures that hold water or permit appreciable water movement through them.
Community	A Coherent, social group of persons with interests or rights in a particular area of land which the members have or exercise communally in terms of an agreement, custom or law (MPRDA).
Effluent	Any liquid, whether or not containing matter in solution or suspension
Environment	The surroundings within which humans exist and that are made up of - (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv)the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing (NEMA).
Environmental Assessment Practitioner	The individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management plans or any other appropriate environmental instruments introduced through regulations (NEMA, Ch. 5).
Environmental Impact Assessment	Means a systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&EIR (NEMA).
General waste	Waste that does not pose an immediate hazard or threat to health or to the environment, and includes - a. Domestic waste; b. Building and demolition waste; c. Business waste; and d. Inert waste.
Hazardous waste	Any waste that contains organic or inorganic elements of compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.
Interested and Affected Party	Any person, group of persons or organisation interested in or affected by such operation or activity; and any organ of state that may have jurisdiction over any aspect of the operation or activity (NEMA, Ch. 5).

Pollution	The direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it- a. less fit for any beneficial purpose for which it may reasonably be expected to be used; or b. harmful or potentially harmful- i. to the welfare, health or safety of human beings; ii. to any aquatic or non-aquatic organisms; iii. to the resource quality; or iv. to property.
Stakeholder	Persons or groups who are affected by or can affect the outcome of a project (e.g. commercial / industrial enterprises, academics, religious groups, media, NGOs, etc.).
Sewage	Waste water, industrial and commercial effluent, standard domestic effluent (soil water) and other liquid waste, either separately or in combination, but does not include stormwater.
Sewage disposal system	The structures, pipes, valves, pumps, meters or other appurtenances used in the conveyance of sewage through the sewer reticulation system and treatment thereof at a sewage treatment plant under the control of the Council or its authorised provider and which may be used by it in connection with the disposal of sewage.
State Department	Means any department or administration in the national or provincial sphere of government exercising functions that involve the management of the environment (NEMA, Chapter 1).
Stormwater Waste	Any liquid resulting from natural precipitation or accumulation and includes rainwater, spring-water and ground-water.
	Any substance, whether that substance can be reduced, reused, recycled and recovered – a. that is surplus, unwanted, rejected, discarded, abandoned or disposed of; b. which the generator has no further use of for the purposes of production; c. that must be treated or disposed of, or d. that is identified as waste by the Minister by notice in the Gazette, e. and includes waste generated by the reclamation / re-processing operation, medical or other sectors, but a by-product is not considered waste, and any portion of waste, once re-used, recycled and recovered, ceases to be waste any portion of waste, once re-used, recycled and recovered, ceases to be waste.
Water resource	Includes a watercourse (see definition), surface water, estuary, or aquifer.
Watercourse	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, e. And a reference to a watercourse includes, where relevant, its bed and banks.

ABBREVIATIONS

Abbreviation / Acronym	Description
CA	Competent Authority
DMR	Department of Mineral Resources
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EM PR	Environmental Management Program
I&AP	Interested and Affected Party
IWWM P	Integrated Water and Waste Management Plan
IWUL	Integrated Water Use Licence
IHI	Index of Habitat Integrity
kit	Kilotonnes (1000 tonnes)
Kt / m	Kilotonnnes per month
M VA	Megavolt Ampere
Mt	Million tons
M PRDA	Minerals and Petroleum Resources Development Act 28 of 2002
NEMA	National Environmental Management Act 107 of 1998
NEM WA	National Environmental Management: Waste Act 59 of 2008
NWA	National Water Act 36 of 1998
NCDENC	Northern Cape Department of Environment and Nature Conservation
PCD	Pollution Control Dam
PES	Present Ecological Status
PGE	Platinum Group Elements
PGM	Platinum Group Metals
RHP	River Health Programme
RLM	Richtersveld Local Municipality
SEP	Stakeholder Engagement Plan
SIA	Social Impact Assessment
t	Tonnes
TSF	Tailings storage facility
WUL	Water Use License

PART A
Scope of Assessment and Basic Assessment Report

1 CONTACT PERSON AND CORRESPONDENCE ADDRESS

1.1 Details of the EAP

The details and role of the environmental assessment practitioners (EAPs) that were involved in the preparation of this Basic Assessment Report and Environmental Management Programme Report are provided in Table 1-1 below. Braaf Environmental Practitioners does not have any interest in the project other than fair payment for consulting services rendered as part of the environmental assessment process.

Table 1-1: EAPs Details

Name of The Practitioner:	**Olivia Braaf**
Tel No.:	0860 111 382
Fax No.:	086 658 7676
e-mail address:	olivia@braafsa.com

1.2 Expertise of the EAP

Braaf Environmental Practitioners has been involved in over 300 environmental applications, both nationally and internationally. Key sectors of Braaf's work include renewable energy, infrastructure, natural resource management, mining, industrial development and oil and gas and compliance monitoring. Braaf's environmental assessments are conducted with national legal requirements as well as those of international agencies such as the World Bank (Equator Principles), International Finance Corporation and World Health Organisation.

(1) The qualifications of the EAP

(with evidence).

Olivia Braaf: Honours Degree in Marine Zoology (UWC) and Bsc Degree (Zoology and Botany)

(2) Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

Olivia Braaf is the Managing Director of Braaf Environmental Practitioners. She holds an Honours Degrees in Zoology and has over 15 years of relevant experience in the assessment of impacts in EIAs and mining operations. She is a member of the IAIA in South Africa. Proof of registrations of the relevant practitioners is provided and her relevant curriculum vitae is attached (see Appendix A).

2 LOCATION OF THE OVERALL ACTIVITY

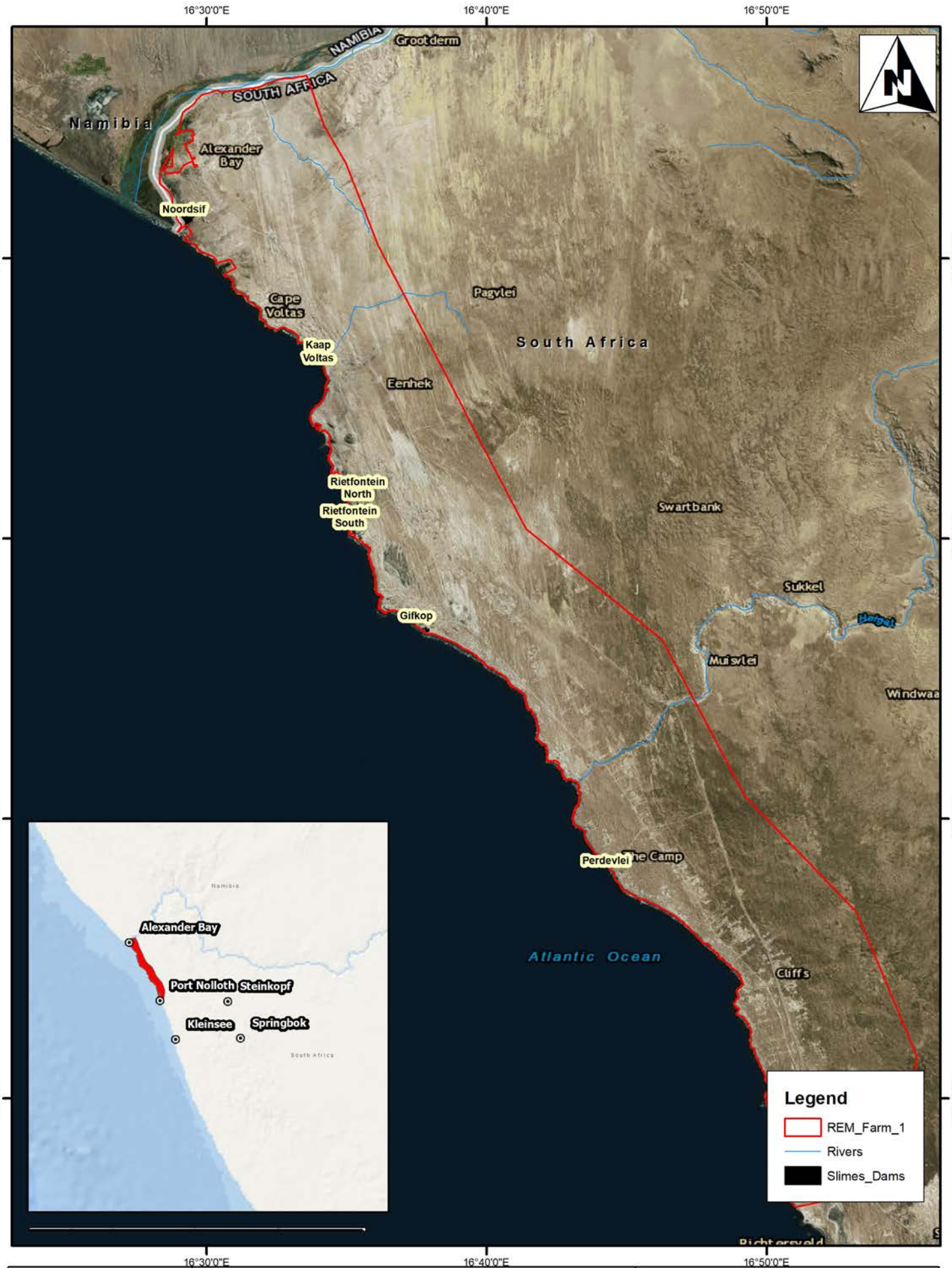
The application area is located on Remainder of Farm 1 on the southern bank of the Orange River at the mouth and stretching some 12 km eastward along the southern bank of the Orange River along the southern border of Namibia. The mine (Alexkor Mine Area) is located close to the town of Alexander Bay. The high tailings dumps are visible from the R382, Port Nolloth – Alexander Bay road. From the Orange River mouth, it stretches for 100km south to some 13km south of Port Nolloth.

Access will be taken using the existing Alexkor mine access roads. All these roads are gravel and in good condition. Access to the deposits will be via the existing internal mine roads (see Figure 1).

Farm Name:	RE Farm 1, Namaqualand RD
Application area (Ha)	~201 ha
Magisterial district:	Namaqualand within the Richtersveld Local Municipality
Distance and direction from nearest town	The tailings/slimes stockpiles to be reprocessed lies along the Northern Cape coastline south of Orange River, between Alexander Bay and Port Nolloth up to 81 km north of Port Nolloth.
21-digit Surveyor General Code for each farm portion	C05300000000000100000
Extent	70 672,21 hectares

3 LOCALITY MAP

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



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RE-MINING OF EXISTING TAILINGS STORAGE FACILITIES
REMAINDER OF FARM 1, NAMAQUALAND RD (ALEXANDER BAY)

Locality Map

GCS_WGS_1984			
Scale:	1:329 348		
Date	24.01.2018	Compiled By:	OB
Project No:	180111	Fig No.	1

3.1 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

Mining has taken place on the area by Alexkor since 1928 by means of dry strip mining, where overburden is removed and placed on overburden dumps next to the boxcut. Diamond-bearing gravels were excavated and transported to the closest of any of the eight processing plants where diamonds were extracted. The waste material was discarded on large coarse tailings dumps and slimes dams. During the Life of Mine (LOM) some 180Mt of tailings and slimes have been accumulated at the processing plants in the Alexkor concession area.

The Vast Minerals project is located within the Alexkor Mining area on Remainder of Farm 1, close to the town of Alexander Bay in the Northern Cape Province. The project area falls within the Richtersveld Local and Namakwa District municipalities, within Ward 2.

On 7 December 2017, Vast Minerals applied for a Waste Management License (NCS 30/5/1/3/2/ (10646) MEM) over Remainder of Farm 1, Namaqualand RD in order to reprocess the slimes dams (refer to Figure 3) dams known as:

- Noordsif (refer to Figure 4);
- Kaap Voltas (refer to Figure 5);
- Giftkop (refer to Figure 6);
- Rietfontein South (refer to Figure 7);
- Rietfontein -North (refer to Figure 8); and
- Perdevlei (refer to Figure 9).

It is Vast Minerals intention to reprocess the slimes dams and extract the heavy minerals, once a waste management license (WML) is granted, and to aid in the rehabilitation of these areas and others as identified by Alexkor through agreement and consultation between the two parties during the operational phase.

Before the WML will be granted, Vast Minerals must undertake an authorisation process as a Basic Assessment in terms of NEMA. The competent authority for the environmental authorisation process is the Northern Cape Department of Mineral Resources (DMR).

SITE INFRASTRUCTURE:

Construction phase

The main road, the R382 Port Nolloth – Alexander Bay road will be used to access the site, where there is an existing road leading to the mining area. Site infrastructure will include a chemical toilet and waste bin, and no buildings will be erected on site. Existing plant buildings will be used to establish the Vast Mineral Sands operations on Farm REM 1. Mining equipment will be standard excavators, Articulated Dump Trucks (ADT's) and front-end loaders. Processing equipment includes screening and gravity separation equipment, with magnetic separation done in the final recovery plants. The areas used for facilities or equipment will be rehabilitated post-mining operations by maintaining the general topography of the area, ensuring that there are no remnants of the structures.

Operational phase

Vast Minerals proposes to mine the slimes dams using a bench strip mining method typically used in dry mining operations in the mineral sands industry. At the proposed run-off-mine ("ROM") feed rate of 900t/h, three large excavators will deliver the ore to a 900t/h screening unit plant ("SUP") via skid-mounted feeding-bin/sump units. The feeding-bin/sump units receive the dry ROM material and a volume of water to slurry the ROM material in the bin before gravitating into the sump from where it is pumped to the SUP acting as a primary screening plant.

Ore mining will take place at the different slimes dam localities in the mine delivering different types of ROM materials to the SUP for the separation of oversize material and undesired particle size components. This allows the reduction of the overall volume of plant feed material that is to be pumped to the secondary screening and Wet Concentrator Plant (WCP) located off the slimes dam, just east of the existing plant structures and buildings at Noordsif. The existing plant infrastructure footprint and remaining structures will be used at the Noordsif and Rietfontein South Plants as slimes are processed from area to area.

Ore mining will be supported by a fleet of loaders, excavators and trucks moving oversize removal and re-handling from the dumps and slimes dams. Zero strip ratios will allow the ore mining fleet to also service the rehabilitation work.

The slurried ore from the feeding bins will be combined at the SUP that will screen coarse oversize gravel (>25mm), with undersize material fed to a sump. The undersize from the sump is further slurried and pumped to the secondary screening and Wet Concentrator Plant (WCP). The oversize gravel will then be piled onto a tailings dump by means of an overland conveyor onto the elongated dump building, parallel to the areas identified for rehabilitation.

The heavy minerals, contained in a concentrate will be slurried and pumped to the Mineral Separation Plant (MSP) for separation by means of magnetic separation using a wet, high intensity, magnetic separator (WHIMS) to separate the magnetic opaque minerals (ilmenite, magnetite and haematite) from the non-magnetic VHM's, zircon, rutile and monazite. The zircon, rutile and monazite concentrate will be bagged in 1ton woven polypropylene bulk bags before shipping to the respective markets.

Decommissioning phase

Tailings remaining after mineral processing, once process water has been recovered will initially be pumped into an off-path tails dam, and later co-disposed with sand and gravel tails into the areas to be rehabilitated.

Closure and rehabilitation of the Vast Minerals mine area will be undertaken when the project ceases operation. At the end of the project life cycle, once the pit areas have been infilled, the soil will be ripped, fertilised and re-vegetated.

Post-closure monitoring will assist in determining the success of the rehabilitation and identify whether any additional measures need to be taken to ensure the area is restored to a reasonable and acceptable condition.

3.2 Listed and specified activities

Table 3-1: Listed activities associated to the project

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY HA OR m²	APPLICABLE LISTING NOTICE AND NUMBER
Reprocessing of slimes dams	201 ha	Waste Licence in terms of the National Environmental Management Waste Act, (Act No. 59 of 2008, NEM:WA)- GN. No. R633, Activity 15

3.3 Description of the activities to be undertaken

Survey data from Alexkor and in-house measurements gave a conservative resource value of some 47 million tonnes coarse tailings and slimes dam deposits at the project site. It is anticipated that the project will run for approximately 17 years. Slimes will be reprocessed to extract the following minerals:

Mineral /Commodity	Code	Type Code
Heavy Minerals (General)	HM	HM
Rutile (Heavy Mineral)	Rt	HM
Ilmenite (Heavy Mineral)	Il	HM
Zircon (Heavy Mineral)	Zr	HM
Monazite (Heavy Mineral)	Mz	HM
Leucoxene (Heavy Mineral)	Lx	HM

The heavy mineral industry of South Africa is characterised by two major products:

1. Ilmenite and rutile as feedstocks for the TiO_2 pigment, titanium metal and welding electrode industries and;
2. Zircon as feedstock for the ceramic, foundry, refractory and chemical industries.

Low-grade titanium ores can be processed to form titanium slag. As a by-product of the titanium slag industry, pig iron is extracted in large quantities. Monazite from placers does not constitute valuable minerals in South African mining operations at present. Owing to an increasing demand for rare-earth elements and concomitant escalating prices, the inclusion of monazite is a high possibility. At present zircon is the

most valuable component and thus high zircon sands are the most valuable. Thereafter follows rutile and then ilmenite in terms of value given to the ore. Extraction and reprocessing activities will take place over Remainder of Farm 1 at the following slimes dams:

Table 3-2: Extent of Slimes Dams

Slimes Dam	Total Area (ha)
Noordsif Plant	103
Kaap Voltas Plant	20
Rietfontein North	23
Rietfontein South	20
Gifkop Plant	5
Gifkop (South)	19
Perdevlei Plant	9
Total Area (ha)	**201**

3.3.1 Mining

The proposed mining technique is a bench strip mining method typically used in dry mining operations in the mineral sands industry. Mining will commence with the excavation of an initial pit to expose the ore and create a mine face. As the pit advances, a 3m high bench will be created along the edge of the slimes dam. At the slimes dam two mining units will be working from two opposite sides of the slimes dam, one starting in the north-eastern and one at the south-western extremes of the dam.

At the proposed run-off-mine ("ROM"), large excavators will deliver the ore to a 900t/h screening unit plant ("SUP") via skid-mounted feeding-bin/sump units, two at the slimes dam. The feeding-bin/sump units receive the dry ROM material and a volume of water to slurry the ROM material in the bin before gravitating into the sump from where it is pumped to the SUP acting as a primary screening plant (Figure 2).

Ore mining will be supported by a fleet of loaders, trucks and excavators and two 50t trucks. Zero strip ratios will allow the ore mining fleet to also service the rehabilitation work. The slurried ore from the feeding bins will be combined at the SUP that will screen coarse oversize gravel (>25mm), with undersize material fed to a sump. The undersize from the sump is further slurried and pumped to the secondary screening and Wet Concentrator Plant (WCP). The oversize gravel is piled onto a tailings dump by means

of an overland conveyor onto the elongated dump building, parallel to the area to be rehabilitated.

Maximum pumping distance from the SUP to the wet concentrator is 1,180m, a distance that will be handled by the pumps without any difficulty. This will ensure that the WCP is not moved during the entire LOM of the operation.

3.3.2 Primary Processing

The slurried ore from the SUP will be screened at the WCP into three fractions, with the -0,3mm to +50µm fraction being sent to the heavy mineral separation gravity and magnetic separation circuits.

Cyclone underflow slimes and -1 to +0.3 mm fractions will be pumped to the areas to be rehabilitated with the gravity separation tailings, where the sediment will be dewatered by means of a stacker cyclone. The diamonds will be recovered in a XMS gravity and x-ray sorting plant and the -0,3 mm to +50µm fraction will report to a two-stage gravity circuit comprising a Reflex Classifier and four stages of spiral separators, which will separate sand from the heavy minerals. Tailings from the WCP, XMS and cyclone overflow will report to a deep cone thickener for recovery of process water. Thickened underflow (mainly slimes) will be pumped initially into an off-path tails dam, and later co-disposed with sand and gravel tails into the areas to be rehabilitated[1].

Processing water for slurrying will be supplied by a large reservoir on the high ground east of the plant. The WCP will be supplied by a process water dam near the WCP. Sea water will have to be piped overland over 2km from an existing well field on the nearby beach to provide the process water[2]. The heavy minerals, contained in a concentrate will be slurried and pumped to the Mineral Separation Plant (MSP) for separation by means of magnetic separation using a wet, high intensity, magnetic separator (WHIMS) to separate the magnetic opaque minerals (ilmenite, magnetite and haematite) from the non-magnetic VHM's, zircon, rutile and monazite. The zircon, rutile and monazite concentrate will be bagged in 1ton woven polypropylene bulk bags before shipping to the respective markets.

[1] Vast as part of this operation will reprocess the tailings to extract diamonds on behalf of and in agreement with Alexkor. Hence existing infrastructure will be used to achieve the latter and heavy mineral sand extraction aided by new plant equipment where required. It is important to remember that reprocessing will take place on existing tailings dams which will be rework in aid of future rehabilitation.
[2] No water will be discharged to the sea.

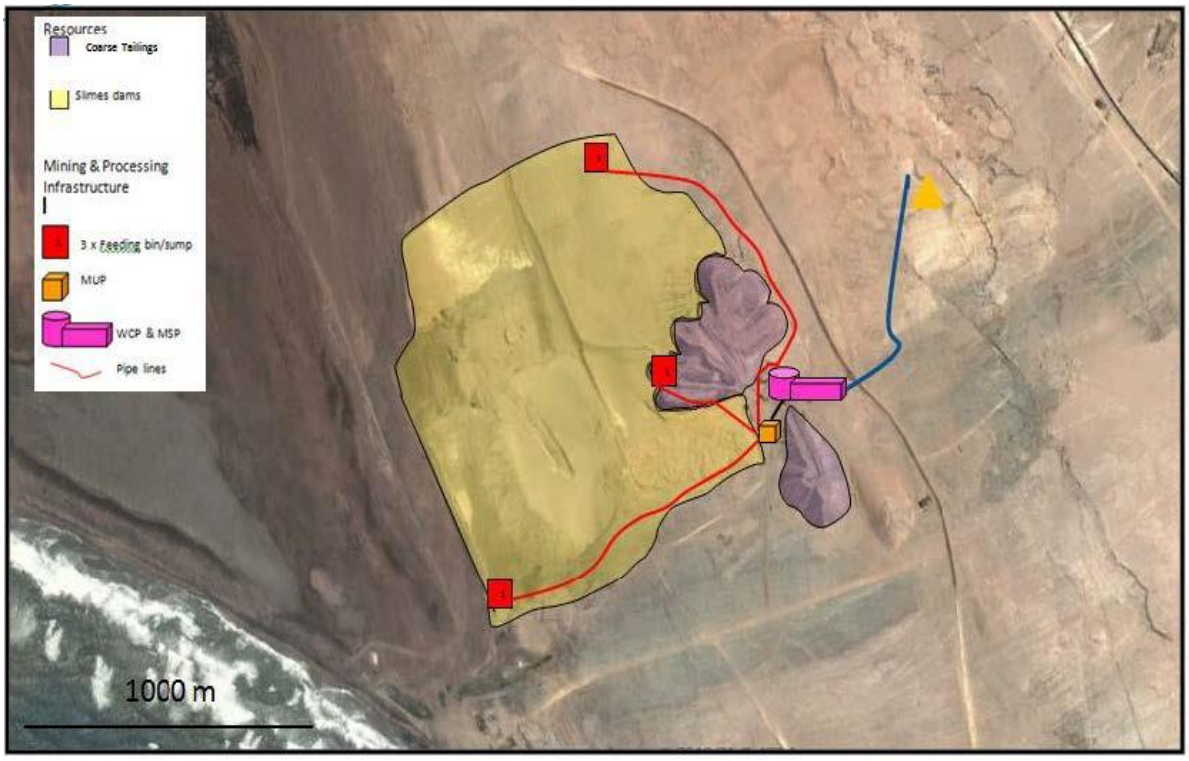

Figure 2: Schematic mine plan and processing plant layout

16°30'0"E
16°40'0"E
16°50'0"E
28°40'0"S
28°50'0"S
29°0'0"S

Alexander Bay
Noordsif
Kaap Voltas
Rietfontein North
Rietfontein South
Gifkop
Perdevlei

Legend

REM Farm 1

Slimes Dams

- Gifkop
- Kaap Voltas
- Noordsif
- Perdevlei
- Rietfontein North
- Rietfontein South

Figure 3: Slimes Dam Locations

0 2 4 8 12 16 Kilometers

1:237 493

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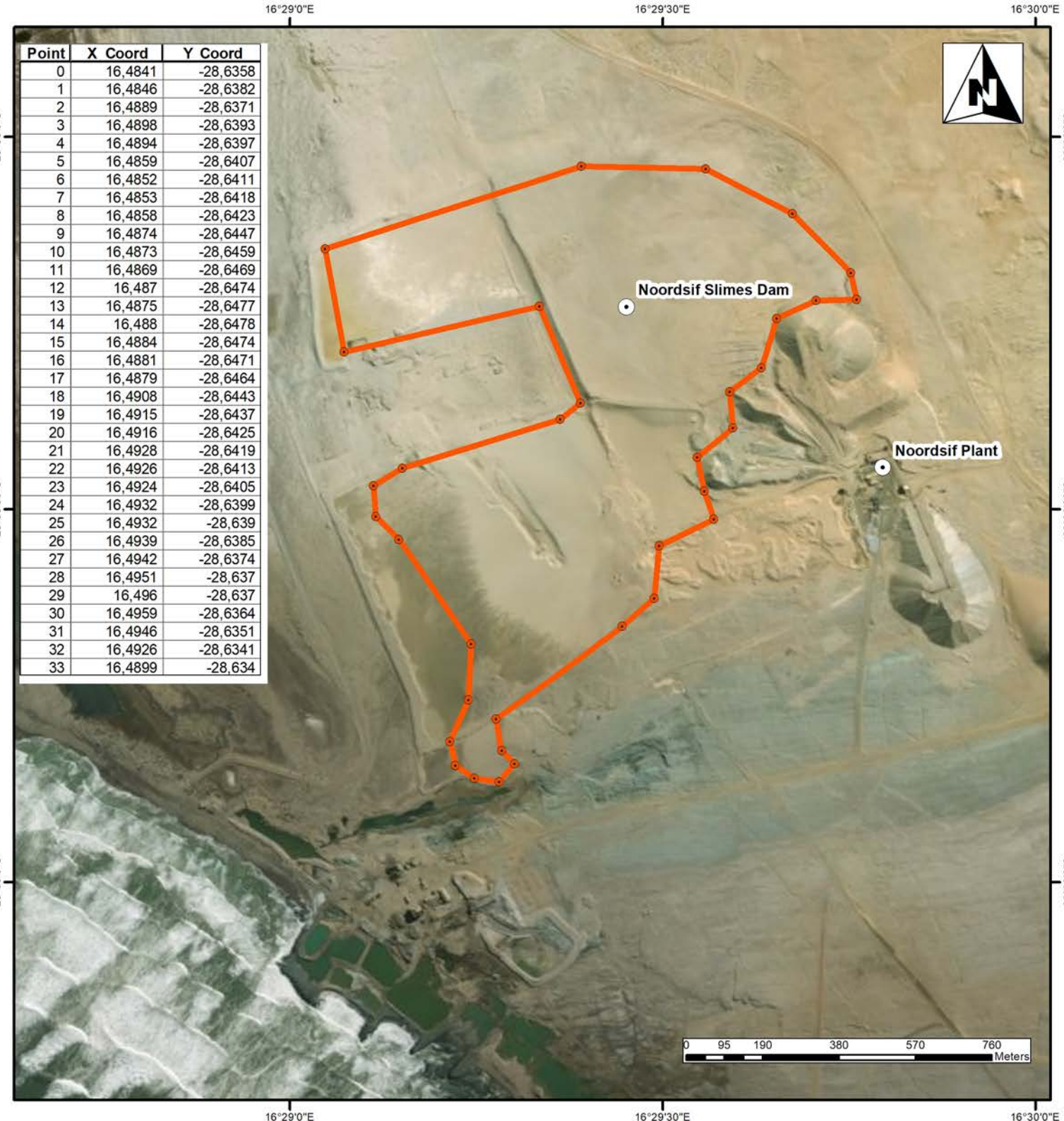

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22	16,4926	-28,6413
23	16,4924	-28,6405
24	16,4932	-28,6399
25	16,4932	-28,639
26	16,4939	-28,6385
27	16,4942	-28,6374
28	16,4951	-28,637
29	16,496	-28,637
30	16,4959	-28,6364
31	16,4946	-28,6351
32	16,4926	-28,6341
33	16,4899	-28,634

Legend

Slimes Dam

Noordsif

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Noordsif Slimes Dam

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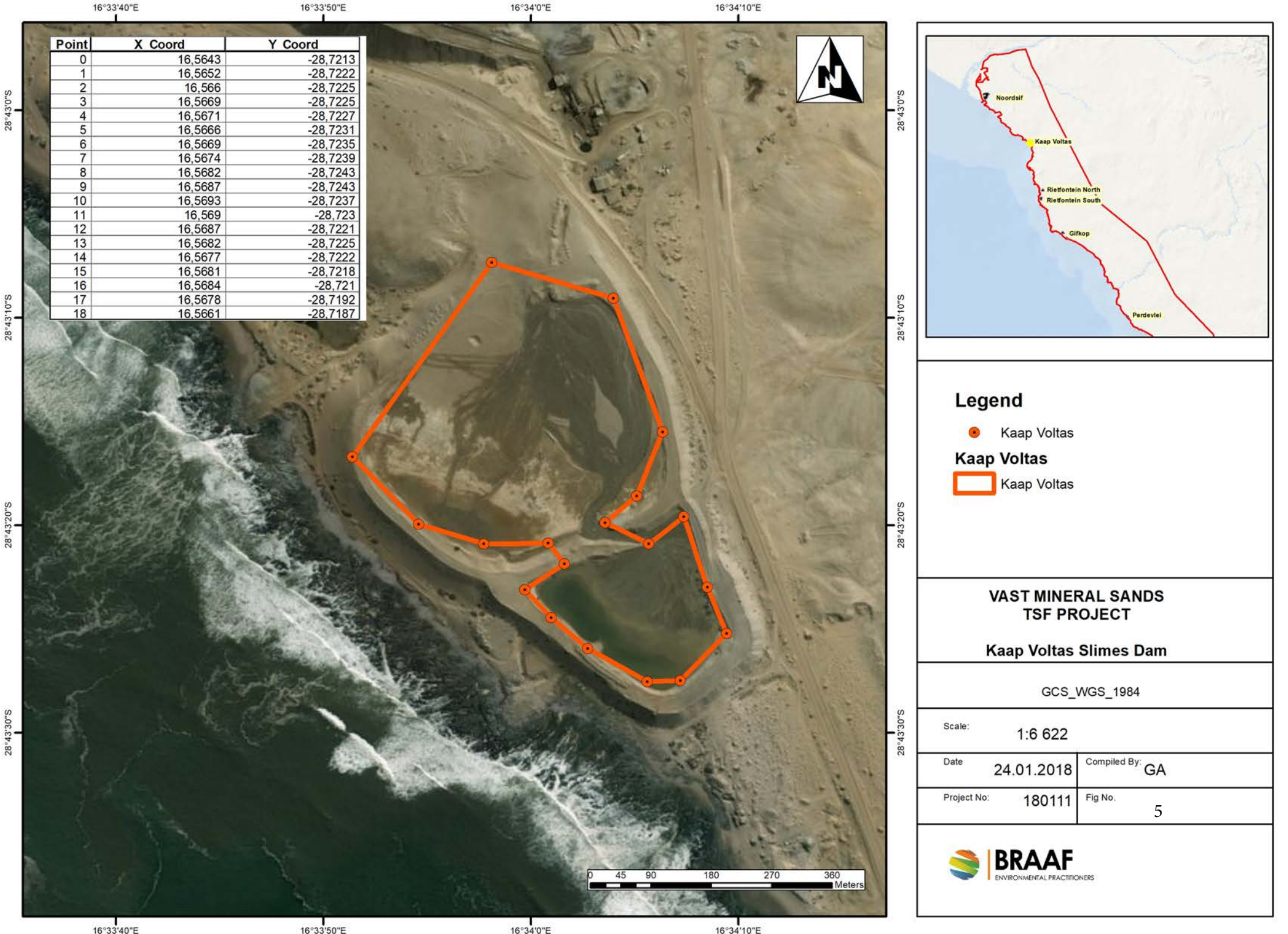

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6	16,5669	-28,7235
7	16,5674	-28,7239
8	16,5682	-28,7243
9	16,5687	-28,7243
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12	16,5687	-28,7221
13	16,5682	-28,7225
14	16,5677	-28,7222
15	16,5681	-28,7218
16	16,5684	-28,721
17	16,5678	-28,7192
18	16,5661	-28,7187

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Kaap Voltas Slimes Dam

GCS_WGS_1984

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Date: 24.01.2018

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Fig No. 5

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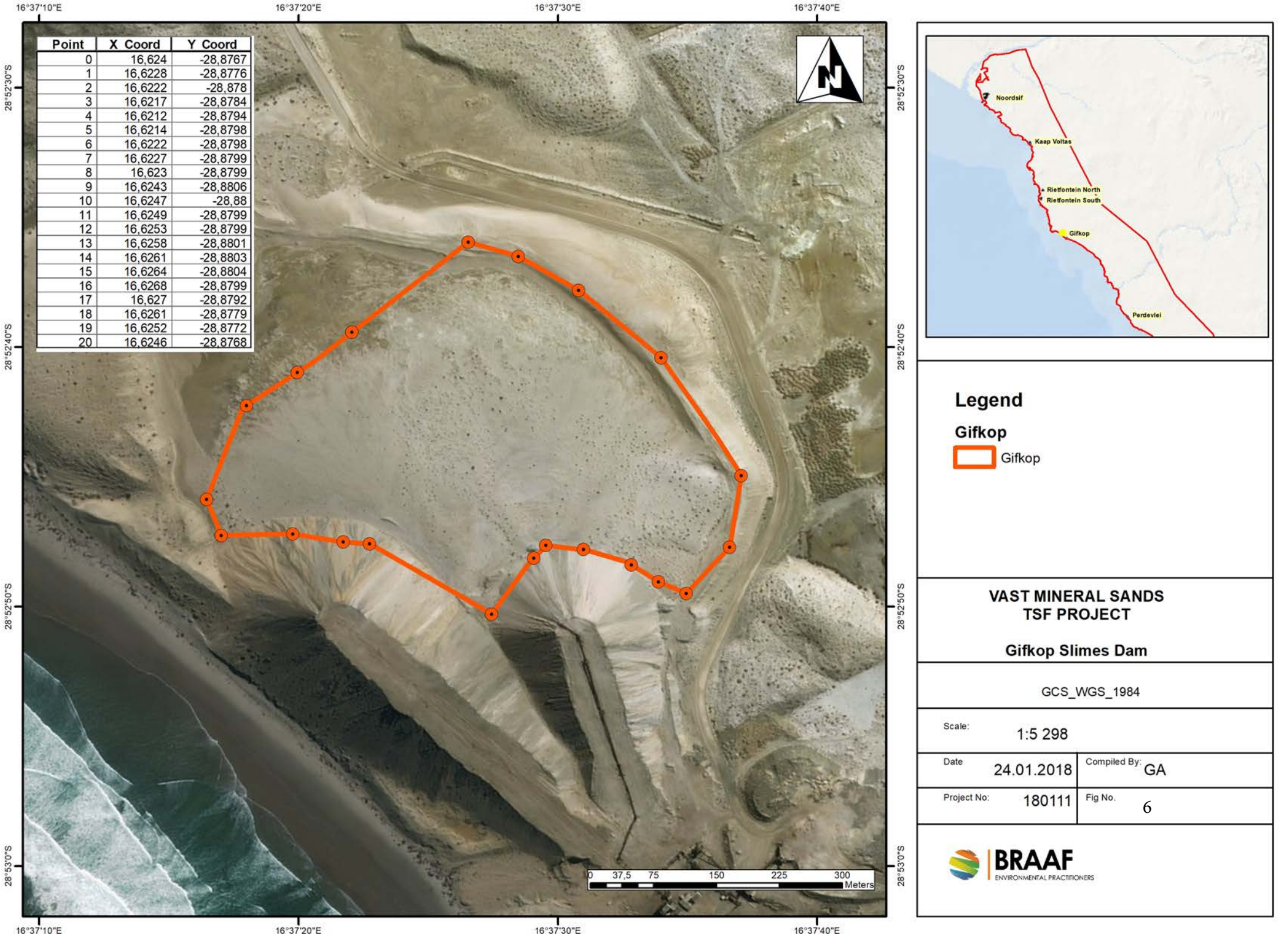

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7	16,6227	-28,8799
8	16,623	-28,8799
9	16,6243	-28,8806
10	16,6247	-28,88
11	16,6249	-28,8799
12	16,6253	-28,8799
13	16,6258	-28,8801
14	16,6261	-28,8803
15	16,6264	-28,8804
16	16,6268	-28,8799
17	16,627	-28,8792
18	16,6261	-28,8779
19	16,6252	-28,8772
20	16,6246	-28,8768

Legend

Gifkop

Gifkop

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Gifkop Slimes Dam

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Fig No. 6

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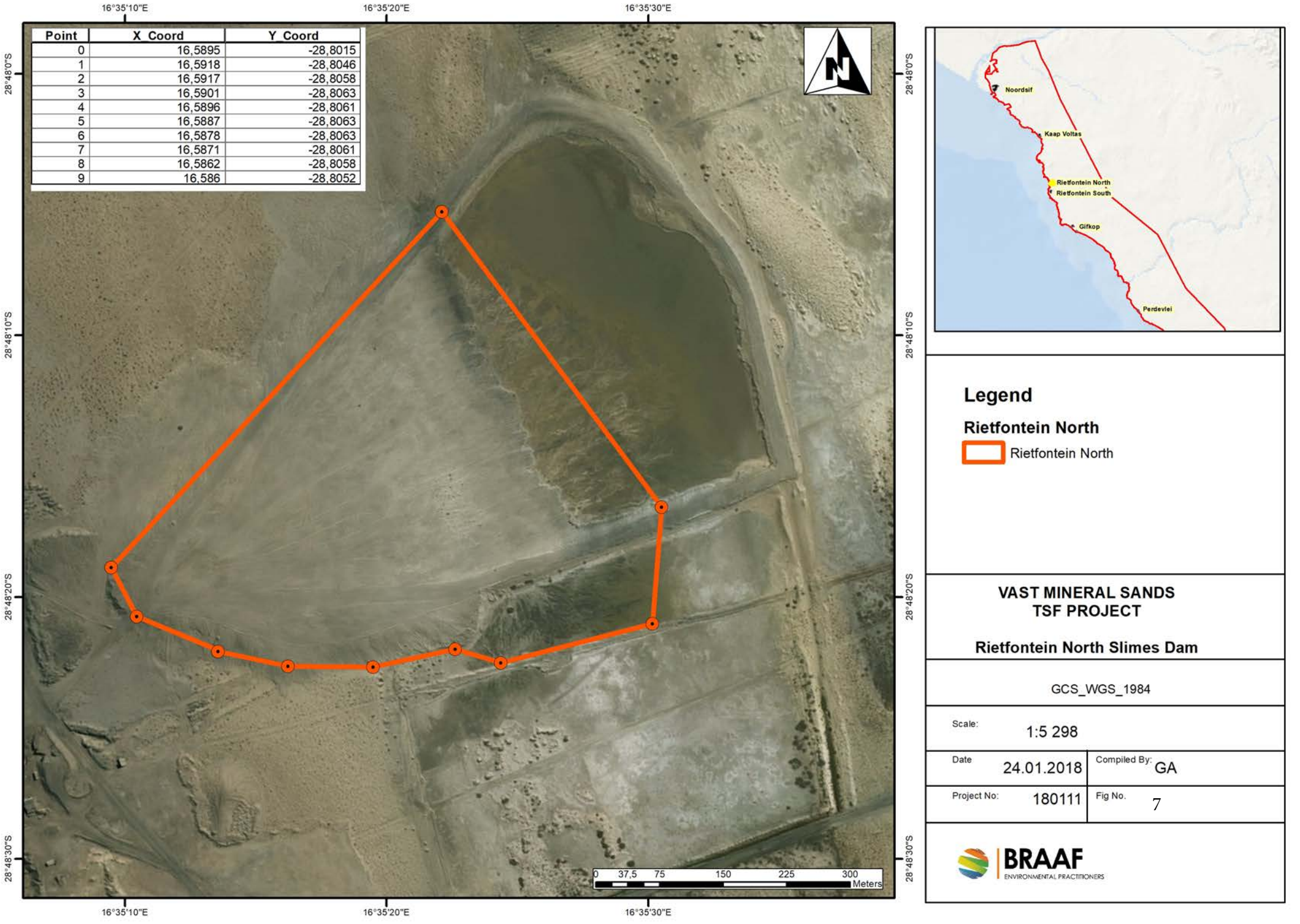

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5	16,5887	-28,8063
6	16,5878	-28,8063
7	16,5871	-28,8061
8	16,5862	-28,8058
9	16,586	-28,8052

Legend

Rietfontein North

Rietfontein North

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Rietfontein North Slimes Dam

GCS_WGS_1984

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Fig No. 7

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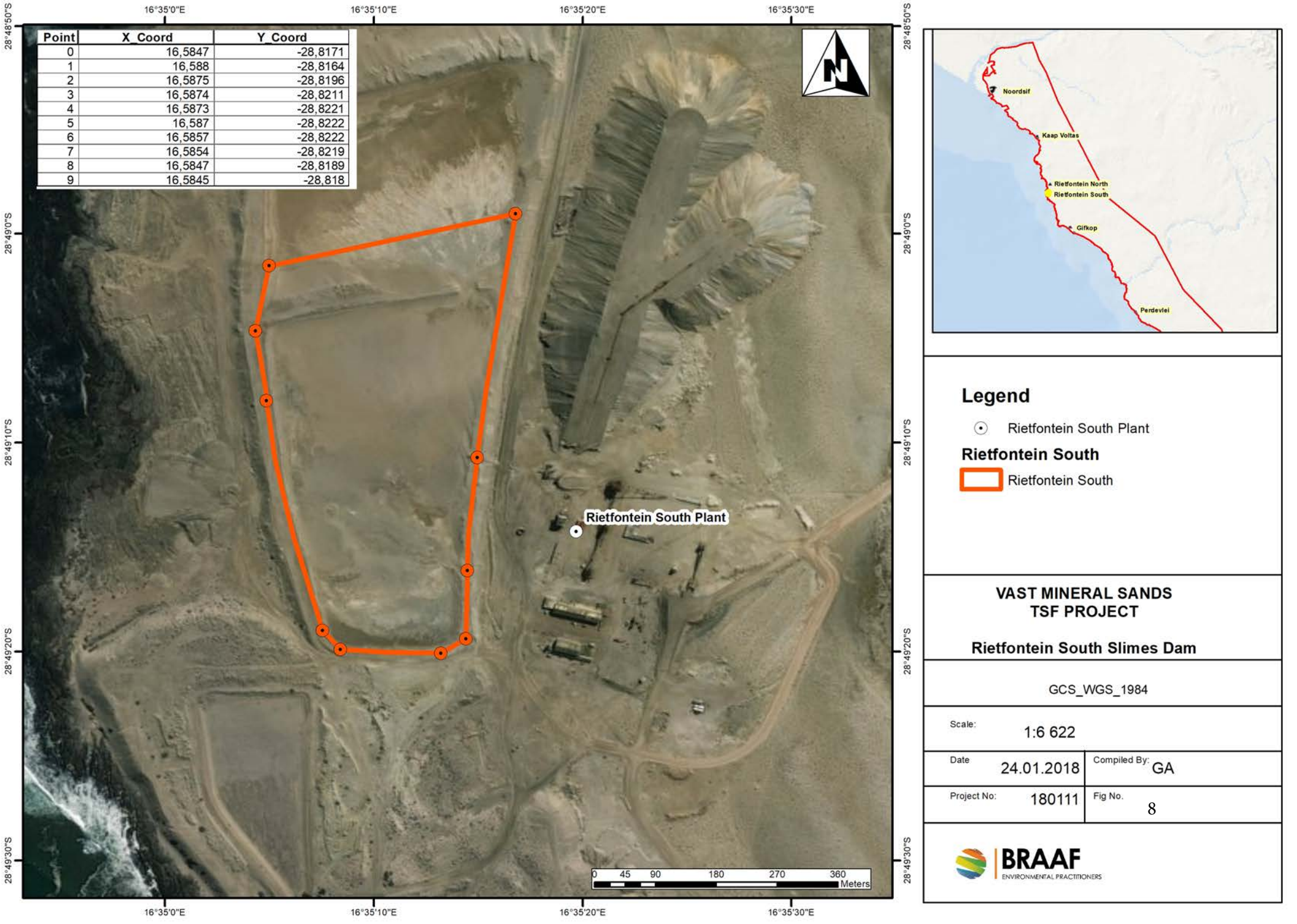

VAST MINERAL SANDS TSF PROJECT

Rietfontein South Slimes Dam

GCS_WGS_1984

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Date: 24.01.2018

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Fig No. 8

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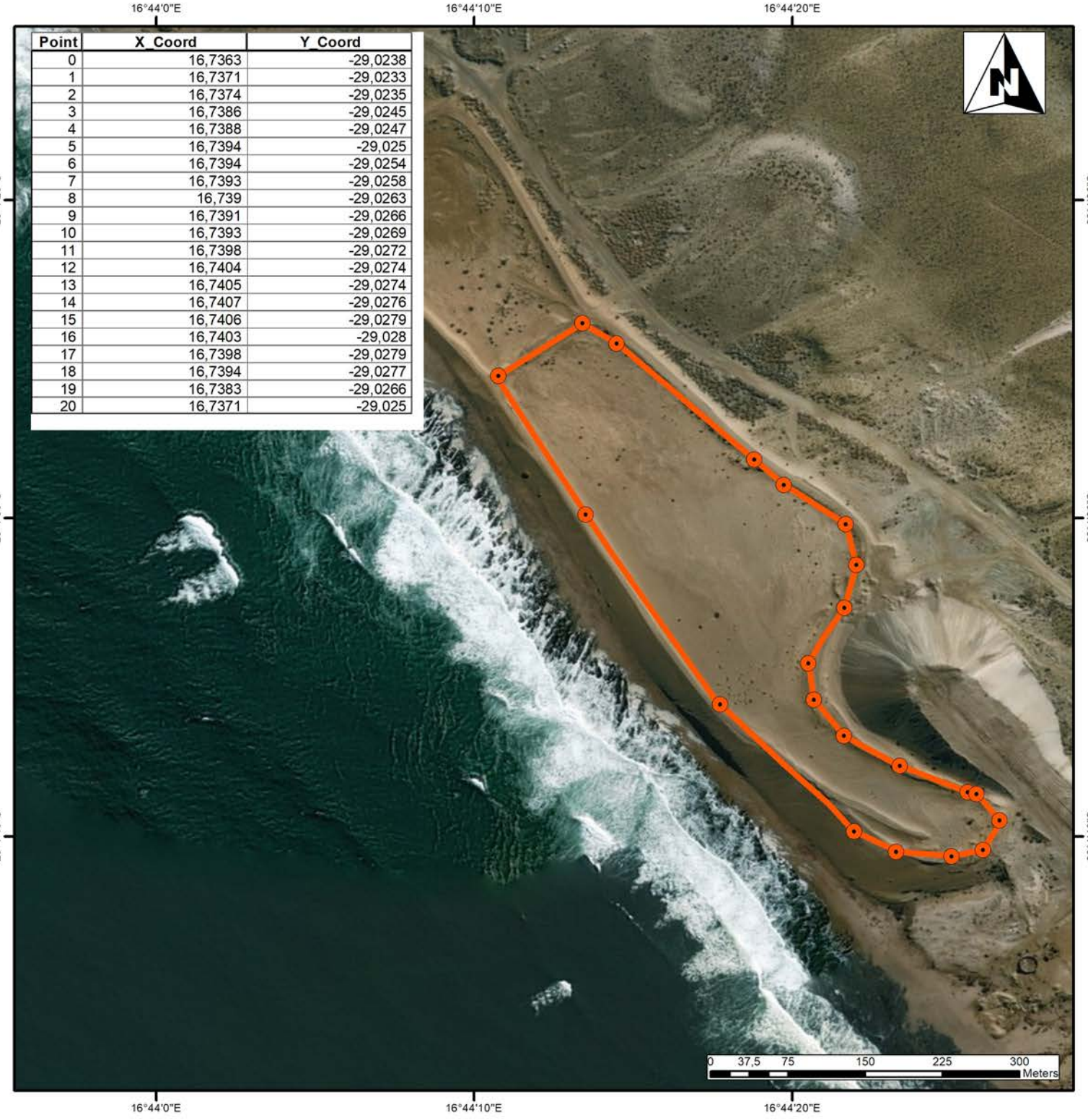
ENVIRONMENTAL PRACTITIONERS



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4	16,7388	-29,0247
5	16,7394	-29,025
6	16,7394	-29,0254
7	16,7393	-29,0258
8	16,739	-29,0263
9	16,7391	-29,0266
10	16,7393	-29,0269
11	16,7398	-29,0272
12	16,7404	-29,0274
13	16,7405	-29,0274
14	16,7407	-29,0276
15	16,7406	-29,0279
16	16,7403	-29,028
17	16,7398	-29,0279
18	16,7394	-29,0277
19	16,7383	-29,0266
20	16,7371	-29,025

Legend

Perdevlei

Perdevlei

VAST MINERAL SANDS TSF PROJECT

Perdevlei Slimes Dam

GCS_WGS_1984

Scale: 1:5 298

Date: 24.01.2018

Compiled By: GA

Project No: 180111

Fig No. 9

BRAAF
ENVIRONMENTAL PRACTITIONERS

4 POLICY AND LEGISLATIVE CONTEXT

Table 4-1: Legal Policy and Framework

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT. (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998).	Mining activities	This BA is being undertaken in terms of NEMA to determine any possible impacts on the environment and to undertake mitigation measures that reduce any potential harm to the environment.
EIA Regulations, 2014 (GN R324, R325, R327)	Reprocessing of slimes	Listed activities as per the NEMA EIA Regulations have been considered, but the project does not trigger any listed activities.
The National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA)	Reprocessing of residue deposits and dumps	Listed activities as per the 2013 NEM: WA Regulations have been considered and it has been determined that a waste licence is required.
Mineral and Petroleum Resources Development Act, 2008 (Act 28 of 2002)	Mining activities	This document has been prepared to meet the

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT. (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
		requirements of the MPRDA.
Mine Health and Safety Act, 1996 (Act 29 of 1996)	The objects of the MHSA are to protect the health & safety of mine workers. All mining activities described in this report must comply with the MHSA.	
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Management/monitoring measures	The project will be submitted to SAHRA.
National Water Act, 1998 (Act No. 36 of 1998)	Not applicable	However, the BAR will be submitted to DWS for comment.
Municipal Integrated Development Plan (2017/2018)	Needs and desirability of the proposed activities	Municipal plans were used to identify relevant socioeconomic information and spatial development information within which the area falls under.
Rural Spatial Development Framework/Land Development Plan 2010	Needs and desirability of the proposed activities	Municipal plans were used to identify relevant socioeconomic information and spatial development information within which the area falls under.
DEA and DEA&DP Guidelines E.g. Need & Desirability, Public	This document	

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT. (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
Participation, Using Specialists and Alternatives.		

5 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 Vast Minerals Tailings Reprocessing project is required to exploit the remaining ore reserves in the slimes dams on Remainder of Farm 1, for the following key reasons:

- Should the slimes not be reclaimed and reprocessed, this resource will otherwise remain unutilised.
- Should the slimes not be reclaimed and re-processed the Slimes Dams will be dealt with as a risk / liability in terms of current rehabilitation and mine closure requirements for Alexkor. If the project goes ahead, the reprocessing process will result in tailings that will be used to infill and rehabilitate mined areas within the Alexkor mine, which will be done as part of the Vast Minerals Rehabilitation Plan. This will reduce the total slimes dam footprint of the Alexkor Mine, as well as the associated environmental impacts / liabilities.
- The continuation of reclamation and re-processing of slimes as identified by Vast Minerals will ensure aid in the creation of new employment for the local community. A small number of new employment opportunities are envisaged.
- The reprocessing of the historic tailings impoundments as identified by Vast Minerals have become economically feasible as commodity prices for heavy minerals are more favourable. Heavy Minerals sand deposits are the main source of zirconium, titanium and a very good source of rare earth elements. South Africa has been a major supplier of zirconium and titanium and has a well-developed heavy mineral mining sector supplying the world market with some 25% of its zirconium demand. Increase in heavy mineral prices and the availability of new markets has rendered previously marginal heavy mineral deposits such as this Alexkor deposit potentially viable at present. Long term forecasts show an increasing deficit in the supply of zirconium, titanium and rare earths.

6 MOTIVATION FOR THE OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE

The proposed site was selected based on extensive research and the following information from previous prospecting /mining activities in the area.

- Numerous studies starting in the1950's was undertaken to investigate the West Coast heavy mineral beach sands, covering the coast line between Alexander Bay and Lamberts Bay. Several heavy mineral deposits were discovered between the Groen River and Alexander Bay.
- The Alexander Bay Development Corporation investigated the possibility of exploiting heavy minerals from the marine diamond placers at Alexander Bay in 1992. The survey examined unmined marine terraces (Rietfontein-Grobler, Rietfontein-Higher, Gifkop-Grobler and Langpan-Grobler), tailings dumps (Noordsif, Muisvlak Old, Muisvlak, Gifkop Old, Gifkop, Rietfontein Old, Rietfontein, Kaap Voltas Old and Kaap Voltas) and the Alexander Bay beaches with the intention of quantifying the resource, evaluating the material, and evaluating the feasibility of exploitation. These studies showed resources contained in different deposits with high ilmenite, rutile, zircon and monazite reserves. Conditions along the Alexander Bay coast have proved favourable for development of heavy mineral placer.
- The application area has been extensively mined for diamonds during the past 90 years by Alexkor and its predecessor the State Alluvial Diggings. This has resulted in the establishment of good infrastructure with two large well serviced towns accommodating some 15 000 inhabitants. Mining provides the bulk of employment to the local towns through direct employment or indirectly through services provided to the mine. Several smaller towns in the area also derive similar benefits from the activities at Alexkor.
- The main commodity being mined in the area is diamonds, which is getting harder to find, as reserves become depleted. Hence, diamond mining activities at Alexander Bay and neighbouring diamond mine at Kleinzee have been downscaling over the past decade, resulting in major job losses and economic down turn in these towns. The economies of the towns in the area have started to change its focus from mining to tourism but this change is gradual and can only accommodate a small fraction of inhabitants.
- A change in the mineral being mined to heavy minerals will aid in the creation of employment for local inhabitants who already have mining experience. Other positives include further development of infrastructure for the area that will be to the advantage of the greater community.
- The reprocessing and reclamation of the slimes dams will result in rehabilitation of the area which includes the slimes dumps that are currently visible from the R382. The result being a rehabilitated area which will follow the end use levels

as stipulated in the Alexkor Rehabilitation Plan. This will eliminate the eye sore of the existing large dumps on the surrounds.

7 FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE

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.

7.1 Details of the development footprint alternatives considered.

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

7.1.1 The property on which or location where it is proposed to undertake the activity

No property alternatives have been considered as the envisaged mining operations will occur in an area of existing mining operations and infrastructure including access roads. The proposed site is the only land that is within reasonable reach to the applicant.

7.1.2 The type of activity to be undertaken

No alternatives to the mining of slimes dams for heavy minerals have been considered; heavy mineral sand mining is a viable business opportunity for the applicant. It is the applicant's personal knowledge that the site possessed viable volumes of minable heavy mineral deposits, as evident through previous exploration studies undertaken in the area and existing mining data as provided by Alexkor.

7.1.3 The design or layout of the activity

The site layout was determined by considering both spatial and practical mining operation aspects. The proposed layout of the mining activity and associated infrastructure will be implemented with the aim to reduce substantial impacts on the area.

7.1.4 The technology to be used in the activity

No alternative technology has been considered for the proposed mining activity.

7.1.5 The operational aspects of the activity

The optimal operational activities have been proposed, inclusive of the site layout and utilising existing infrastructure footprints and buildings (such as the Noordsif and Rietfontein South Plants), in consideration of spatial aspects, post-mining appearance, as well as reducing costs and impacts associated with stripping down built infrastructure.

7.1.6 The option of not implementing the activity

The No-Go Alternative implies that the status quo will remain. This would result in no benefit to the area and existing mine, as the TSFs will continue to be dealt with as a risk / liability in terms of current rehabilitation and mine closure requirements for Alexkor.

The proposed reclamation and re-processing of the TSFs will result in several new job opportunities during construction and operation, which will largely be sourced locally. It also presents an opportunity to efficiently and sustainably utilise the mineral resources in the tailings, which will otherwise remain as a TSF with associated liabilities and rehabilitation requirements.

7.2 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.

A Basic Assessment is required to obtain Waste Management License for Vast Minerals TSF Reprocessing Project. A public participation process is being undertaken as part of the Basic Assessment process and will be done in the following manner:

Identification of Interested and Affected Parties

The NEMA Regulations require identification of and consultation with I&APs. The term I&AP generally refers to persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively.

A Register of I&AP's in terms of Section 42 of the EIA Regulations (GN R 326 of 2017) was compiled. This regulation requires that a register with full contact details of registered I&APs be submitted to the competent authority. list of identified I&APs and the Register of I&APs are included in Appendix B.1.

Project Announcement and Draft BA Report Phase

Notice of the Basic Assessment process has been given by:

1. placing a Site Notice at the Alexkor Mine and Port Nolloth Public Library;
2. posting and emailing the Background Information Document (BID) and notifying I&AP's of the release of the Draft Basic Assessment Report for 30-day review period to Interested and Affected Parties, including neighbours and Ward councillor, competent authority and other relevant Government departments;
3. placing an advertisement in Die Plattelander newspaper, which allowed potential Interested and Affected Parties to register and to submit comments within a 30-day period regarding the Basic Assessment of the proposed project;
4. a copy of the Draft Basic Assessment Report was placed at the Port Nolloth Public Library and at the Sanddrift Library in Alexander Bay;
5. the Draft Basic Assessment Report is also available on the project website: https://www.braafsa.com (Documents for Comment – Vast Mineral Sands);
6. the Draft BAR was distributed for 30-days to registered I&APs and organs of state. The commenting period ended on 26 February 2018.
7. After the first commenting period, updates have been made to the BAR and thus the report has been released for a further 30 days. The commenting period ended on 11 May 2018.
8. The updated BAR was placed at the Port Nolloth (AJ Bekeur) and Sanddrift Public Library, Alexander Bay as well as on the project website: https://www.braafsa.com (Documents for Comment – Vast Mineral Sands).

Final BA Report Phase

All comments raised by I&AP's during the first and second 30-day review period of the Draft BA Report have been included in the Final Basic Assessment Report. As part of the submission of this final report, I&AP's will be notified of the submission and the report which will be placed on the Braaf website (www.braafsa.com).

7.3 Summary of issues raised by I&APs

To date no comments have been received regarding this application, except input from the Alexkor Environmental Department regarding rehabilitation requirements which have been factored in this report and questions of clarification from the Department of Water and Sanitation (DWS).

7.4 The Environmental attributes associated with the alternatives

(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

7.4.1 Baseline Environment

7.4.1.1 Type of environment affected by the proposed activity.

(its current geographical, physical, biological, socio- economic, and cultural character).

Site description

The proposed project site is located on the West Coast of the Northern Cape Province, near Alexander Bay. The project lies within an existing mining area on the Alexkor Mine on Remainder of Farm 1. The general location of the TSF which will be mined is shown in Figure 3. General access is from the R382 and existing mine roads.

Climate

The region is classified as an arid zone with desert climate. Rainfall in the Northern Cape is generally low and highly variable. Alexander Bay typically receives about 20mm of rain per year with the lowest rainfall (0mm) recorded in January and the highest (6mm) in June. The average annual evaporation rate is measured at 2,524mm and the combined effect of low rainfall and high evaporation rates result in extremely

dry conditions. The driest month is January, with 1 mm of rain. Most precipitation falls in June, with an average of 8 mm.

The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Alexander Bay range from 20.6°C in July to 27.5°C in January. The region is the coldest during July when the mercury drops to 8.1°C on average during night time.

Table 7-1: Alexander Bay Climatic Conditions

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	18.1	18.1	17.5	16.6	15.6	14.7	13.5	13.6	14.4	15.1	16.8	17.1
Min. Temperature (°C)	13.8	13.9	13.1	11.9	10.2	8.9	8.1	8.5	9.7	10.7	12.4	12.9
Max. Temperature (°C)	22.4	22.3	22	21.4	21.1	20.5	19	18.8	19.1	19.6	21.2	21.3
Avg. Temperature (°F)	64.6	64.6	63.5	61.9	60.1	58.5	56.3	56.5	57.9	59.2	62.2	62.8
Min. Temperature (°F)	56.8	57.0	55.6	53.4	50.4	48.0	46.6	47.3	49.5	51.3	54.3	55.2
Max. Temperature (°F)	72.3	72.1	71.6	70.5	70.0	68.9	66.2	65.8	66.4	67.3	70.2	70.3
Precipitation / Rainfall (mm)	1	3	3	4	6	8	6	7	4	4	2	2

The strongest winds occur in summer, during which winds blow 99% of the time. Practically all winds in summer come from the south-east to south-west (see Figure 10), strongly dominated by southerlies which occur over 40% of the time, averaging 20 - 30 kts and reaching speeds in excess of 100 km/h (60 kts).

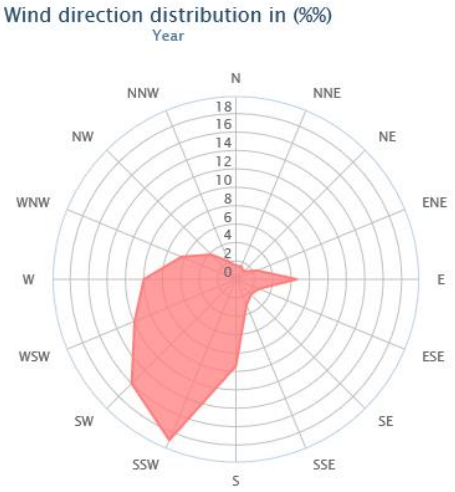


Figure 10: Annual Wind Rose (source: windfinder)

Topography

The Alexkor Mine is located on the Namaqualand coastal plain. This coastal plain is bounded on the west by the Atlantic Ocean and it backs onto the Great Escarpment to the east. It is a strip of land 50 to 60km wide by 300km long lying parallel to the coast, extending from the Orange River in the north to the Olifants River in the south. Much of the coastal plain is covered by sands and other sediments, which support sparse coastal dune vegetation cover, occasional karoo-type shrubs consisting principally of succulents comprising the xerophytic vegetation of Namaqualand. The Orange River mouth is the northern boundary of the area and the Holgat River is located in the middle of the 90 km coastline, 45 km south of the Griep River mouth.

Geology

The primary source of the heavy minerals at the project site is igneous and metamorphic rocks in the Namaqualand hinterland where these minerals occur as accessory minerals. Nearly all major economic deposits of these minerals, principally rutile, zircon and ilmenite occur in detrital accumulations in young (Pliocene or younger) shoreline or beach placer deposits. These granular minerals are eroded from the original crystalline rock formations and get gradually washed towards the sea, where sorting takes place by natural fluvial processes followed by wave, current and wind actions. Of the numerous heavy minerals, only a few have economic significance owing to their properties and prevalence. In the VHM deposits the main minerals of economic interest are ilmenite (FeTiO3), rutile (TiO2), leucoxene (a mineral derived from the weathering of ilmenite), and zircon (ZrSiO4), by far the most common zirconium mineral.

Water Resources

The study area is located within the Lower Orange River Catchment (Primary Catchment F). The project areas fall within quaternary catchments F10C and D82L (Refer to Figure 8). The natural mean annual runoff of all the coastal catchments in the Water Management Area (WMA), which stretch some 285 km from Strandfontein in the south to Alexander Bay at the mouth of the Orange River in the north, is estimated to be 24 million cubic metres (Mm3).

REM Farm 1 is bordered by the perennial Orange River in the north, which falls within a Phase 2: Freshwater Ecosystem Priority Area (FEPA) with a C category. Systems falling within a FEPA with a C ecological rating, infers a Moderately Modified state. Phase 2

FEPAs were identified in moderately modified rivers (C ecological category), only in cases where it was not possible to meet biodiversity targets for river ecosystems in rivers that were still in good condition (A or B ecological category). The river condition of these Phase 2 FEPAs should not be degraded further, as they may in future be considered for rehabilitation once FEPAs in good condition (A or B ecological category) are considered fully rehabilitated and well managed (Driver et al, 2011). Systems falling within a Phase 2, FEPA with a C ecological category implies that a loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.

The status of the water quality in the lower Orange River is generally assessed to be moderately modified to strongly affected because of fragmentation and flow regulation. Although the general water quality of the lower Orange River is still fairly good, it is deteriorating, but is still regarded as acceptable for agricultural, domestic, recreational, and industrial use. Major water quality related issues and concerns are blackfly outbreaks, increased loads of salts (salinity), and eutrophication (nutrient over-enrichment) (ARTP Joint Management Board, 2009).

The Holgat River, a coastal river in Namaqualand, comprises relatively small river channels (in places, more than one channel) meandering in wide, shallow, alluvium-filled valleys that have been incised over time into the crystalline bedrock (Erasmus, L. 2017)). The catchment area of this river is very small and ephemeral nature. This means that surface water resources are not used at all in the area, either for domestic use or stock watering. Neither river flows sufficiently reliably to be considered as a possible source of water for mining operations. As a result, available reliable yield from surface water sources in all the coastal catchments is estimated to be zero, while reliable yield from groundwater from the catchments is estimated to be a total of 3 Mm3/a. Approximately 6 Mm3/a of water is transferred into the southern part of the area from the Orange River to meet the urban / domestic requirements in the Alexander Bay, Port Nolloth and Kleinzee area (DWAF 2004).

The Orange River Mouth is a Ramsar wetland with a Gariep Desert (Dg)_Floodplain wetland type classification. The Orange River Mouth on the South African side received its Ramsar status on 28 June 1991. It is regarded as the second most important estuary in South Africa in terms of conservation importance after the Knysna Estuary. The importance of the site becomes even more apparent when one considers the fact that the next nearest coastal wetland is the Olifants River mouth, some 400km to the south in South Africa, and Sandwich Harbour, 500km to the north

in Namibia. There is an existing road bordered by a fence which buffers the Alexkor Mine area and hence the Noordsif slimes dam from the Ramsar site. The existing buffer between the Ramsar site and the Noordsif slimes dam must be adhered to.

Groundwater

Information regarding the groundwater in the Vast Minerals project area was obtained from the Groundwater specialist report compiled by Erasmus, L (2017) (see Appendix F).

The geological conditions on site comprise an uncomplicated arrangement of aquifers and hydrostratigraphic units. The aquifers on site can be divided into two main units, namely an Unconsolidated primary and Fractured secondary aquifer.

The unconsolidated aquifer consists of the surface aeolian sands, marine sands and basal grits and conglomerates overlying the quartzitic and schist bedrock. The presence of damp sands and minor mud at the base of several exploration boreholes, most notably in areas corresponding to topographic lows in the surface of the bedrock, are indicative of a minor concentration of groundwater in the Muisvlak and Seemansrus areas. Although minor kaolinisation and cementation in the underlying schist and gneisses exists, the unit is generally unconsolidated and relatively permeable. The unit has a relatively high clay content constituting some 20% of the overall volume on average with local values up to 35%. The undulating nature of the bedrock contact means that only local perched aquifers with limited aerial extent may form, separated by palaeo-highs in the bedrock contact.

The fractured secondary aquifer underlies the primary aquifer and comprises predominantly fractured bedrock within quartzite, gneiss and schist, which underlie the site. The bedrock geology consists of high-grade metamorphic rocks of the Namaqua-Natal Mobile Belt, which are generally massive and highly deformed. The topography of the bedrock contact with the overlying weathered material has been shown to correspond with structures in the bedrock such as faults and fractures, which are generally oriented north-north-west – south-south-east, northeast - south-west and west-northwest - east-south-east. Although significant groundwater flow may be encountered in faults and fracture zones, overall storativity is likely to be very limited with a resultant decrease in long-term sustainability of abstraction, particularly at the relatively high rates that would be required for production. Based on the apparent

depths of drilling, it is clear that all the boreholes in the area are drilled into fracture or fault zones in the bedrock.

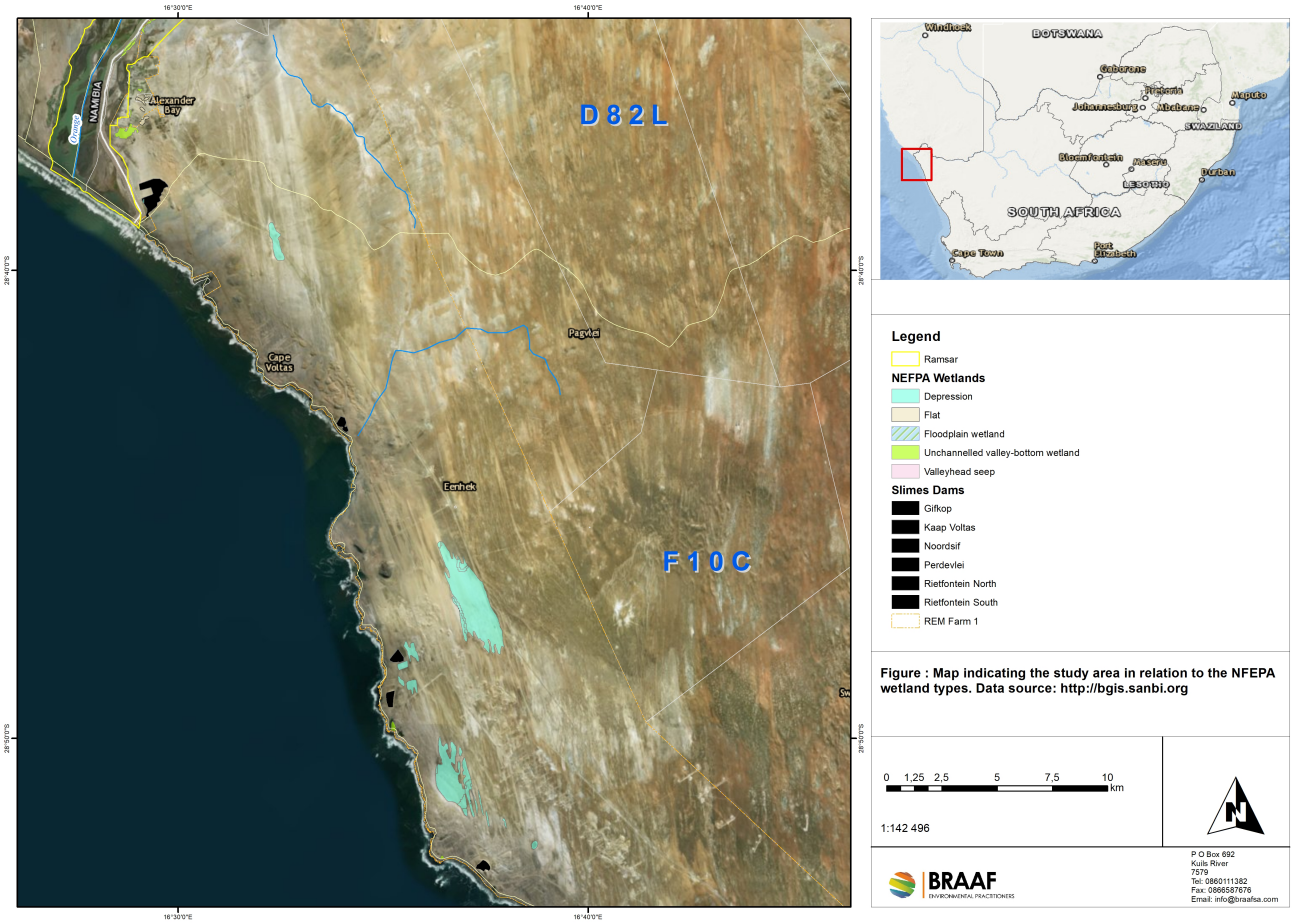
Due to the availability of water from the Orange River and the low potential of appreciable ground water yield in the area, ground water has been ruled out as a source of water at present. The last borehole abstraction of ground water at Alexkor and at the neighbouring properties was terminated in the late 1980's.

Wetlands

Information regarding wetlands in the project area was obtained from data accessed from the bgis.sanbi site pertaining to the National Freshwater Ecosystem Priority Areas (NFEPA) project Wetlands. This data indicates several wetlands on the Alexkor mine area, classified as unchanneled valley-bottom and depression wetlands. The wetlands of particular notice are the ones identified on the existing tailings and slimes dams, which are modified mining areas. These areas identified as wetlands are settling ponds which were created on the dumps (see Figure 7 and Figure 8 – Rietfontein North and South Dumps, respectively). The dumps in its current state must be rehabilitated and reprofiled to the natural ground level as per the Alexkor Rehabilitation Plan.

Mining at the Noordsif Slimes Dam must remain within the boundary of the current mining activity to avoid any disturbance that might cause interference with the natural flow of ground water or to generate dust that might impact the water body at the Orange River mouth. No mining will take place in the Holgat River and the riparian zone should be excluded from mining.

Figure 11: Map indicating the study area in relation to the NFEPA wetland types. Data source: http://bgis.sanbi.org



Biodiversity

The Vegetation Map of South Africa, Lesotho and Swaziland (Mucina, Rutherford & Powrie, 2005; SANBI, 2012) (VEGMAP) shows that four vegetation types originally occurred within the project area. The most extensive types within the project area were Namaqualand Salt Pans, Richtersveld Coastal Duneveld, Namib Seashore Vegetation, Alexander Bay Coastal Duneveld. These vegetation types still persist but have diminished in extent within the project area due to the long history of open-cast mining. All the vegetation types found are considered to be 'Least Threatened', except for the seashore vegetation which is rated, Vulnerable.

The proposed application area to be mined comprise existing slimes dams which contain process waste resulting from mineral processing. The TSF project area does not fall within the 2016 Northern Cape Critical Biodiversity Area (CBA), however other portions of REM Farm 1 do and is designated as CBA1 and CBA 2 (see Figure 14).

Fauna

Terrestrial animals

Avifauna

The Orange river mouth and the surrounding pans and salt marsh provide a sizeable area of sheltered shallow water suitable for concentrations of wetland birds (see Figure 12). The Orange River Mouth Wetland is used by waterbirds either for breeding purposes or as a stopover on migration routes. The wetland bird population can be as high as 26 000 individuals from up to 57 species. Of the 57-species recorded in the area, 14 can be considered as endangered and appear in one or both of the South African or Namibian Red Data Books of birds.

Globally significant numbers of Cape Cormorant *Phalacrocorax capensis*, Kelp Gull *Larus dominicanus* and Hartlaub's Gull *Chroicocephalus hartlaubii*, and nationally significant numbers of South African Shelduck *Tadorna cana* and Cape Shoveler *Anas smithii* are present. The IBA regularly supports Great White Pelican *Pelecanus onocrotalus*, Lesser Flamingo *Phoeniconaias minor*, Greater Flamingo *Phoenicopterus roseus* and White-breasted Cormorant *Phalacrocorax lucidus*. Substantial numbers of Damara Tern *Sterna balaenarum*, Common Tern *S. hirundo*, Caspian Tern *S. caspia*, Pied Avocet Recurvirostra avosetta, Chestnut-banded Plover *Charadrius* pallidus, Black-necked Grebe *Podiceps nigricollis*, Little Bittern *Ixobrychus minutus*, African Spoonbill *Platalea alba* and Maccoa Duck *Oxyura maccoa* occur.

The proposed mining activities fall outside of the Important Bird Area (IBA) and within the fenced Alexkor Mine area.

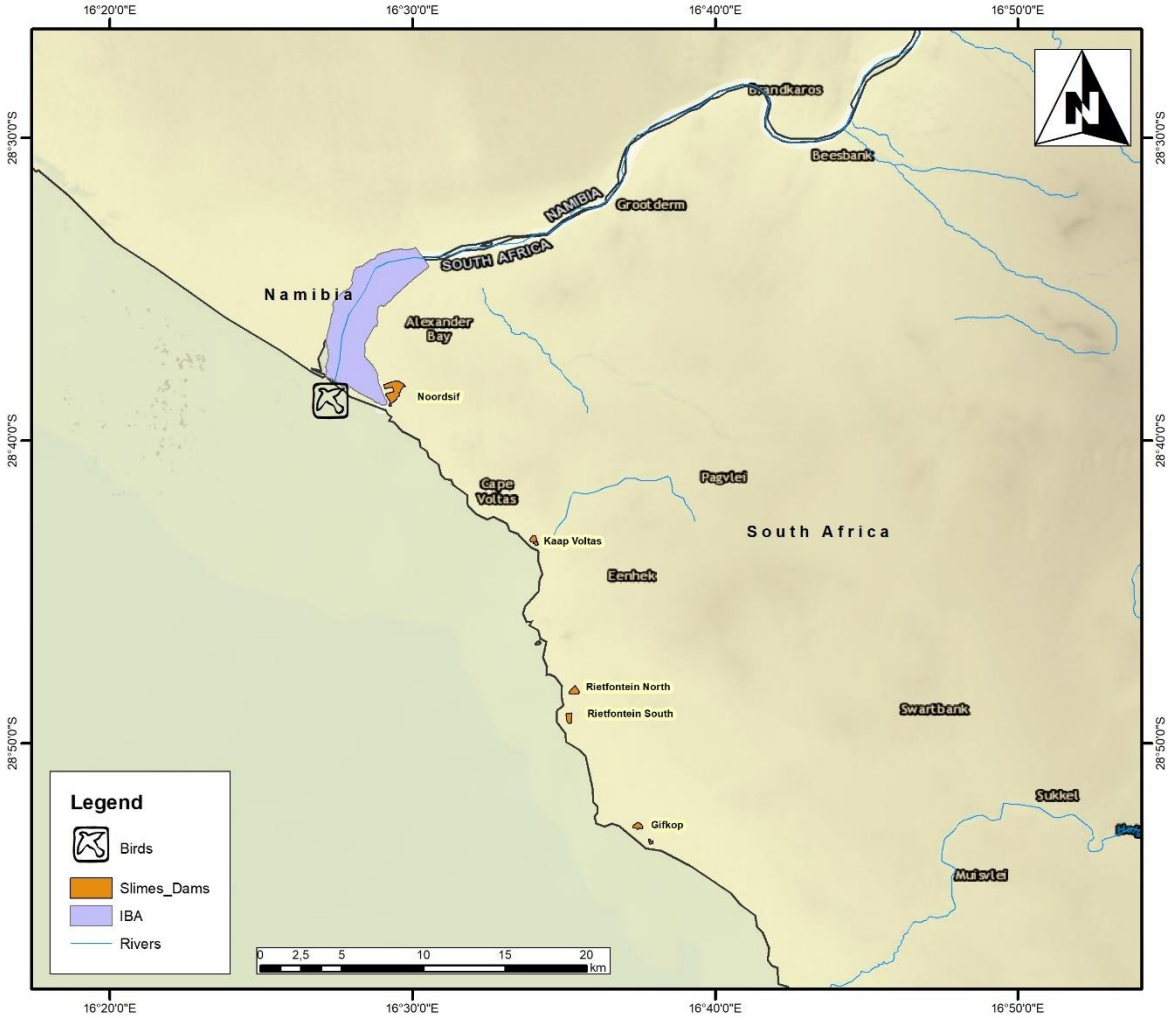


Figure 12: Orange Mouth Wetlands Important Bird Area

Herpetofauna (amphibians and reptiles)

There are nine principal biomes in Southern Africa for amphibian habitats. The study area falls within the karoo (semi-desert) amphibian habitat (du Preez and Carruthers, 2009). This habitat comprises of arid stony areas with low, flat topped koppies and sparse scrub vegetation in the south central and west central areas (du Preez and Carruthers, 2009). The Alexkor mining area specifically, falls within the range of eight frog, two tortoise, 14 snake .and 37 lizard species (Siteplan, 2008). Two frog, one snake and three lizard species have restricted ranges along the west coast, immediately north and south of the Gariep River. The remaining herpetofauna species have extensive distribution ranges throughout southern Africa. The Alexander Bay

herpetofauna consist of a large psammophilous component, comprising probably up to some 20 species. As the proposed TSF project will entail reworking of existing disturbed areas, the overall impact on these animals will be limited.

Mammals

56 mammal species are likely to currently occur within the proposed application area, which includes, small mammals such as shrew, mole, bat, mice and mongoose species while larger mammals include the Aardwolf, Brown Hyaena, Springbok and Gemsbok. Caracal and African Wild Cat are understood to occur within the Alexkor mining area.

Marine fauna

Mammals

The Cape fur seal (*Arctocephalus pusillus pusillus*) congregates at numerous breeding and non-breeding sites on the mainland and on nearshore islands and reefs along the West Coast (Figure 13). Four other seal species may occasionally be found as vagrants along the West Coast, including southern elephant seal (*Mirounga leoninas*), subantarctic fur seal (*Arctocephalus tropicalis*), crabeater (*Lobodon carcinophagus*) and leopard seals (*Hydrurga leptonyx*) (David 1989). The marine mammal fauna occurring off the southern African coast includes several species of whales and dolphins and one resident seal species near Alexander Bay. The seal colony within the study area includes Bucchu Twins, formerly a non-breeding colony, which has also attained breeding status (SRK, 2014). Seals are highly mobile animals with a general foraging area covering the continental shelf up to 120 nautical miles offshore (Shaughnessy 1979), with bulls ranging further out to sea than females. The timing of the annual breeding cycle is very regular, occurring between November and January. Breeding success is highly dependent on the local abundance of food, territorial bulls and lactating females being most vulnerable to local fluctuations as they feed in the vicinity of the colonies prior to and after the pupping season (Oosthuizen 1991). The TSF project area is not located near Bucchu Twins seal colony (refer to Figure 13).

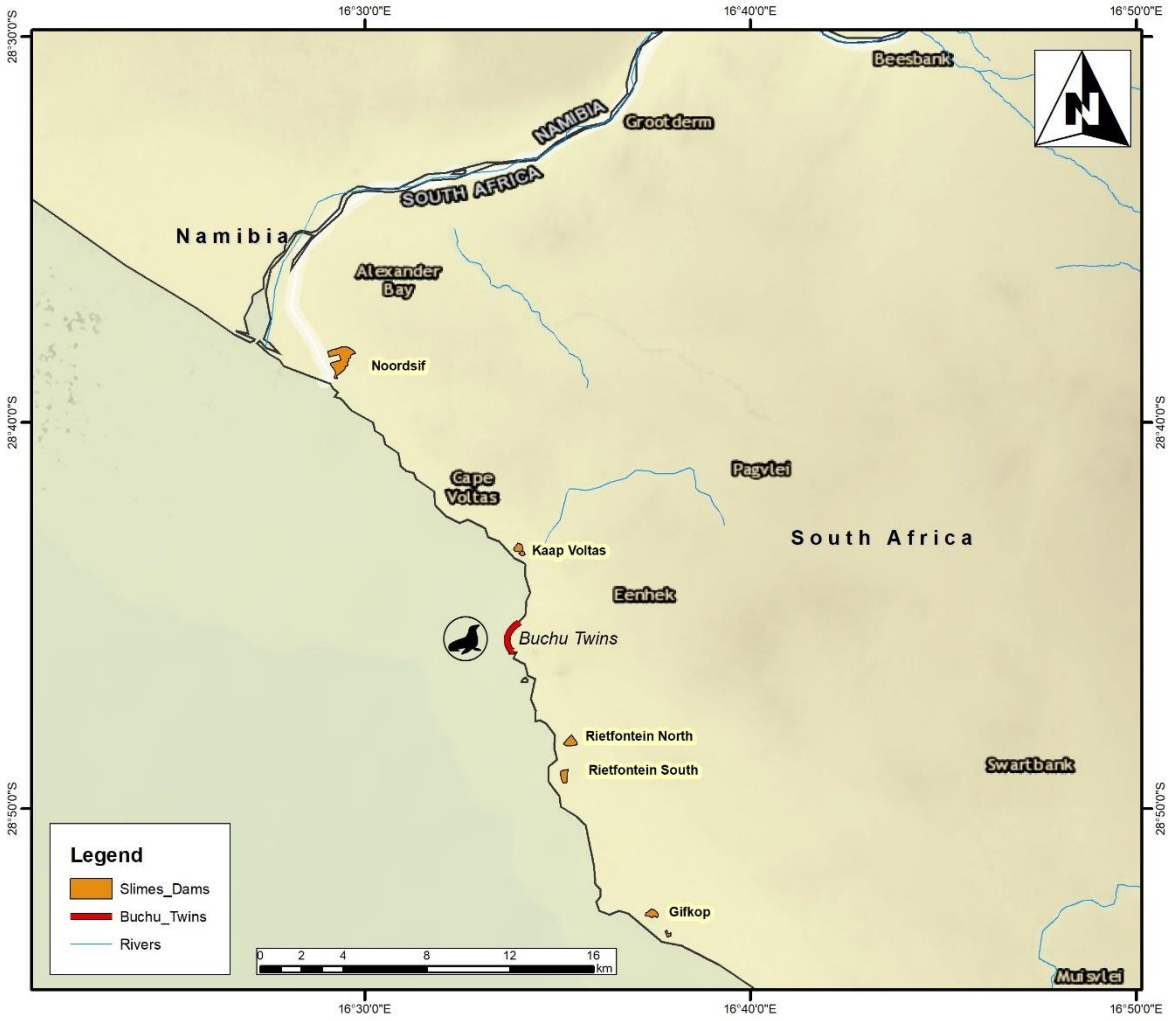


Figure 13: Project - environment interaction points on the West Coast, illustrating the location of the seal colony in relation to the proposed slimes dams to be reprocessed (shaded orange).

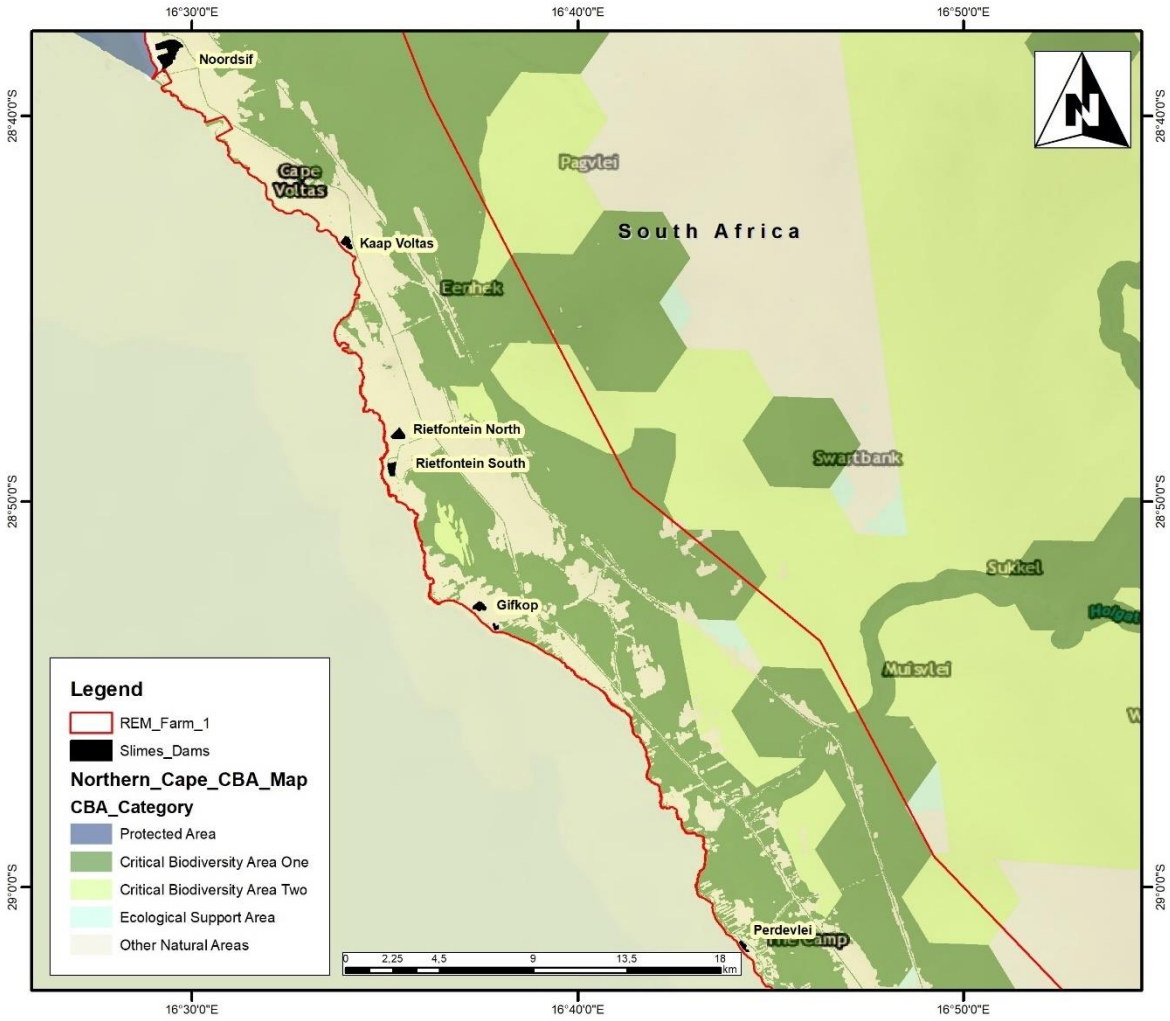


Figure 14: Map highlighting provincial terrestrial conservation priorities for the study area

Socio-economic

The proposed mining site is located near Alexander Bay, which falls in the Richtersveld Local Municipality, under the Namakwa District Municipality. According to the 2011 Census, Alexander Bay has a total population of 1,736. The population distribution is dominated by coloured people, followed by the white community, black Africans, and lastly the Indian community and other groups.

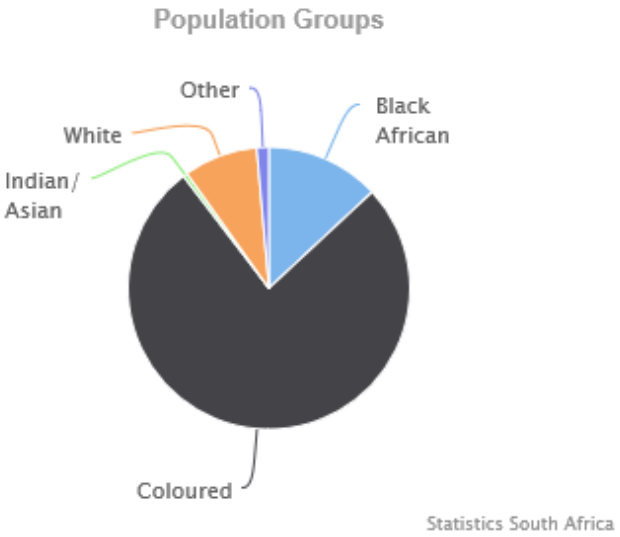


Figure 15: Richtersveld Population Make Up

Table 7-2: Age Structure and population within the Namakwa District and Richtersveld Local Municipality (Source: StatsSA)

	Namakwa	Richtersveld
Population	115 488	11,982
Population under 15	22,50%	23,80%
Working age (15-64)	68,00%	70,20%
Elderley (65+)	9,50%	6%
Sex Ratio	101,5	110,9
Dependency Ratio	47,1	42,5

The table above indicates the age distribution within the Namakwa District and Richtersveld Local Municipality. Understanding the age structure and population of a municipality is important for planning with regards to the anticipated demands for services and employments opportunities. It allows the municipality to identify the potential need and location of facilities, expected growth in economically active population and potential employment seekers, as well as project and plan for facilities to cater for the older persons. According to the 2011 Census, the population growth is high within the municipality. Of those 20 years and older 18,9% has completed grade 12, 7,3% have higher education, 13,7% completed primary education, 15,1% have some primary, 42,7% some secondary and 2,5 % has no schooling.

The broader regional community reflects poor socio-economic prospects, including:

- Low literacy levels occurring widespread throughout the rural population;

- Unemployment due to a decrease in mining activities;
- Inadequate housing, with rentals largely in arrears;
- Low affordability levels;
- Very low level of community health;
- Poverty within certain communities.

The socio-economic conditions within a post-diamond mining economy poses employment sustainability challenges, therefore new mining initiatives of different commodities could proof valuable for job security in the region.

Cultural Heritage

The wider area rich in SAN and Khoi-Khoi folklore and legend, much linked to special places which today are treasured and respected and express a distinct identity of the Khoi-Khoi. The area within the coastal belt, the Boegoeberg Twins (inselbergs) and environs represents a place of strong cultural heritage and association, while natural features including the "spuitgat caves" and natural coastal fountains were well frequented by Khoi-Khoi pastoralists. Transhumant pastoral activities were dictated by coastal winter rains, as well as coastal fountains, which at the time were the only source of water. A fountain of this nature still exists in the locale of Muisvlakte, contributing to making the area a favoured destination by past pastoralists (Phs Consulting, 2017).

Archaeological impacts assessment undertaken in the rich diamond-mining regions on the Cape West coast of South Africa has revealed that shore-based mining operations impacts severely negatively on archaeological heritage sites. Mining operations over the last nine decades by Alexkor Limited, has undeniably destroyed many sites in the Alexkor mining area.

Important vertebrate fossils (bone) and extinct marine molluscs have also been documented, buried under tons of meters of overburden, in deep open cast mining operations and prospecting trenches. The reasons for the abundance of fossil palaeontological remains, is in part related to the highly calcareous character of the aeolianites (fossil dunes) and shallow marine sediments (Phs Consulting, 2017). Findings of archaeological investigations on the area have shown that, despite the destruction and damage of archaeological and palaeontological heritage remnants caused as a result of historical mining operations, it is likely that there are still intact and relatively

well-preserved sites in the Alexkor mining area. It is also highly probable that important vertebrate fossils and marine molluscs will be exposed below the overburden in deeper excavations and areas where no mining have taking place.

7.4.1.2 Description of the current land uses.

The application area consists of 1 farm portion that is owned by the Richtersveld Sida Hub Communal Prop Association. In 2011, Alexkor SOC Limited (Alexkor) and the Richtersveld Mining Company (Pty) Ltd (RMC) formed a Pooling and Sharing Joint Venture (hereafter referred to as "PSJV"), to oversee all current and future mining activities relating to Alexkor's mining rights. The area is managed according to an approved EMPr for the Alexkor Mining Right on the site. This EMPr document acts as baseline information and guideline for this protecting right application. This proposal will therefore not be a new use or a conflicting activity. The site has been heavily disturbed by mining over the past few decades. The slimes dams will be subject to mining for heavy mineral deposits. The remainder of the study area comprises an area designated as a mine which includes ongoing diamond mining activities.

7.4.1.3 Description of specific environmental features and infrastructure on the site.

Environmental features

The Vast Minerals TSF project area will take place on existing slimes dams, areas which have been subject to mining activities. As described in the baseline and the current land use sections above, the major sensitive features of the Alexkor site surrounding the Vast Minerals TSF project area are as follows:

- Two main factors are considered in determining sensitivity in the project area. The first is the current disturbance regime and the second is the designation of critical biodiversity areas (CBAs). CBAs have mainly been selected in Northern and Southern Richtersveld Yellow Duneveld, which lie inland of the coast, and to a lesser extent in Richtersveld Coastal Duneveld.
- The vegetation on REM Farm 1 has been heavily disturbed over significant areas within the greater project area. The result is that the remaining vegetation is important not only since it represents particular types but because it is important for functioning of the ecosystem.
- Other sensitive features include the Orange River mouth that is a Ramsar site. This largely applies to the Noordsif Slimes Dam in the north. The existing buffer around the slimes dam must be adhered to, to prevent impacts on the Ramsar site.
- The Holgat River sand riparian zones will be regarded as no-go areas.
- Avoidance of current important mining operations and infrastructure.

- Red-flagged coastal area (due to Archaeological, Palaeontological and Coastal littoral active zone). The area to be mined (slimes dams) must not extend beyond the current limits of the slimes dams and where possible must observe the red flagged coastal area. The onsite geologist and mining team will be trained with reference to Archaeological, Palaeontological and Coastal littoral active zone features in order to avoid sensitive and intact area (see Appendix E).

These are shown on the map in Appendix C.

Existing infrastructure in the area

Water

Alexkor sources potable water from the Orange River and Process water is pumped from the sea. Waste water, together with the slimes, are pumped to the slimes dams at the operating plants.

Power

Power is provided to Alexkor via a 22kV Eskom line. Voltage is decreased to 400V and distributed as required to the plants.

Telecommunications

Telkom telephone communication is available via a microwave tower and land link. Cellular telephone reception is available throughout most of the mine.

Accommodation and Offices

Alexander Bay town provides accommodation in the form of houses or single quarters for permanent staff and contractors, as well as shops, schools and a hospital. The mine complex, comprising several office buildings and workshops, forms the centre of the infrastructure for the Alexkor Operations.

Security

Security at the Alexkor Projects is of paramount importance to the company and as a result will be of a high standard. Security is divided into the physical aspects and the electronic surveillance systems. The physical security comprises a 24-hour service, utilising well-trained staff carrying out the following:

- access control for personnel, vehicles and equipment;
- surveillance and patrolling of the mine area;
- surveillance and patrolling of the processing and final recovery plants;
- escorting and safeguarding the concentrate during transport to the final plants; and
- escorting and safeguarding the product off the site.

Main Access

The R382 road from Steinkopf to Port Nolloth is tarred all the way to Alexander Bay. From Steinkopf to Port Nolloth is a distance of 84km and from Port Nolloth to Alexander Bay is another 84km.

Internal Roads

All roads in and around the mine are gravel and well-maintained when in use.

Railroad

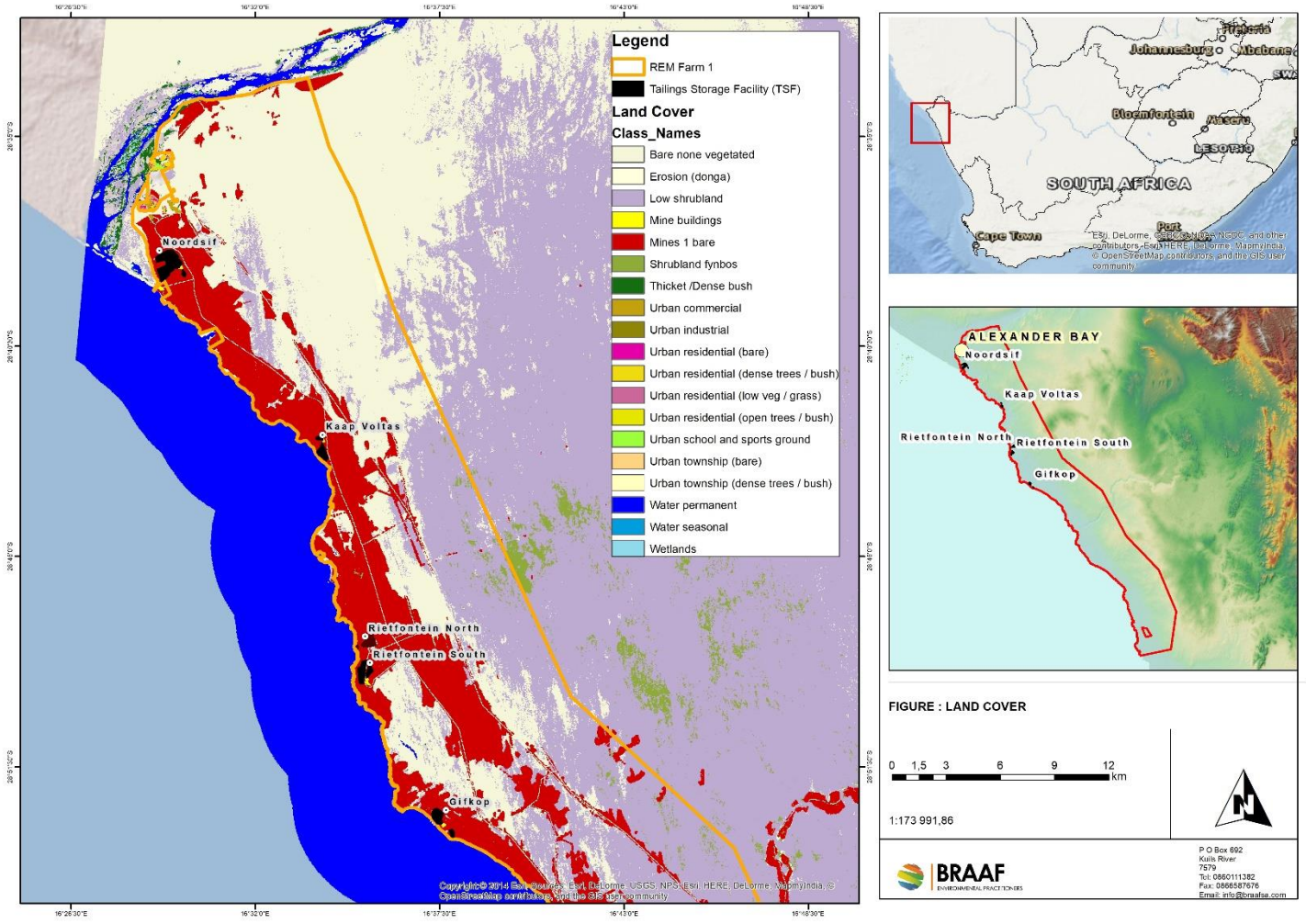
The closest railroad access is from Bitterfontein southwards to Cape Town, and from Loop #10 on the Sishen-Saldanha railway line southwards to Saldanha, which is the closest export harbour.

Waste and Sewage

Septic tanks and French drains provide sewage disposal. Solid waste disposal will take place in cooperation and consultation with the Alexkor EMPr. A contractor currently removes oil, grease and related pollutants. Any other hazardous waste is transported to a registered hazardous waste site and in full compliance with the Alexkor EMPr.

7.4.1.4 Environmental and current land use map.

(Show all environmental, and current land use features)



7.5 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).

The Basic assessment (EIA) has been undertaken according to Braaf's impact assessment methodology which follows internationally recognised and accepted impact assessment principles and is compliant with NEMA regulations. The method used to define and evaluate the impacts is explained in Part A, Section 7.6

Refer to Section 7.12 where potential impacts were identified and rated for significance without mitigation measures in place.

Other impacts identified were drawn from recent studies undertaken for the Alexkor Mine on REM Farm 1.

7.6 Methodology used in determining the significance rating of impacts

The impact significance rating process serves two purposes: First of all, it helps to highlight the critical impacts requiring consideration in the management and approval process; and secondly, it serves to show the primary impact characteristics, as defined above, used to evaluate impact significance.

The impact significance rating system is presented in Table 7-3 and involves three parts:

1. Define impact consequence using the three primary impact characteristics of magnitude, spatial scale/population and duration;
2. Use the matrix to determine a rating for impact consequence based on the definitions identified in Part 1; and
3. Use the matrix to determine the impact significance rating, which is a function of the impact consequence rating (from Part 2) and the probability of occurrence.

Table 7-3: Significance rating methodology

PART 1: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE Use these definitions to define the consequence in Part 2		
Impact characteristics	**Definition**	**Criteria**
MAGNITUDE	Major -	Substantial deterioration or harm to receptors; receiving environment has an inherent value to stakeholders; receptors of impact are of conservation importance; or identified threshold often exceeded
	Moderate -	Moderate/measurable deterioration or harm to receptors; receiving environment moderately sensitive; or identified threshold occasionally exceeded
	Minor -	Minor deterioration (nuisance or minor deterioration) or harm to receptors; change to receiving environment not measurable; or identified threshold never exceeded
	Minor +	Minor improvement; change not measurable; or threshold never exceeded
	Moderate +	Moderate improvement; within or better than the threshold; or no observed reaction
	Major +	Substantial improvement; within or better than the threshold; or favourable publicity
SPATIAL SCALE OR POPULATION	Site or local	Site specific or confined to the immediate project area
	Regional	May be defined in various ways, e.g. cadastral, catchment, topographic
	National/ International	Nationally or beyond
DURATION	Short term	Up to 18 months.
	Medium term	18 months to 6 years
	Long term	Longer than 6 years

PART 2: DETERMINING CONSEQUENCE RATING Rate consequence based on definition of magnitude, spatial extent and duration					
			SPATIAL SCALE/ POPULATION		
			Site or Local	**Regional**	**National/ international**
MAGNITUDE					
Minor	**DURATION**	**Long term**	Medium	Medium	High
		Medium term	Low	Low	Medium
		Short term	Low	Low	Medium
Moderate	**DURATION**	**Long term**	Medium	High	High
		Medium term	Medium	Medium	High
		Short term	Low	Medium	Medium
Major	**DURATION**	**Long term**	High	High	High
		Medium term	Medium	Medium	High
		Short term	Medium	Medium	High

PART 3: DETERMINING SIGNIFICANCE RATING *Rate significance based on consequence and probability*				
		CONSEQUENCE		
		Low	**Medium**	**High**
PROBABILITY (of exposure to impacts)	Definite	Medium	Medium	High
	Possible	Low	Medium	High
	Unlikely	Low	Low	Medium

7.7 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

Kindly see Part A, Section 6 and 7 above; the advantages and disadvantages of the proposed site layout have been discussed in the reasons provided in this section, inclusive of the reasons for not considering alternatives.

Currently, there is no alternative layout, however, the no-go areas were excluded eliminating impacts up-front. If comments are received during the BA process raising major issues these will be considered in aligning the site layout to minimise impacts.

7.8 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).

All comments and issues raised by I&Aps will be included in the updated BAR. The Basic Assessment underwent two rounds of public participation and to date no comments have been received.

7.9 Motivation where no alternative sites were considered

The application is tied to the Alexkor/RMC JV farm cadastral. The mining alternatives relates to site layout on a micro-scale after the waste management license has been awarded. No other suitable farms exist in the area for an application of this nature. The reprocessing of slimes for heavy minerals has proven to be commercially viable and will aid in decreasing Alexkor's financial commitments as it is linked to rehabilitation of the site. The no-go development option is not regarded as feasible because potential resources are available, and mining land-use rights are in place.

No property alternatives have been considered as the envisaged mining operations will occur in an area of existing mining operations, and in close proximity to the access road and local markets.

7.10 Statement motivating the alternative development location within the overall site

The site layout was determined by considering both spatial and practical mining operation aspects. The proposed layout and nature of the mining activity within a disturbed footprint (slimes dams) and associated infrastructure will be implemented with the aim to reduce substantial impacts on the area.

The environmental characteristics of the site were determined using previous studies undertaken on REM Farm 1 since mining activities have been taking place on the area for numerous decades, including making use of existing information to assess the sensitivity of the overall application site. The potential impacts associated with the proposed development are of medium to low significance and with the implementation of the proposed mitigation measures, these can be significantly reduced to be of low to very low significance. The proposed site and layout is considered suitable provided that all the conditions, mitigation measures and environmental impact regulations are implemented.

7.11 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

The identified risks and impacts for this study, specifically the proposed site layout, were informed by the environmental studies undertaken over the past years for REM Farm 1, the socio-economic need of the surrounding area, as well as the ongoing mining activities on site and the landscape.

All the anticipated impacts and risks, as well as significance for the proposed project during the life of the project have been included in Part A, Section 7.12. Mitigation measures associated with each impact and risk are also included in these tables.

Impacts and risks were identified using a standardised method that forms part of methodology that the EAP utilised (PART A, Section 7.6) for the BAR and EMPr. This process involved:

- Input from the specialist surveys, baseline assessments and recommendations;
- Input from the desktop analysis of relevant sector plans and available land use planning tools;
- Consultation and discussions with the project team and Alexkor Environmental Department; and
- Application of previous knowledge and experience by the EAP for these types of projects in Northern Cape region.

7.12 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

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.... etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
Re-mining of slimes dams (excavations)	Dust emissions.	Air Quality	• Construction Phase • Operation Phase • Decommissioning Phase	Medium (Negative)	• Monitor and manage through Dust Management Plan and Measures.	Low (Negative)
	Soil erosion due to exposed soil.	Soils and water resources	• Construction Phase • Operation Phase • Decommissioning Phase	Very low (Negative)	• Monitor and remedy through Emergency Response Plan. • No materials should be stockpiled within the wetland area adjacent to the Slimes dams (i.e. this does not pertain to the 'wetlands' identified on the existing Slimes dams as these areas have previously been transformed by mining activities). • Clearly defined access routes should be used.	Very low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
	Noise generation	Noise Receptors	• Construction Phase • Operation Phase • Decommissioning Phase	Very low (Negative)	• Manage through Noise Reduction Measures and Regular Vehicle Inspections.	Very low (Negative)
	Low and peak flow	Alteration of flow characteristics and free drainage of the area	• Operation Phase	Very low (Negative)	• All infrastructure will be planned and continuously implemented to such an extent to ensure that all blend into the surrounding topography as far as feasible.	Very low (Negative)
	Loss of vegetation and faunal habitat.	Flora and Fauna	• Construction Phase	Moderate (Negative)	• Remedy through Rehabilitation Plan, and Alien Invasive Management Programme.	Low (Negative)
Stockpiles	Dust emissions.	Air Quality	• Construction Phase • Operation Phase • Decommissioning Phase	Very low (Negative)	• Monitor and manage through Dust Management Plan and Measures.	Very low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
	Topography and visual alteration.	Topography and Visual Environment	• Construction Phase • Operation Phase	Moderate (Negative)	• Minimise through Mine Design and Management Plan.	Low (Negative)
	Surface water contamination.	Water resources	• Construction Phase • Operation Phase • Decommissioning Phase	Moderate (Negative)	• Monitor and remedy through Emergency Response Plan and Stormwater Management Plan.	Moderate (Negative)
Processing Plant	Topography	Land transformation: Construction of new infrastructure and site clearing	• Construction Phase	Low (Negative)	• Locate Plant and new infrastructure on areas previously disturbed by mining activities. • Demarcate development footprint area. No development outside of this footprint will take place. • Design and location of infrastructure needs to be developed in consultation with Alexkor's Environmental Manager to minimise landtake as far as possible. • A permanent, dedicated communication channel	Low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
					should be established by the mine to ensure transparent and open negotiation channels between the VMS and the Alexkor mine. • Stockpiled soils should be lightly ripped to at least 30 cm and re-vegetated by hydro-seeding to re-establish the protective vegetation cover (where applicable and if in line with Alexkor's Rehabilitation Plan). • Limiting the area of impact to as small a footprint as possible, inclusive of resource stockpiles. • The development and inclusion of soil management as part of the general housekeeping operations. • Regular servicing of all vehicles in bunded areas.	

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
					• Install erosion prevention measures prior to the onset of construction activities. • Locate all stockpiles, laydown areas and temporary construction infrastructure at least 50m from the edge of delineated wetlands (this specification does not pertain to 'wetlands' on Slimes dams). • No washing of equipment or machinery in any waterbody or wetland on site.	
	Land transformation- Uncovering of archaeological material during construction	Archaeology and cultural heritage	• Construction Phase	Medium (Negative)	• If any sites of potential heritage significance are uncovered during construction activities, work in the area will be stopped immediately and the occurrence will be reported to the SAHRA within 24 hours. • If the removal of a heritage site is required,	Low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
					the necessary permits will be obtained from the SAHRA and the removal of a site will be undertaken by a qualified archaeologist in consultation with the SAHRA. • Where necessary, heritage sites will be fenced off in order to protect the sites during construction. • All construction activities will remain outside of areas where heritage sites are present due to earlier settlements, e.g. the red flagged coastal strip. • Implement the Chance find procedure throughout works, where applicable.	
	Decommissioning of infrastructure	Land transformation: Demolition of surface	• Decommissioning Phase	Low (Negative)	• The affected area will be rehabilitated, as close as possible, to its pre-mining land capability.	Low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
		infrastructure			• All areas where rehabilitation is taking place will be fenced off until the process has been completed and self-succession is in place. • Newly seeded/planted areas must be protected against compaction and erosion. • Traffic should be limited were possible while the vegetation is establishing itself. • Repair any damage caused by erosion. • A suitably qualified biodiversity team will assist with the rehabilitation and landscaping plans. • Rehabilitation of the Slimes dams will take place in line with the Alexkor EMPr and Rehabilitation Plan.	
		Low and peak flow: Alteration of flow characteristics and free drainage of the area				
		Land transformation: Removal of the four TSFs				

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
					• Weekly inspection of vegetation establishment. • Continuation of alien vegetation removal and ensure the removal of the alien and weed species encountered on the rehabilitated area.	
	Surface and groundwater	Wetlands, existing boreholes and coast	• Construction and Operation Phase	Low (Negative)	• Tailings will be dewatered, and this water recycled to the process water dam for reuse in the plant. • Process water dam must not to be located near any identified sensitive surface water body, or within the coastal area. • The dam should be of sufficient capacity to ensure that no overflow occurs. • Slimes initially to be pumped into an off-path tails dam, and later co-disposed with sand and	Low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
					gravel tails into the areas to be rehabilitated. • Seawater will be piped from the existing wells on the nearby beach. Water storage tanks/Process water dam not to be located near surface water resources and boreholes. No water is to be discharged to the ocean.	
	Removal of surface infrastructure could result in disturbance to adjacent wetland habitat. Disturbed areas will subsequently be prone to erosion and establishment of alien vegetation, leading to overall wetland degradation.	Surface and Groundwater	• Decommissioning	Low (Negative)	• All decommissioning activities will be restricted to the disturbed footprint and make use of existing access routes and roads. • Fences around wetland areas (if required)0 should be maintained until completion of decommissioning and closure activities (if required and applicable). • All solid waste should be removed from site and disposed of at suitable	Low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
					waste disposal sites offsite. • Disturbance footprints should be revegetated as soon as possible following completion of demolition activities. • Alien vegetation management plan should be implemented following re-vegetation to clear alien species. • Inform all contractors and staff on the sensitivity and location of adjacent wetland areas (not applicable to 'wetlands' on TSF's). • Implement alien vegetation management plan to remove and control establishment and spread of alien species.	
Loading, hauling and transport	Topography and visual alteration.	Topography and Visual Environment	• Construction Phase • Operation Phase	Moderate (Negative)	• Minimise through Mine Design and Management Plan.	Low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
	Traffic increase	Road safety	• Construction Phase • Operation Phase • Decommissioning of infrastructure	Very low (Negative)	• Implement a traffic management plan.	Very low (Negative)
Hydrocarbon spill	Soil and water resources contamination.	Surface and Groundwater	• Construction Phase • Operation Phase • Decommissioning of infrastructure	Moderate (Negative)	• Monitor and remedy through Emergency Response Plan. Manage and control through a Soil Rehabilitation Plan and Stormwater Management Plan (to be prepared prior to ops). • Excess water will be disposed of in a legal acceptable manner.	Very low (Negative)
Waste	Soil and water resources contamination.	Soils and water resources	• Construction Phase • Operation Phase	Moderate (Negative)	• Monitor and remedy through Emergency Response Plan. Manage and control through Soil Rehabilitation Plan and Stormwater Management Plan. • All settling ponds and runoff must be located	Very low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
					and directed away from surface water resources (such as the Ramsar site and other rivers or streams). • Develop a leak/spill procedure for all possible areas of leaks/spillages. • Spill kits will be provided for on site for spill clearing. • Spills will be cleared and remediated immediately as per the mine's Leak/Spill Procedure.	
	Topography and visual alteration.	Topography and Visual Environment	• Construction Phase • Operation Phase	Moderate (Negative)	• Minimise through Mine Design and Management Plan.	Low (Negative)
Tailings extraction	Impact on instream biota and habitat.	Environment and Natural Resources Biota	• Construction Phase Operation Phase Decommissioning Phase	Low (Negative)	• Remedy and Minimise through Rehabilitation Plan and implementing a buffer around all rivers and streams.	Low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
	Establishment and spread of alien plant species.	Fauna and Flora	• Construction Phase Operation Phase Decommissioning Phase Post Closure	Moderate (Negative)	• Manage and control through Alien eradication programme.	Low (Negative)
	Destruction of features of heritage importance.	Heritage	• Construction Phase Operation Phase	Very low (Negative)	• Manage and avoid through training prior to ops and implementing a chance find procedure (see Appendix E). Keep clear of coastal strip by remaining within footprint area of existing slimes dam ops area.	Very low (Negative)
	Topography and visual alteration.	Topography and Visual Environment	• Operation Phase	Moderate (Negative)	• All infrastructure will be planned and continuously implemented to such an extent to ensure that all blend into the surrounding topography as far as feasible.	N/A
	Dust emissions	Air quality	• Construction Phase	Very low (Negative)	• Monitor and manage through a Dust Management Plan which must be	Very low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
					prepared and implemented.	
			• Operation Phase	Moderate (Negative)	• Phased mining. • Clearing must take place in alignment with mining phases. • Implement dust suppression measures. • Use reprocessed tailings to rehabilitate mined out areas. Prepare a Rehabilitation and Revegetation Plan for implementation. • Clearing will be limited to the designed footprint. • Water sprays (or other form of dust prevention) on unpaved roads, stockpiles and material handling points. • Traffic control done through restriction of traffic volumes on internal roads and vehicle speeds.	Low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
					• Vehicle speeds within the mining area will be limited to 40 km/h. • Use water sprays (or other form of dust prevention) on all stockpiles with special attention given to active stockpiles. • Maintain a complaint register and capture the dust related complaints in the grievance mechanism. The grievance will be investigated by the applicable VMS representative in order for the complaint to be resolved and closed out.	
Rehabilitation and restoration of disturbed areas	Establishment and spread of alien plant species.	Fauna and Flora	• Decommissioning Phase Post Closure	Moderate (Negative)	• Manage and control through Alien Invasive Management measures.	Low (Negative)
	Destruction of vegetation.	Fauna and Flora	• Decommissioning Phase	Moderate (Negative)	• Manage and Minimise through Management Plan and Rehabilitation Plan	Low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
	Soil and water resources contamination.	Soils Groundwater	• Decommissioning Phase	Low (Negative)	• Monitor and remedy through Emergency Response Plan.	Very low (Negative)
	Impact on upstream tributaries and water in the catchment.	Surface water	• Decommissioning Phase	Moderate (Negative)	• Manage and Minimise through Management and Rehabilitation Plan.	Low (Negative)
	Topography and visual alteration.	Topography and Visual Environment	Decommissioning Phase	Low (Negative)	• Remedy through Rehabilitation and Closure Plan.	Very low (Negative)
	Noise generation.	Noise receptors	Decommissioning Phase	Very low (Negative)	• Manage through Noise Reduction Measures and Regular Vehicle Inspections.	Very low (Negative)
	Air quality and dust emissions.	Air quality	Decommissioning Phase	Very low (Negative)	• Monitor and manage through Dust Management Plan and Measures.	Very low (Negative)
	Land capability reduction.	Soils Vegetation	Decommissioning Phase Post Closure	Moderate (Negative)	• Manage, minimise through Post-Closure Management Plan and Rehabilitation Plan.	Very low (Negative)
Employment of workers, and acquiring mining		Socio-economic	Construction Phase Operation Phase	Moderate	• Promote through Local Based Employment	High (Positive)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
vehicles, machinery, equipment and materials.	Creation of local employment and skills development.			(Positive)	Strategy, and Women and Youth Employment Initiatives.	
	Contribution to the short-term growth of the local economy.	Socio-economic	Construction Phase Operation Phase	Moderate	• Management of employment expectations through distribution of appropriate and timely information. • Communication with community and job-seekers regarding actual project start dates and available job opportunities. • Do not employ at the mine gates, ensure there is an employment procedure in place and known to work seekers. • Use existing employment databases which may be made available by Alexkor to determine which locals are available and have the necessary skills to be	High (Positive)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
					employed at the VMS operation. • Enforce the contractor management plan, especially relating to local recruitment and procurement.	
				(Positive)	• Promote through Local Construction Markets. Support to SMME Initiatives.	
	Impact on health and safety of workers.	Socio-economic	Construction Phase Operation Phase	Moderate (Negative)	• Prevent impacts on health and safety of workers through Awareness Campaigns and Training.	Low (Negative)
Rehabilitation and closure of mine	Loss of employment and enterprise development opportunities due to closure of mine During decommissioning and closure, all mining activities will cease and therefore	Socio-economic	Decommissioning Phase	Moderate (Negative)	• Develop a closure plan which will aim to reinforce the objectives for employment by promoting skills transfer to enable alternative livelihoods.	Low (Negative)

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. For mining,- 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.)	**POTENTIAL IMPACT** (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**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 etc. etc) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation	**SIGNIFICANCE if mitigated**
	employment opportunities will be lost. It is anticipated that there will be a negative effect on employees as a result of job losses.					

7.13 Summary of specialist reports

The proposed Vast Minerals TSF project entails reprocessing of the existing slimes dams within the Alexkor Mine area. The proposed project will not impact on any virgin land and will not extend the footprint of the existing mining operation. It will adhere to the current mine's footprint as well as adhere to existing buffers around slimes dams to prevent impacts to the environment.

The nature and scale of the activity is such that it will have a minimal impact on the current mining operation and environment. As the current mining operation has been ongoing for the past 90 years, extensive studies have been done for the affected area. For this reason, information was drawn from existing studies for the mine site to inform the controls and mitigations measures recommended in this report. The reports which were used is referenced in Section 11.

Recommendations are listed in Section 7.12.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.

7.14 Environmental impact statement

7.14.1 Summary of the key findings of the environmental impact assessment;

The impact assessment confirmed that the proposed activities (without mitigation) are expected to have impacts of medium significance rating in relation to: groundwater, surface water, and air quality conditions.

There are no impacts related to the proposed Vast Minerals TSF project that are rated as having a high significance. The majority of impacts are rated moderate to low and

are included in the Table under Section 7.12 which describes all impacts identified in detail and includes mitigation measures to reduce the significant ratings.

7.14.2 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 indicating any areas that should be avoided, including buffers. Attach as Appendix D.

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

A summary of the positive and negative potential impacts associated with the project has been outlined in Section 7.14.1 above.

For the slimes dams to be exploited, Vast Minerals will first set up their Processing Plant using the existing infrastructure at the Noordsif and Rietfontein South Plants, one after the other as mining proceeds. As mining will commence at the Rietfontein South slimes dam, the Rietfontein South Plant will be activated first. This plant will be established adjacent to the tailings dump on an area which has previously been disturbed (see Figure 8). Existing internal roads will be used to access the dumps and transport concentrate offsite to markets. The impacts are split in two sections namely site establishment (construction) and operations.

Site establishment	
Cultural and Heritage	a Local Possible low impact before mitigation and with mitigation a very low impact is expected
Noise	a Local possible very low impact before and after mitigation is expected.
Visual -	a Local possible very low impact before and after mitigation is expected.
Traffic	a Local probable very low impact before and after mitigation is expected.
Dust	a Local definite low impact before and after mitigation is expected.
Soil and vegetation	a Local definite very low impact before and after mitigation is expected.
Fauna	Local extent, definite very low impact before and after mitigation is expected.

Socio-economic	Local extent, possibility, moderate impact before and high after mitigation is expected.
Surface and Groundwater	Local extent, possible very low impact before and after mitigation is expected.
Operation	
Cultural and Heritage	a Local Possible low impact before mitigation and with mitigation a very low impact is expected
Noise	a Local possible very low impact before and after mitigation is expected.
Visual -	a Local possible very low impact before and after mitigation is expected.
Traffic	a Local probable very low impact before and after mitigation is expected.
Dust	a Local definite medium to low impact before and after mitigation is expected.
Soil and vegetation	a Local definite very low impact before and after mitigation is expected.
Fauna	Local extent, definite very low impact before and after mitigation is expected.
Socio-economic	Local extent, possibility, moderate impact before and high after mitigation is expected.
Surface and Groundwater	Local extent, possible very low impact before and after mitigation is expected.

7.15 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 for inclusion as conditions of authorisation.

The EMPr addresses the environmental impacts associated with the project during Construction, Operation, Decommissioning Phases of the proposed project. The objectives of the EMPr will be to provide detailed information that will advise the planning design of the Vast Mining TSF mining activities in order to avoid and/or reduce impacts that may be detrimental to the environment. The following environmental management objectives are recommended for the proposed mining development and associated infrastructure:

- Alien plant monitoring should take place after construction, throughout the lifecycle of the mine, as well as post closure of the mine.
- Development planning must restrict the area of impact to a minimum and designated area only.

- Monitor and prevent contamination and undertake appropriate remedial actions.
- Limit the visual and noise impact on receptors.
- Avoid impact on possible heritage finds. Adhere to existing mine and infrastructure footprint.
- Promote health and safety of workers.
- Limit dust and other emissions to within allowable limits and careful phased mining and stripping.
- Areas should be rehabilitated as soon as practically possible.
- Traffic must be managed as far as possible; speed limits are honoured and traffic congestion prevented in and around the mine site;
- Employment creation as part of the mining activity must contribute to the local economy.
- Manage soils to prevent erosion.

7.16 Aspects for inclusion as conditions of Authorisation.

Any aspects which must be made conditions of the Environmental Authorisation The following aspects as recommended by the specialist studies are emphasised to be included as conditions in the Environmental Authorisation:

It is imperative that an effective management plan is implemented to ensure that all mitigation measures discussed in the report are adhered to. The project proposal will be permissible if all the conditions, mitigation measures and environmental impact regulations are implemented.

- If any archaeological or palaeontological material or human burials are uncovered during the course of development, then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist or palaeontologist as appropriate. The project EMPr should make reference to this possibility so that appropriate action can be taken as and when necessary.
- Avoid natural vegetated areas.
- Maintain existing buffer from the Ramsar area (Orange River), i.e. adhere to the existing Noordsif Slimes Dam and infrastructure footprint.
- No vehicle driving within 100 m from the high-water mark of the sea (littoral active zone).

7.17 Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

Uncertainties form part of any proposed development with regards to the actual degree of impact that the development will have on the immediate environment. Any actual and/or site-specific results will only be determined once development has commenced and throughout the life cycle of the proposed project.

The following assumptions and limitations have been identified with regards to the environmental baseline, impacts and mitigation measures:

- All the technical data, project description and information provided by the proponent to the EAP is pre-concept level. The EAP has identified all possible impacts based on the information provided and these have been assessed and rated accordingly;
- Vast Minerals and its contractors will implement the management measures contained in the BAR and EMPr;
- A monitoring and evaluation system, including auditing, will be established, in line with this EMPr, to track the implementation of this specific EMPr to ensure that management measures are effective to avoid, minimize and mitigate impacts; and that corrective action is being undertaken to address shortcomings and/or non-performances;
- Vast Minerals will adopt a process of continual improvement when managing and/or mitigating negative environmental impacts arising from the project. The EMPr will be used as the basis of environmental management and will be improved and refined regularly; and
- The monitoring required of the project will determine the validity and accuracy of the predictions made. Any exceedances of parameters or complaints from stakeholders will be investigated and remedied by the mine when required to do so.

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

7.18.1 Reasons why the activity should be authorized or not.

Mining is important for economic development, to construct durable, modern structures, employment creation and revenue collection. The proposed mining activities will generate several new employment opportunities which is in line with the longstanding employment creation though mining for the area. The project site is in the Richtersveld Municipality, and according to the municipality's 2016/17 Local Economic Development Strategy, the identified economic sectors of the municipality are mining, agriculture, fishing, tourism. Heavy minerals have become a sought-after commodity and with the existing reserves in the tailings dumps and slimes dams, it stands to reason that it should be exploited. As the identified resource is in what is essentially mine waste, it will be lost if not reprocessed.

Braaf is of the opinion that should the identified mitigation and management measures be implemented, the Project ought to proceed to provide the following opportunities to Vast Minerals:

- A small number of new employment opportunities;
- Access to a previously unreachable resource that will ultimately increase the life of operations on REM Farm 1.

No fatal flaws have been identified in the Vast Minerals TSF project thus far through the EIA process. However, several environmental and social impacts are envisaged from construction phase through to post-closure, which require careful mitigation and monitoring. It is the opinion of the EAP that all major impacts have been identified and have been assigned appropriate management measures. Most moderate negative impacts with mitigation, are reduced to a MEDIUM or LOW significance, and can be managed accordingly.

It is recommended by the EAP that the proposed Vast Minerals TSF project could be authorised, on the assumption that the environmental and social management commitments included in this BAR/EMPr are adhered to, the project description remains as per the description provided in this document and considering the positive social impacts associated with the project. The Vast Minerals TSF project will ensure exploitation of new mineral to be mined in the Alexander Bay area, which would be lost to the market if it remained tailings. In so doing, it will reduce Alexkor's current rehabilitation liabilities.

7.18.2 Conditions that must be included in the authorisation

The BAR and EMPr of this proposed project must form part of the contractual agreement and be adhered to by both the contractors and the applicant. The applicant must also ascertain that there is representation of the applicant on site, at all times of the project, ensuring compliance with the conditions of the BAR and EMPr, and Environmental Authorisation thereof.

To ensure compliance with, and implementation of the BAR and EMPr by:

- Appointing of a suitably qualified individual to oversee implementation of the EMPr during all phases of the project; and
- Appointing a suitably qualified Environmental Control Officer/Superintendent to undertake audits on a regular basis throughout the construction phase.

To ensure that all staff, contractors and sub-contractors are aware of and understand the requirements of the BAR and EMPr and environmental issues in relation to their individual areas of work by:

- Developing an induction and training program covering the BAR and EMPr, environmental awareness, dealing with environmental incidents and waste management; and
- Advising staff commissioned during pre-construction and construction, including sub-contractors, of BAR and EMPr requirements through the induction program as well as on notice boards at the contractor's camps during construction and notice boards during operation. These notice boards should cover the BAR and EMPr, environmental awareness, dealing with emergencies and waste management.
- Implementing an Environmental Emergency preparedness procedure and the non-conformance and compiling the corrective action procedure for the project. This is to be implemented in emergency situations such as Oil or fuel leaks and spills, fires, sewage spillage. The Emergency preparedness procedure must include requirements to contact the Environmental Coordinator following an emergency or incident.
- Potential impacts identified should be monitored during all phases of the Vast Minerals TSF project. Monitoring will form an important aspect of the mine's operations. Management measures will be amended to address the impacts if analysis of monitoring trends indicates this may be necessary. Monitoring of the operations, in accordance with their operating plans and protocols, will also form an important activity to ensure their long-term sustainability.

- Through Vast Minerals internal auditing and reporting processes and environmental audits (as per the requirements of NEMA EIA Regulations, 2014 and NEMA Closure Regulations, 2015) and other legislated reporting, Vast Minerals should continue to examine the proposed management commitments for the life of mine with a view to continually improve and reduce negative impacts and enhance positive impacts where achievable.

7.18.3 Period for which the Environmental Authorisation (Waste Management License) is required

The waste management license will be required for the following periods:

- Construction = 12-15 months
- Operation =55 years (including ramp up and ramp down)
- Closure = 2 years

7.19 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 EAP undertakes that the information provided in PART A is correct, and that the comments and inputs from stakeholders and Interested and Affected parties upon closure of the comment period will be included and addressed as part of the final BAR and EMPr submission to the DMR.

Refer to Part B, Section 10 for the EAP's signed undertaking.

7.20 Financial Provision

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

The slimes dams will be reprocessed in the following order:

1. Area 1: Rietfontein South

2. Area 2: Rietfontein -North

3. Area 3: Perdevlei

4. Area 4: Noordsif

5. Area 5: Giftkop

6. Area 6: Kaap Voltas

As reprocessing of these slimes dams, based on the current rate of mining will take over 55 years, the rehabilitation has been calculated per Slimes Dam area according to the mining order. As approval is not required in terms of the MPRDA but NEM:WA, the rehabilitation funds will be provided to the competent authority per slimes area prior to mining commencing (e.g. starting with Area 1)and not as a single upfront payment for all the slimes dams. This is further supported by the fact that there are existing financial guarantees in place for these slimes dams based on the current Alexkor Mining Operation on REM Farm 1.

Table 7-4: Financial Provision for Slime Dams to be paid per area starting from Area 1

Mining Order	Slimes Dam	Slimes Dams Extent (ha)	Slimes Dams Rehabilitation Cost	Built Structures
Area 1	Rietfontein South	20	R1 732 977	R158 481
Area 2	Rietfontein North	23	R1 541 874	
Area 3	Holgat South / Perdevlei Plant	9	R466 107	
Area 4	Noordsif Plant	103	R5 222 622	R330 301
Area 5	Gifkop Plant	5	R469 242	
Area 5	Gifkop (South)	19	R1 839 403	
Area 6	Kaap Voltas Plant	20	R1 356 783	
Subtotal				R13 117 789
VAT (15%)				R1 967 668
Total (incl. VAT)				**R15 085 458**

7.20.1 Explain how the aforesaid amount was derived.

The liability for closure of the aspects associated with the proposed Vast Minerals TSF Project has been determined with the input of Alexkor's Environmental Management team based on their most current rehabilitation calculations.

7.20.2 Confirm that this amount can be provided for 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).

Vast Minerals (the Project Applicant), has confirmed that this amount can be provided for.

7.21 Specific Information required by the competent Authority

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: -

7.21.1 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 an Appendix .

Specific impacts include the following:

Construction:

- Potential to result in land take and thus potential loss of property and economic livelihoods;
- As a result of perceptions around job creation, increased expectations around employment opportunities may be created;
- As a result of construction of the mine related infrastructure, supply chain opportunities will be created that could benefit local suppliers;
- Influx as a result of expectations around job and supply chain opportunities, resulting in pressure on land, social services, relationships and other social infrastructure;

Operational:

- As a result of perceptions around job creation, increased expectations around employment and supply chain opportunities may be created;
- Social unrest and protests because of unmet expectations as a result of operation of the mine, combined with existing socio-economic needs and levels of poverty; and

Closure:

- Loss of employment and enterprise development opportunities due to closure of mine.

7.21.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act 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).

There are no significant heritage resources present on the site (i.e. slimes dams) and significant impacts are thus not expected. A chance find procedure for heritage resources is included in the BAR and EMPr (see Appendix E).

7.22 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).

Information regarding the baseline and potential impacts for the Vast Mineral TSF project, is based on the information available, discussions with stakeholders, the applicant and discussions with authorities. The EAP has included all identified impacts, based on the current scope, in this BAR and has assigned appropriate management measures to reduce and manage each identified impact, which included in this BAR and EMPr.

PART B
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

8 DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

8.1 Details of the EAP

The details and expertise of the EAP are detailed in Part A, Section 1.1 and 1.2.

8.2 Description of the Aspects of the Activity

The requirement to describe the aspects of the activity that are covered by the environmental management programme is included in Part A, Section 3.1.

8.3 Composite Map

Refer to Appendix C for the layout with all sensitivities and buffers identified.

8.4 Description of Impact management objectives including management statements

8.4.1 Determination of closure objectives

The proposed application area in on an existing operational mine area which has been mined for the past 90 years. As such the study area has been extensively transformed in terms of soil profile, topography, vegetation, and geomorphology.

The transformed areas fall within an operational mine and are unvegetated or contain little indigenous vegetation. The main potential environmental impacts associated with the proposed project include:

- Topography and Visual Alteration;
- Dust generation;
- Increased traffic;
- Potential Soil and water resources contamination.

Therefore, effective and practical measures need to be implemented to prevent, reduce or control and remedy any impacts that may be detrimental to the

environment, as well as to rehabilitate the site to a desired state similar to that of the pre-mining state. These measures include:

- Rehabilitation of the disturbed areas to return the site to its similar visual state prior mining.
- Identify and attend to possible areas of erosion.
- Implement an effective waste management plan to contain waste on site, as well as any spills that may occur
- Locate plant infrastructure within existing disturbed footprint. Not to be located close to sensitive groundwater (i.e. borehole abstraction points) or sensitive surface water features, i.e. Orange River Mouth Ramsar Site

8.5 Volumes and rate of water use required for the operation

Water will be required for the mineral processing plant. Processing water for slurrying will be supplied by a large reservoir on the high ground east of the plant. The Wet Concentrator Plant (WCP) will be supplied by a process water dam near the WCP. Sea water will be piped over a distance of 2km from an existing well field on the nearby beach to provide process water. This will be done in line with existing approvals and conditions for infrastructure of this nature on the Alexkor Mine Area.

8.6 Has a water use licence has been applied for?

The BAR and EMPr was submitted to the Department of Water and Sanitation (DWS). The DWS contacted Braaf telephonically to clarify several aspects regarding the application which included:

i) Where will process water be sourced from? Braaf responded that seawater will be used in line with the current practice at Alexkor. Further to this, no water will be discharged from the operation to the ocean.
ii) Will new boreholes be required? Braaf responded, No.

It was therefore concluded that no Water Use License was required.

8.7 Impacts to be mitigated in their respective phases

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

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Remining of slimes dams (excavations)	Dust	Air Quality	• Construction • Operation • Decommissioning	• Monitor and manage through Dust Management Plan and Measures.	• Mine rules and acceptable to the mine operators. • GNR 893 Minimum Emission Standards. • Alexkor Air Quality Performance Standards.	Planning stage, during construction, operation and decommissioning.
	Soil erosion due to exposed soil.	Soils and water resources	• Construction • Operation • Decommissioning	• Monitor and remedy through Emergency Response Plan. • Training personnel during pre-construction phase, setup selection, access selection by avoiding areas which have not been transformed by prev. Avoid vegetation removal. Respect no-go areas. • Vegetate and irrigate open areas to limit erosion but take care not to promote erosion by irrigating.	NEM:BA & Integrated Coastal Management Act (ICMA), limit new disturbance try stay within existing disturbed mine footprint.	From pre-construction phase throughout life of mine.
	Loss of vegetation and faunal habitat.	Flora and Fauna	• Construction Phase	• Development planning must ensure loss of vegetation and disturbance is restricted to within the minimum and designated areas only.		

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• Removal of vegetation during construction and operation will be minimised to reduce the risk of excessive open areas occurring. • Adhere to existing roads, and if new roads are constructed, these must not cross sensitive areas such as the areas with existing indigenous vegetation, RAMSAR site, coastal strip or rivers. • Protected plant or animal species encountered must be managed in accordance with an accepted management plan for these species. • Implement a Stormwater Plan. All stormwater infrastructure or settlings ponds must be located away from surface and groundwater sensitivities, prevent runoff into these areas, sea or RAMSAR site.		
	Noise generation.	Noise Receptors	• Construction Phase • Operation Phase	• Manage through Noise Reduction Measures and Regular Vehicle Inspections.	Compliance with SANS 10103 Acceptable Ambient Levels and SANS 10210 of 2004, the national standard for the calculating and predicting of road traffic noise SANS 10328 of 2008	On-going during the construction and operational phase.

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
					Noise Control Regulations – General Notice R154 of 10 January 1992	
	Chance findings	Heritage	• Construction Phase • Operational Phase	• Should a heritage resource (artefact, grave etc) be uncovered during construction, the following steps should be implemented: o Stop all work on site; o Demarcate area so that people know to stay away; o Contact heritage specialist to come and assess the matter; o It may be helpful to provide the following to the heritage specialist beforehand o Photograph of find o GPS coordinates o Basic description (e.g. graves, stone walling, stone tools)	National Heritage Act, 1999	To ensure heritage resources are not damaged during the mining process
Stockpiles	Dust	Air Quality	• Construction • Operation • Decommissioning	• Monitor and manage through Dust Management Plan and Measures. • Maintain a complaint register and capture the dust related complaints in the grievance mechanism. The grievance will be investigated by the applicable Vast Minerals representative in order for the	• Mine rules and acceptable to the mine operators. • GNR 893 Minimum Emission Standards. • Alexkor Air Quality	Planning stage, during construction, operation and decommissioning.

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				complaint to be resolved and closed out.	Performance Standards.	
	Alteration of topography	Topography and Visual	• Construction Phase • Operational Phase	• Minimise through Mine Design and Management Plan. • Demarcate development footprint area. No development outside of this footprint will take place. • Vegetate stockpiles in order to minimise visual transformation of topography and ensure that the stockpiles are free draining. • Stockpiled soils should be lightly ripped to at least 30 cm and re-vegetated by hydro-seeding to re-establish the protective vegetation cover.	N/A.	On-going during the construction and operational phase.
	Surface water contamination.	Water resources	• Construction Phase • Operational Phase	• Construction will be limited to the project footprint. • "No-go" zones will be delineated for contractor's camp. • Surface water management measures are to be constructed first to ensure that runoff and dirty water spills are contained. • Servicing of construction vehicles will take place only in dedicated areas that are equipped with drip trays. • Bunded containment and settlement facilities will be	Alexkor Policies and Guidelines to manage and remediate spills.	On-going during the construction and operational phase.

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				provided for hazardous materials, such as fuel and oil. • Spill-sorb or a similar product will be kept on site and used to clean up hydrocarbon spills in the event that they should occur. • Erosion protection measures will be implemented at steep areas. • A waste management plan will be developed for the duration of the project • Monitor and remedy through Emergency Response Plan and Stormwater Management Plan.		
Loading, hauling and transport **Hydrocarbon spill**	Topography and visual	Topography and Visual	• Construction Phase • Operational Phase	• Adhere to existing roads, and if new roads are constructed, these must not cross sensitive areas such as the ridges or drainage lines. • Implement effective Stormwater Management measures.	In alignment with Alexkor Rehabilitation Plan for affected areas and through ongoing discussion with Environmental Manager of Alexkor. Alexkor Policies and	On-going during the construction operational phase.

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• Create and implement a hydrocarbon spill prevention plan. • Minimise through Mine Design and Management Plan. • Monitor and remedy through Emergency Response Plan. • Manage in accordance with the rehabilitation plan.	Guidelines to manage and remediate spills. Manage soils in line with the requirements of the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN 37603 No 331).	
	Soil and water resources contamination.	Surface and Groundwater	• Construction Phase • Operation Phase	• Monitor and remedy through Emergency Response Plan. • Manage and control through Soil Rehabilitation • Plan and Stormwater Management Plan.	Alexkor Policies and Guidelines to manage and remediate spills. Complaints register to record complaints regarding groundwater South African National Standard (SANS) 241:2011 Drinking Water Standards. Manage soils in line with the requirements of the National Norms and Standards for the	

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
					Remediation of Contaminated Land and Soil Quality (GN 37603 No 331).	
	Dust	Air Quality	• Construction • Operation • Decommissioning	• Monitor and manage through Dust Management Plan and Measures.	• Mine rules and acceptable to the mine operators. • GNR 893 Minimum Emission Standards. • Alexkor Air Quality Performance Standards.	Planning stage, during construction, operation and decommissioning.
Waste	Soil and water resources contamination.	Soil and water resources contamination.	• Construction • Operational • Decommissioning	• Any waste generated must be stored in such a manner that it prevents pollution and amenity impacts. • Bins will be provided for waste and removed regularly from the site. • Waste to be disposed of at a licenced landfill site. • Hazardous waste to be correctly stored and disposed of in terms of relevant legislation and guidelines. • Monitor and remedy through Emergency Response Plan. • Manage and control through Soil Rehabilitation Plan and	Minimise through Mine Design and Management Plan. Manage in accordance with Best Practice Guidelines, NWA, NEMWA."	Life of Mine (~55 years).

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Stormwater Management Plan.		
	Topography and visual alteration.	Topography and Visual Environment	• Construction Phase • Operation Phase	• Minimise through Mine Design and Management Plan. • A waste management plan will be developed for the duration of the project.	Comply with the requirement of NEM: WA.	From Pre-construction throughout Life of Mine.
Rehabilitation and restoration of disturbed areas.	Establishment and spread of alien plant species.	Fauna and Flora	• Decommissioning • Post Closure	• All disturbed areas must be rehabilitated. • Limit activity footprint and avoid disturbance of rehabilitated areas. • Implement an effective Alien Invasive Programme. • Removal of structures to be done cautiously. • Monitoring to be undertaken for a long enough period post closure, e.g., 2-3 years.	Manage in accordance with the Rehabilitation Plan, Alien Invasive Management Programme, NEM:BA and Best Practice Guidelines.	Ongoing during Decommissioning and Post Closure Phase.
	Destruction of vegetation.	Fauna and Flora	Decommissioning Phase	• Manage and Minimise through Management Plan and Rehabilitation Plan	To demonstrate active stewardship of land and biodiversity by: Identifying and removing relevant species if necessary	During decommissioning up until closure.

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
	Soil and water resources contamination.	Soils	Decommissioning Phase	• Monitor and remedy through Emergency Response Plan.	Alexkor Policies and Guidelines to manage and remediate spills. Complaints register to record complaints regarding groundwater South African National Standard (SANS) 241:2011 Drinking Water Standards. Manage soils in line with the requirements of the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN 37603 No 331).	During decommissioning up until closure.
	Dust	Air Quality	• Decommissioning	• Monitor and manage through Dust Management Plan and Measures.	• Mine rules and acceptable to the mine operators. • GNR 893 Minimum Emission Standards.	During decommissioning up until closure.

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
					• Alexkor Air Quality Performance Standards.	
	Noise generation.	Noise Receptors	• Construction Phase • Operation Phase	• Manage through Noise Reduction Measures and Regular Vehicle Inspections.	Compliance with SANS 10103 Acceptable Ambient Levels and SANS 10210 of 2004, the national standard for the calculating and predicting of road traffic noise SANS 10328 of 2008 Noise Control Regulations – General Notice R154 of 10 January 1992	During decommissioning up until closure.
	Land capability reduction.	Soils	Decommissioning Phase Post Closure	• Manage, minimise through Post-Closure Management Plan and Rehabilitation Plan.	In line with Closure objectives and plan and MPDRA closure requirements.	During decommissioning up until closure.
Employment of workers, and acquiring mining vehicles, machinery, equipment and materials.	Creation of local	Socio-economic	• Construction Phase • Operation Phase	• Ensure maximisation of job creation and promote local employment and skills training. Explore opportunities for mineral markets. • Development of skills in mining for Small-Medium Micro Enterprises (SMMEs) as part of Municipal Local Economic Development initiatives.	To meet employment and procurement standards and requirements of Vast Mineral Sands.	During Planning phase and on- going during the construction and operational phase.

ACTIVITIES	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• Development of contractual agreements to supply local construction markets.		
	Contribution to the short-term growth of the local	Socio-economic	• Construction Phase • Operation Phase	• Promote through Local Construction Markets. Support to SMME Initiatives.		
	Impact on health and safety of workers.	Socio-economic	• Construction Phase • Operation Phase	• Prevent through Awareness Campaigns and Training.		

8.8 Impact Management Outcomes

A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated

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.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)	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 etc. etc) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation..	STANDARD TO BE ACHIEVED (Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
All of the above requirements are addressed in the table above in Section 8.7.					

8.9 Impact Management Actions

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

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.).	**POTENTIAL IMPACT** (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc…. etc…)	**MITIGATION TYPE** (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring Remedy through rehabilitation.	**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)
All the above requirements are addressed in the table above in Section 8.7.				

9 FINANCIAL PROVISION

9.1 Determination of the amount of Financial Provision.

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

Closure and rehabilitation of the slimes dams and processing plants (Noordsif and Rietfontein South) will be undertaken when the project ceases operation, but concurrently as mining progress from one area to the next (i.e. Area 1 – Rietfontein South, Area 2 – Rietfontein North; Area 3 Holgat South / Perdevlei Plant; Area 4- Noordsif Plant; Area 5 - Gifkop Plant; Area 5 - Gifkop (South) and Area 6 -Kaap Voltas Slimes Dams.

Tailings resulting from the reprocessing activities [i.e. Thickened underflow (mainly slimes)] will be pumped initially into an off-path tails dam, and later co-disposed with sand and gravel tails into the areas to be rehabilitated. At the end of the project life cycle, a thick soil layer of approximately 333 mm will be spread across the disturbed areas; thereafter the soil will be ripped, fertilised and re-vegetated (with an appropriate seed mix). Post-closure monitoring will assist in determining the success of the rehabilitation and also identify whether any additional measures need to be taken to ensure the area is restored to a reasonable and acceptable condition.

Rehabilitation measures and objectives will be undertaken in compliance with legislation and policy governing the requirements for rehabilitation such as the National Environmental Management Act 107 of 1998 and the Mineral and Petroleum Resources Development Act 28 of 2002 and aligned to best practice and success rates of rehabilitation measures implemented by Alexkor through lessons learnt.

9.1.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

This Report highlights the rehabilitation and management objectives with regards to mitigating negative environmental impacts associated with the proposed mining operation. These environmental objectives related to the closure of the mining operation contained in this report was subjected to two 30-day review periods by Interested and Affected Parties.

9.1.3 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 plan for the proposed mining operation aims to mitigate the negative impacts associated with the mining activities, and ultimately to return the affected land to its desired land use standard. The objectives of the plan are to ensure that the condition of the site post mining operation is suitable to and in agreement with the affected neighbouring community and the competent authority, that there is minimal loss to the biodiversity of the area, and that rehabilitation restores the land use and capability of the area/site. Through discussions with Alexkor it has been indicated that the post land use for the mine area is that of tourism.

The rehabilitation process will be undertaken during the mine closure phase. A more detailed closure plan will be developed during the life of mine, prior to the cessation of mining activities; adapted to the developed information and environmental impact status of the project to achieve a site-specific closure plan.

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

The closure plan will assist the proposed mining operation to achieve the following objectives:

- Comply with relevant legislation and policy requirements with regards to mine rehabilitation.
- Avoid or mitigate impacts associated with the project which may be detrimental to the environment.
- Land rehabilitation to a predetermined and agreed upon state that allows sustainable land use and capability of the site, that is to return the site to the condition that existed prior to mining or an agreed upon state.
- Cost effective and efficient closure of mining operations.
- Management and monitoring of the area post-closure.
- To progressively reinstate a post-mining landscape that improves local spatial development patterns and maximises socio-economic opportunities, by supporting sustainable tourism development, while maintaining essential ecosystem services.

The rehabilitation plan will thus be aligned to the closure objectives and tailored to the project to achieve these objectives. It will include information about the site prior to the reprocessing (VMS mining) operation and provide information on the maintenance of resources required for the rehabilitation process, as well as detail regarding how rehabilitation will unfold. It will also provide information on the management and monitoring of disturbance to avoid or minimise detrimental impacts, as well as an estimate of the financial closure provision. It will also include information associated with post-closure environmental monitoring of the site to ensure that the rehabilitation plan is followed, and its objectives are achieved.

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

The rehabilitation fee guarantee was calculated using information provided by Alexkor via their updated Rehabilitation Plans.

Rehabilitation guarantees for VMS will be provided on an area to area basis prior to mining activities commencing at a Slimes Dam.

The first area to be mined is Rietfontein South which requires a guarantee as outlined in Table 9-1.

Table 9-1: Representing financial guarantee schedule to allow waste management activities, i.e. reprocessing of slimes dams in terms of NEM: WA

Mining Order	Slimes Dam	Slimes Dams Extent (ha)	Slimes Dams Rehabilitation Cost	Built Structures	Payment Order (excl. VAT)	
Area 1	**Rietfontein South**	**20**	**R1 732 977**	**R158 481**	**R1 891 458**	**First guarantee payable**
Area 2	Rietfontein North	23	R1 541 874		R1 541 874	Second guarantee payable
Area 3	Holgat South / Perdevlei Plant	9	R466 107		R466 107	Third guarantee payable
Area 4	Noordsif Plant	103	R5 222 622	R330 301	R5 552 923	Fourth guarantee payable
Area 5	Gifkop Plant	5	R469 242		R469 242	Fifth guarantee payable
Area 5	Gifkop (South)	19	R1 839 403		R1 839 403	Sixth guarantee payable
Area 6	Kaap Voltas Plant	20	R1 356 783		R1 356 783	Seventh guarantee payable

9.1.6 Confirm that the financial provision will be provided as determined.

In terms of Section 41, Regulations 53 and 54 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), Vast Minerals is required to make financial provision for the interim and final rehabilitation activities on the site. This provision is reviewed annually for adequacy and amended to compensate for new activities and/or inflation. Vast Minerals will provide for the closure liability associated with the project to the DMR following authorisation of the project for one area at a time (i.e. one slimes dam area to be reprocessed). It is proposed that since this approval is for a waste management license and mining activities are related to reprocessing existing waste dumps (slimes dams), financial guarantees be payable by VMS from area to area as mining progresses as there are existing guarantees in place covering the rehabilitation of these slimes dams as part of the Alexkor operation.

Table 9-2: Financial Provision

Mining Order	Slimes Dam	Slimes Dams Extent (ha)	Slimes Dams Rehabilitation Cost	Built Structures
Area 1	**Rietfontein South**	**20**	**R1 732 977**	**R158 481**
Area 2	Rietfontein North	23	R1 541 874	
Area 3	Holgat South / Perdevlei Plant	9	R466 107	
Area 4	Noordsif Plant	103	R5 222 622	R330 301
Area 5	Gifkop Plant	5	R469 242	
Area 5	Gifkop (South)	19	R1 839 403	
Area 6	Kaap Voltas Plant	20	R1 356 783	
Subtotal				R13 117 789
VAT				R1 967 668
Total (incl. VAT)				**R15 085 458**

9.2 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) Mechanism 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
Mining operation activities	Impacts on soil, air, surrounding land uses, access roads, visual impacts, biophysical environment inclusive of alien vegetation control and water.	Monitor and inspect on a daily basis throughout the mining operation and assess against the recommendations and conditions of the specialist studies, and that of the Environmental Authorisation.	Applicant and Environmental Control Officer	• Ongoing during the Life of Mine. • Compile monthly reports.
Waste Management License	All commitments contained in the BA Report and accompanying EMPr	Ensure commitments made within the approved BAR and EMPr are being adhered to.	Independent EAP/ECO	• Undertake and submit an environmental performance audit every year to DMR

9.3 The frequency of the submission of the performance assessment/ environmental audit report

The Environmental Control Officer will undertake audits in compliance with the provided EMPR contents and guidelines and will compile audit reports, which will ultimately be submitted to the DMR every two years. Operational internal environmental inspections will need to be done once a month by the mine's Environmental personnel.

9.4 Environmental Awareness Plan

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

Vast Mineral Management of the proposed project has to appoint an independent Environmental Control Officer whose duty is to also implement an effective environmental awareness plan aimed to educate workers and contractors in terms of the biodiversity on site, environmental risks associated with the proposed development and land management of the site. Training and/or awareness should be raised and effectively communicated prior to the commencement of the construction phase.

Training sessions should incorporate the management plans addressed in this BAR and EMPr as well as any new information and documentation provided by the ECO (or applicable representative from the mining team with adequate experience), as well as that of the Environmental Health & Safety Officer. The ECO would be the most suitable person to conduct these training sessions, identifying sensitive environments as well as all the risks and impacts associated with the mining operation and the methods in which to deal with the impacts in order to avoid environmental degradation. Training sessions can be monitored by providing an attendance register indicating the workers that received training as well as evidence of the training and/or awareness received. These sessions would also need to be carried out throughout the Life of Mine, at least once a year, or as new information becomes available. All personnel performing tasks which can cause significant or major environmental impacts shall be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above – i.e. operators, artisans.

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

Kindly refer to the table of possible mitigation measures that could be applied in section 7.12 of Part A for an indication of the way risks will be dealt with.

9.5 Specific information required by the Competent Authority

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

No specific information requirements have been made by the competent authority at this stage.

10 UNDERTAKING

The EAP herewith confirms

Undertaking	Confirmation
the correctness of the information provided in the reports	√
the inclusion of comments and inputs from stakeholders and I&APs	√
the inclusion of inputs and recommendations from the specialist reports where relevant	√
that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein	√

Signature of the environmental assessment practitioner	
Name of company	Billet Trade (Pty) Ltd T/A Braaf Environmental Practitioners
Date	14 May 2018

11 REFERENCES

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APPENDIX A CV of EAP

APPENDIX B Public Participation Information

APPENDIX B.1 I&Ap Database

APPENDIX B.2 Newspaper Advert

APPENDIX B.3 Site Notice

APPENDIX B.4 Notification Letter and Background Information Document

APPENDIX C Sensitivity Map

APPENDIX D Final Site Map

APPENDIX E Chance Finds Procedure

APPENDIX F Groundwater Study

APPENDIX G Rehabilitation Plan