mineral resources & energy
Department:
Minerals Resources and Energy
REPUBLIC OF SOUTH AFRICA

DRAFT INTEGRATED SCOPING REPORT FOR THE UPGRADE OF THE APPROVED ENVIRONMENTAL MANAGEMENT PROGRAMME FOR DIAMOND, DIAMOND (GENERAL), DIAMOND (ALLUVIAL), DIAMOND (IN KIMBERLITE), PEBBLE STONES MINING ACTIVITIES FOR ALL MINING RIGHTS ON THE BEACH, SURF ZONES AND SEA CONCESSIONS IN THE MAGISTERIAL DISTRICT OF VANRHYNSDORP, WESTERN CAPE REGION.

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (AS AMENDED IN 2021), NATIONAL ENVIRONMENTAL MANAGEMENT: INTEGRATED COASTAL MANAGEMENT ACT 24 OF 2008 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

Compiled For

MOONSTONE DIAMOND MARKETING (PTY) LTD

By:

Archean Resources (Pty) Ltd

Release Date: 30 August 2021

REPORT INFORMATION

Report Title:	Upgrade of the approved Environmental Management Programme in terms section 12 (s) of the National Environmental Management Act, 2008 (Act No. 62 of 2008) approved mining rights in terms of the MPRDA Act 28 Of 2002, National Environmental Management Waste Act, 2008, National Environmental Management Act (NEMA) (Act No 107 Of 1998): in line with the Environmental Impact Assessment (EIA) Regulations, 2014 as amended were again amended in 2021 (Government Gazette No. 44701, GNR 517) and Coastal Waters Discharge Permit Regulations in terms of the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008).	
Report Reference:	Draft Integrated Scoping Report for the upgrade of the approved Environmental Management Programme for diamond, Diamond (General), Diamond (Alluvial), Diamond (In Kimberlite), Pebble Stones mining activities for all mining rights on The Beach, Surf Zones and Sea Concessions in the magisterial district of Vanrhynsdorp, Western Cape Region.	
Approved Mining Right References	The above-mentioned application includes the following rights and farms: i. De Punt- DMR reference number WC 314 MR (Renewal reference number WC 10733 MR) ii. Bethel 278 Mining Right - DMR reference number WC 315 MR (Renewal reference number WC 10132 MR) iii. Farm 423 & Surf Zone Area Mining Right - DMR reference number WC 47 MR (Renewal reference number WC 10134 MR) iv. Hollebaksfontein Mining Right - DMR reference number WC 318 MR (Renewal reference number WC 10135 MR) v. Papendorp Mining Right - DMR reference number WC 316 MR (Renewal reference number WC 10136 MR) vi. Sea Area 12A Mining Right - DMR reference number WC 3271 MR (Renewal reference number WC 10130 MR) vii. Sea Area 13A Mining Right - DMR reference number WC 320 MR (Renewal reference number WC 10137 MR) viii. Strykloof Mining Right - DMR reference number WC 317 MR (Renewal reference number WC 10137 MR) ix. Weskus Mining Right - DMR reference number WC 319 MR (Renewal reference number WC 10138 MR) x. Sea Area 11A DMR reference number WC 112 MR (Renewal reference number WC 10066MR)	
Report Status:	DSR- 01: Draft Report for Public review	
REVISION	DATE	REASON FOR CHANGE
001	30 August 2021- 29 September 2021	Release of Draft Scoping for public review

002	TBA	Final Integrated Scoping Report: Additional Environmental information and consolidation of I&AP comments

DETAILS OF APPLICANT AND EAP

Table 1: Applicant Details

NAME OF APPLICANT	Moonstone Diamond Marketing (Pty) Ltd
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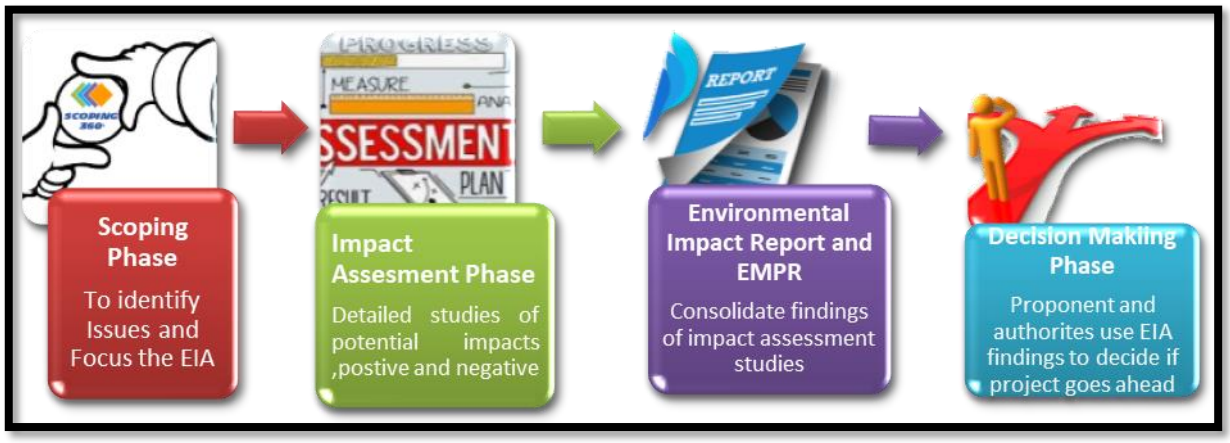
Moonstone Diamond Marketing Pty Ltd (Moonstone Diamond Marketing) formerly Trans Hex Operations (Pty) Ltd has appointed Archean Resources (Pty) Ltd, an independent consulting company, to conduct an integrated Scoping & Environmental Impact Assessment (S&EIR) process for the upgrade of the approved Environmental Management Programme for Moonstone Diamonds Marketing (Pty) Ltd existing diamond, Diamond (General), Diamond (Alluvial), Diamond (In Kimberlite), Pebble Stones mining activities for all mining rights on The Beach, Surf Zones and Sea Concessions in the magisterial district of Vanrhynsdorp, Western Cape Region. The existing rights are surrounded by farmlands with the nearest Residential areas being situated at Koekenaap and Lutzville, 23 km and 30 km inland, respectively.

Moonstone Diamond Marketing lodged an application for Environmental Authorisation (EA) in terms of Section 24 of the NEMA Act read with Section 21 of the EIA regulations to the DMR which was acknowledged on the 20th of August 2021. The application will involve the amendment of the existing environmental management program in terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), National Environmental Management Act (Act No 107 of 1998) as amended, National Environmental Management Waste Act, 2008 and National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008). The report has been designed to meet the requirements for conducting an Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPR) as stipulated in the Regulations contained in both the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002-MPRDA) and National Environmental Management Act (NEMA) respectively.

Comments received during this phase will be considered and addressed in the Environmental Impact Assessment (EIA/EMPr) which will be submitted to the competent authority Department of Minerals (DMR) for approval.

AN EIA CONSISTS OF THE FOLLOWING PHASES



Purpose of this Report

This report addresses the requirements for Scoping Phase and the Plan of Study (PoS) for the Environmental Authorisation Process as outlined in the NEMA regulations and the MPRDA regulations. The aim of this SR is to:

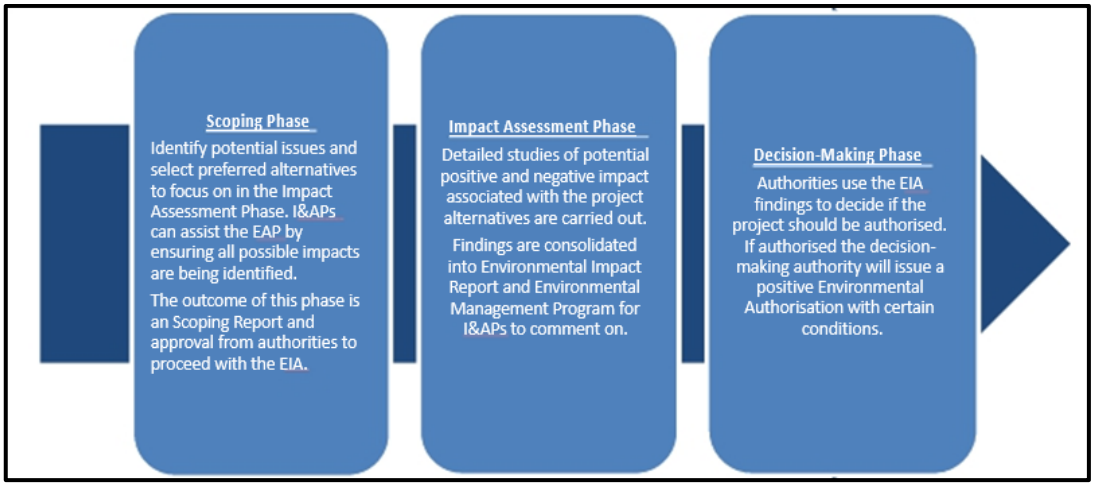
- Provide information to the authorities as well as interested and affected parties (I&APs) on the proposed project;
- Provide information regarding alternatives that are being considered;
- Indicate how I&APs have been and are still being afforded the opportunity to contribute to the project, verify that the issues raised during the scoping phase are incorporated in the impact assessment phase of the environmental authorization process;
- Describe the baseline receiving environment;
- Define the Terms of Reference (ToR) for specialist studies to be undertaken in the Impact Assessment Phase of the EIA; and
- Present the findings of the Scoping Phase in a manner that facilitates input by the I&AP's and decision-making by the relevant authorities.

The Process

As part of the project, a Scoping and Environmental Impact Assessment Process (S&EIR) is being undertaken in line with the provisions of the National Environmental Management Act (EIA regulations as amended). The S&EIR process and specialist studies to be undertaken will also support the applications for the required licenses and environmental authorizations. The EIA findings are used by the applicant and authorities to obtain an objective view of the potential environmental, social, and cultural impacts that could arise during the prospecting of the proposed area.

Measures for the avoidance or mitigation of negative impacts will be proposed and positive impacts will be enhanced. The outcome of the first phase of the S&EIR is the Scoping Report, which provides the basis for undertaking the Impact Assessment Phase of the project. The draft scoping report will be available for review for at least 30 days from the 30th of August 2021 to the 29th of September 2021.

The process is summarized in the illustration below



Environmental Baseline and Potential Impacts

The mining right areas has been identified and this assessment is aimed at identifying the general environmental sensitivities across the stretch which will involve desktop plus specialist studies and draws extensively on information contained in these studies to assess these potential impacts the following baseline information will be assessed:

- Agricultural Impact Assessment
- Landscape/Visual Impact Assessment
- Archaeological and Cultural Heritage Impact Assessment
- Palaeontology Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Aquatic Biodiversity Impact Assessment
- Hydrology Assessment
- Noise Impact Assessment
- Radioactivity Impact Assessment
- Traffic Impact Assessment
- Geotechnical Assessment
- Climate Impact Assessment
- Health Impact Assessment
- Socio- Economic Assessment
- Ambient Air Quality Impact Assessment
- Seismicity Assessment
- Plant Species Assessment
- Animal Species Assessment

Way Forward

The EIA process is being carried out in accordance with the NEMA EIA regulations. Each of the specialists will undertake a detailed EIA assessment. Included in this report is a detailed plan of study provided by each of the appointed specialists to be implemented during the EIA phase. Potential impacts identified during the Scoping and EIA will be assessed by the specialists for each feasible development alternative and for each phase of the project. The EIA and specialist studies will provide input into the EMPR which will provide the necessary action plans and management measures to mitigate the identified impacts.

This Scoping study has been undertaken with the aim of identifying potential positive and negative impacts on the environment and gathering issues, concerns, and queries from I&APs. The Scoping report documents the process followed, the findings and recommendations of the Scoping Phase study, and the proposed Plan of Study for the EIA Phase to follow.

The way forward recommended by this study is as follows:

- Make the Scoping Report available for public comment for a period of 30 calendar days;

- Submit the Scoping Report to the competent authority for permission to undertake the Impact Assessment Phase of the project;
- Upon approval of the Scoping Report, all I&APs are to be notified of the conditions of the Department of Mineral Resources for proceeding with the Impact Assessment Phase of the project;
- Execute the Plan of Study for Impact Assessment during the Impact Assessment Phase of the project.

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LIST OF ABBREVIATIONS

AIA	Archaeological Impact Assessment
ASAPA	Association of Southern African Professional Archaeologists
BID	Background Information Document
CA	Competent Authority
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CSA	Constitution of South Africa (Act No. 108 of 1996)
DEA	Department of Environmental Affairs
DMRE	Department of Minerals and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act (ECA), 1989 (Act No. 73 of 1989)
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GN	Government Notice
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IEM	Integrated Environmental Management
IWULA	Integrated Water Use License Application
IWWMP	Integrated Water and Waste Management Plan
MPRDA	Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) (as amended)
NEMA	National Environmental Management Act (EIA regulations of 4 Dec 2014 as amended in 2021)
NEMAQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OHSA	Occupational Health and Safety Act (Act No. 85 of 1993)
PPP	Public Participation Process
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SR /DSR	Scoping Report / Draft Scoping
UNCLOS	United Nations Convention on the Law of the Sea

GLOSSARY OF TERMS

Anthropogenic: Change induced by human intervention.

Applicant: Any person who applies for an authorisation to undertake an activity or undertake an Environmental Process in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 as amended were again amended in 2021 (Government Gazette No. 44701, GNR 517); and these amendments became effective on the 11th of June 2021 which also affects mining activities.

Archaeological resources: This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency, and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which South African Heritage Resources Agency (SAHRA) considers to be worthy of conservation; features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Biodiversity: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

Cultural significance: This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Cumulative Impact: In relation to an activity, cumulative impact means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Environment: All physical, chemical and biological factors and conditions that influence an object.

Environmental Impact Assessment: In relation to an application, to which Scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

Environmental Impact Assessment Report: In-depth assessment of impacts associated with a proposed development. This forms the second phase of an EIA and follows on the Scoping Report (SR).

Heritage resources: This means any place or object of cultural significance. See also archaeological resources above.

Precipitation: Any form of water, such as rain, snow, sleet, or hail that falls to the earth's surface.

Red Data species: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

Riparian: The area of land adjacent to a stream or river that is influenced by stream induced or related processes.

1 PROJECT INFORMATION

1.1.1 Introduction

Moonstone Diamond Marketing Pty Ltd (Moonstone Diamond Marketing) formerly Trans Hex Operations (Pty) Ltd has appointed Archean Resources (Pty) Ltd, an independent consulting company, to conduct an integrated Scoping & Environmental Impact Assessment (S&EIR) process for the upgrade of the approved Environmental Management Programme for Moonstone Diamonds Marketing (Pty) Ltd existing diamond, Diamond (General), Diamond (Alluvial), Diamond (In Kimberlite), Pebble Stones mining activities for all mining rights on The Beach, Surf Zones and Sea Concessions in the magisterial district of Vanrhynsdorp, Western Cape Region. The existing rights are surrounded by farmlands with the nearest Residential areas being situated at Koekenaap and Lutzville, 23 km and 30 km inland, respectively.

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The report has been designed to meet the requirements for conducting an Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPR) as stipulated in the Regulations contained in both the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002-MPRDA) and National Environmental Management Act (EIA regulations as amended) respectively.

1.1.2 Purpose of the report

In terms of relevant legislations, the applicant may not commence with the prospecting prior to a suite of authorisations. This document is the Scoping Report, the purpose of which is to provide stakeholders with the preliminary results of the Scoping Phase of the study and with an opportunity to verify that all issues have been identified and, if not, provides an opportunity for stakeholders to raise them and for them to be captured and considered in the EIA process.

1.1.3 Assumptions and Limitations

As is standard practice, this Scoping Report is based on a number of assumptions and is subject to certain limitations. These are as follows:

- It is assumed that information provided by the applicant and specialists is accurate;

- A more detailed project description will be presented in the Impact Assessment Phase; and
- Detailed assessment of the potential positive and negative environmental impacts of the proposed development will only be undertaken during the Impact Assessment Phase.

Notwithstanding the above, Archean is confident that these assumptions and limitations do not compromise the overall findings of this report.

1.1.4 Description of the property

The 11A and 12A concessions are a group of shallow- water A-concessions stretching along a ~70 km stretch of coastline between the Sout River in the north and the Olifants River Mouth in the south, off the west coast of South Africa. The 13 A concession stretches along a ~15 km stretch of coastline south of the Olifants River mouth. Associated with these marine concessions are surf-zone concessions and admiralty strip areas. This coastline falls into the Matzikama Magisterial District and is administered from Vredendal situated on the Olifants River. The nearest fishing harbours are situated at Doringbaai and Lamberts Bay, ~14 km and ~50 km south of the river mouth, respectively. The 120 ha De Punt onshore processing and production facility associated with the concessions is situated on ~1600 hectares of private land owned by Moonstone. With the exception of an ~50-hectare portion at the Olifants River mouth, the Moonstone property stretches to the Olifants River Mouth. The property is surrounded by farmlands with the nearest residential areas being situated at Koekenaap and Lutzville, 23 km and 30 km inland, respectively.

Concessions 11A, 12A and 13A occupy a coastal strip from 31.49 m seaward of the low water mark (LWM) to approximately 1000 m seawards of the high water mark (HWM) north of Doringbaai. The positions of these concession areas in relation to coastal features and the boundaries of neighbouring farms are shown in more detail in the maps attached in Annexure 1 of the draft scoping report.

Concession 11A extends from Tietiesbaai in the north to approximately 2 km south of Koubaai. Concession 12A extends from 2 km south of Koubaai to ~1 km south of the Olifants River mouth. Concession 13A stretches along a ~15 km stretch of coastline from the Olifants River mouth south to Doringbaai. The associated surf- zone and admiralty strip concessions Weskus, Bethel, Strykloof, De Punt, Papendorp and Hollebakstrandfontein occupy a narrow coastal strip ~70m to ~300m wide from 31.49 m seaward of the LWM to the edge of the adjacent farm boundaries, from ~1.5 km north of Jakkalshok to Doring Bay. All mining operations conducted by Moonstone on the above- mentioned concessions thus take place below the HWM only.

1.1.5 Project Locality

Mining Right Name:	The following existing mining rights are relevant to the De Punt mining right EMP update area: • De Punt- DMR reference number WC 314 MR (Renewal reference number WC 10733 MR) • Bethel 278 Mining Right - DMR reference number WC 315 MR (Renewal reference number WC 10132 MR)

	• Farm 423 & Surf Zone Area Mining Right - DMR reference number WC 47 MR (Renewal reference number WC 10134 MR) • Hollebaksfontein Mining Right - DMR reference number WC 318 MR (Renewal reference number WC 10135 MR) • Papendorp Mining Right - DMR reference number WC 316 MR (Renewal reference number WC 10136 MR) • Sea Area 12A Mining Right - DMR reference number WC 3271 MR (Renewal reference number WC 10130 MR) • Sea Area 13A Mining Right - DMR reference number WC 320 MR (Renewal reference number WC 10137 MR) • Strykloof Mining Right - DMR reference number WC 317 MR (Renewal reference number WC 10137 MR) • Weskus Mining Right - DMR reference number WC 319 MR (Renewal reference number WC 10138 MR) • Sea Area 11A DMR reference number WC 112 MR (Renewal reference number WC 10066MR)
Application area (Ha)	The project area covers a surface area of 9950 hectares
Magisterial district:	Matzikama Local Municipality, West Coast District Municipality, Western Cape
Distance and direction from nearest town	The property is surrounded by farmlands with the nearest Residential areas being situated at Koekenaap and Lutzville, 23 km and 30 km inland, respectively
21-digit Surveyor General Code for each farm portion	C07800000000020600000, C07800000000020400000 C07800000000020200000; C07800000000020000000 C07800000000019800000; C07800000000019700000 C07800000000019100000; C07800000000019200000 C07800000000019600000; C07800000000019300000 C07800000000026700001; C07800000000026300000 C07800000000026700001; C07800000000042300000 C07800000000042600000; C07800000000042400000

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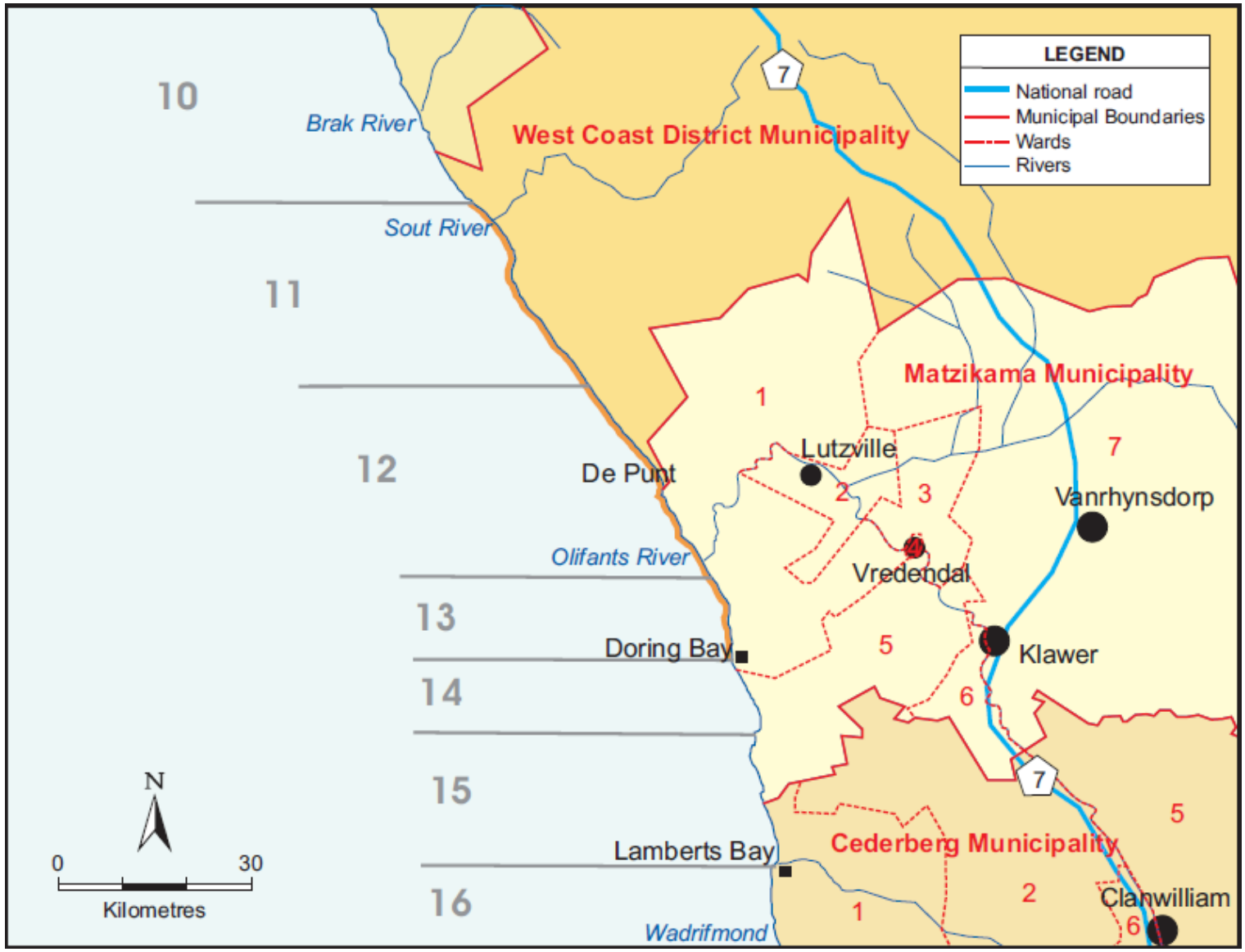


Figure 1: Locality Map

Figure 2: Sea Area 11a-12a Weskus

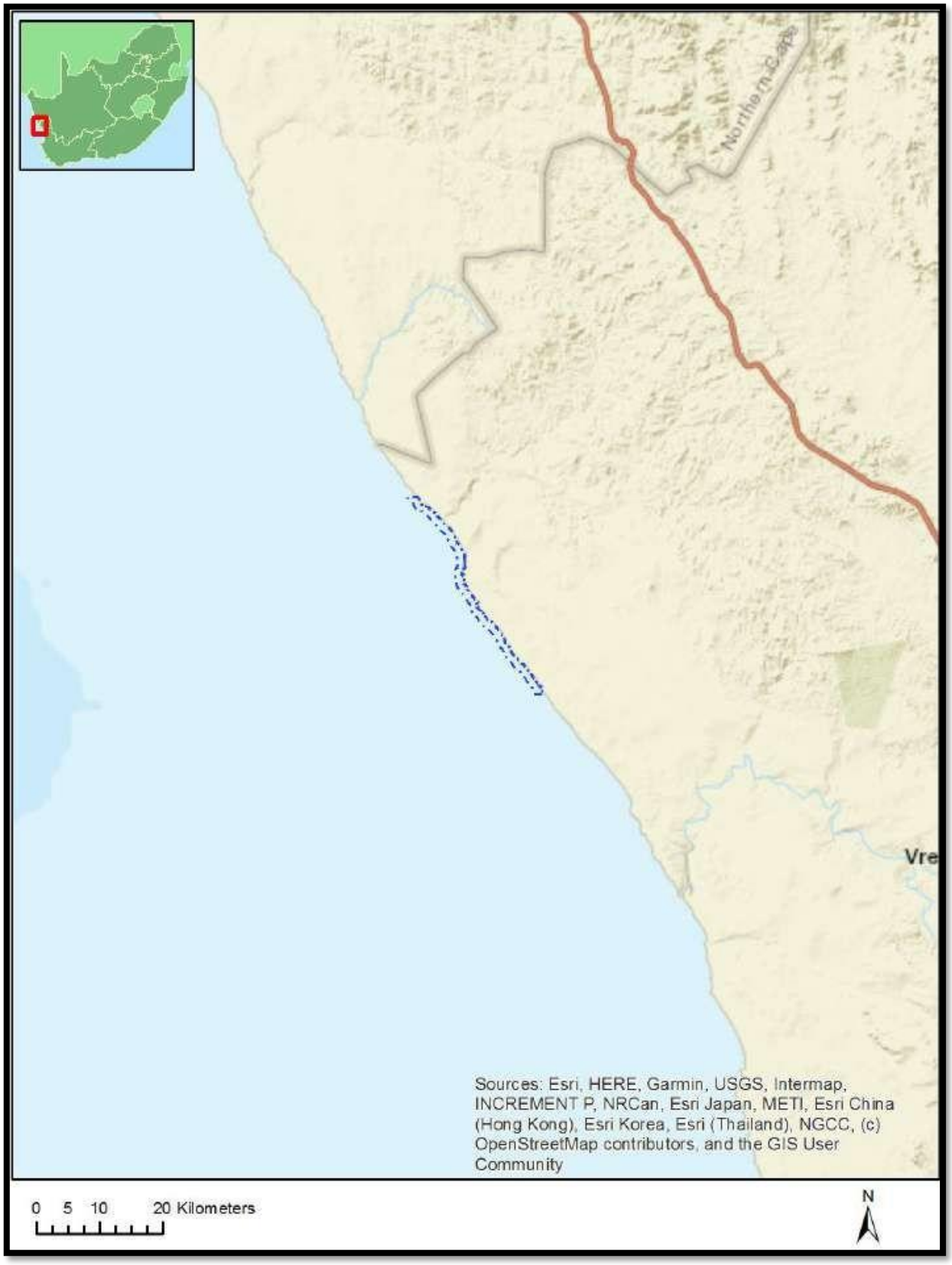


Figure 3: Sea Area 11a

Figure 4: 12a Bethel

Figure 5: 12a De Punt

Figure 6: 12a Strykloof

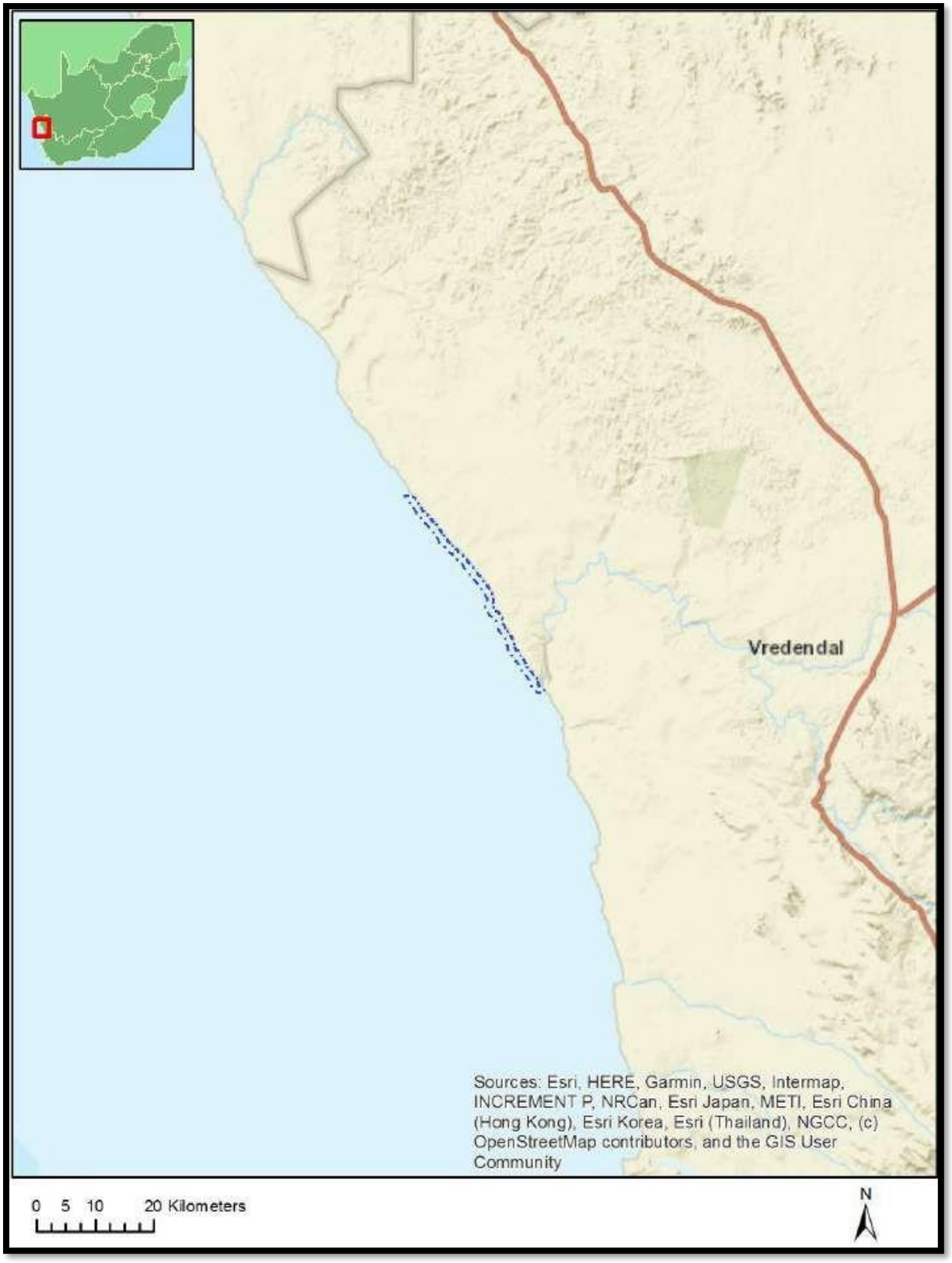


Figure 7: Sea Area 12a

Figure 8: 13a Hollebaksfontein

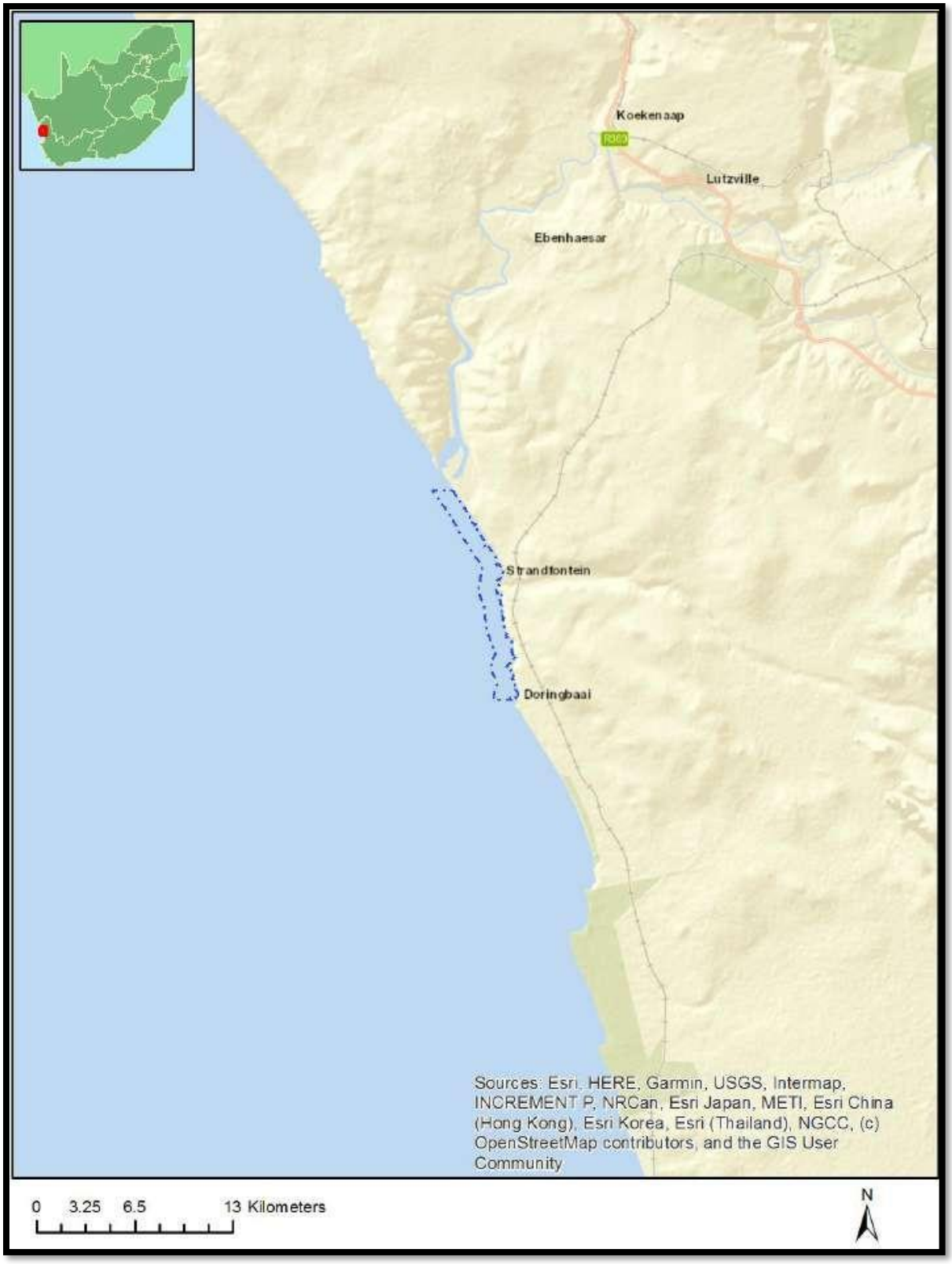


Figure 9: Sea Area 13a

Figure 10: Farm 423

Figure 11: Papendorp

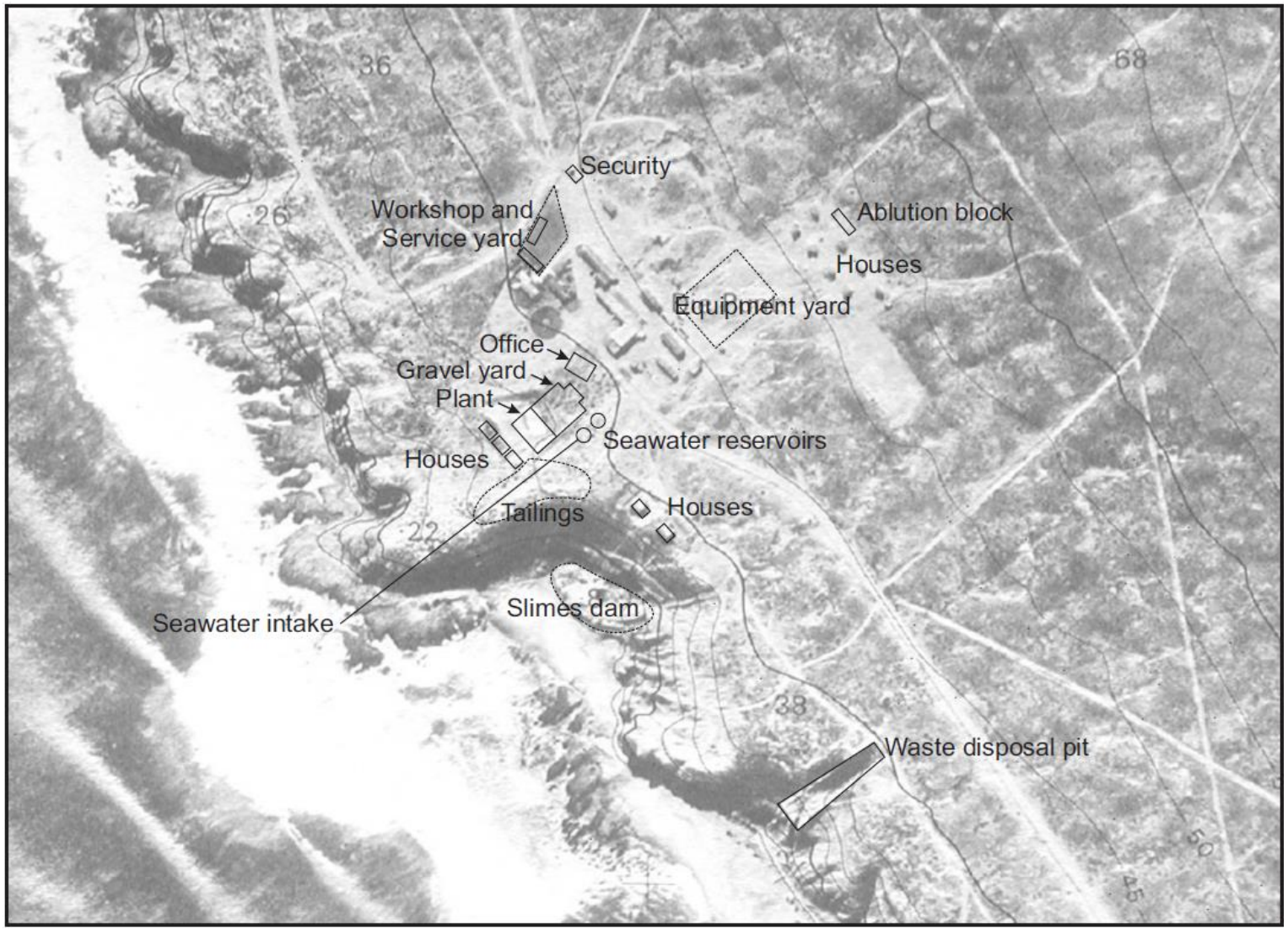


Figure 12: The facilities at De Punt, showing the location of the processing plant, gravel yard, tailings disposal and slimes dam. The waste disposal pit and housing, office and workshop facilities are also shown.

1.1.6 Description why the Geological formation substantiates the minerals to be mined.

1.1.6.1 Geological formation

The areas can be divided up into three zones, the northern rocky area, the central sediment area and the southern rocky area.

The northern rocky area is found in the northern 10km of the concession. It is backed mostly by a sandy beach shoreline with occasional rocky reefs comprising of rocks from the Gariep Supergroup. The shoreline in turn is backed by a cliff of variable height. The seafloor of this area comprises mostly subdued to low relief rock outcrop with occasional moderate shoals. The lithology is interpreted to comprise phyllites and greywackes. Three structural foliation directions are observed: NW, NNE and WSW. These foliation directions have been preferentially eroded to produce sediment-filled gullies.

Generally a large amount of sediment veneer is associated with the rock outcrop in this northern area. The seaward edge of this northern area is overlain by fine sediment with occasional coarse sediment streamers. This fine sediment wedge onlaps and encroached the rock outcrop. This encroachment is most probably seasonal with larger winter swells resulting in a net offshore movement in the fine sediment with normal sea conditions causing a net onshore movement.

The central area begins in the south at Cliff Point and runs into the northern area. Like the northern area, it is backed by a sandy beach but has a more prominent cliff line. The seafloor in this area comprises mostly fine sediment with minor patches of rock outcrop being confined to the seaward boundary. Rock outcrop is associated with a subdued relief and coarse sediment veneer. Sub-bottom chirp profiles across this region shows the sediment to be at least 5m thick with some internal structure as reflected by the multiple reflectors observed in some of the records. However due to the nature of the sediment and possibly this internal structure, depth to bedrock is not clearly discernible. This sediment pile is interpreted to be part of the onlapping nearshore wedge that should coarsen slightly as the shore face is approached.

The southern area extends from Cliff Point to the southern boundary. The shoreline consists of a combination of rocky reef/beach, sea cliffs and small sandy beaches. The onshore lithologies comprise rocks of the Gariep and Cape Supergroups. More specifically the Cape Supergroup outcrops around Cliff Point and comprises the Table Mountain Group. There are three sediment embayments in the southern rocky area and are situated in the north just south of Cliff Point, in the centre of the southern area and in the south. The sediment in these embayment's is fine with a fringe of coarse sediment and sediment veneer onlapping the rock. A cross cutting channel-like feature is observed just north of Rob Eiland, and is filled with fine sediment. The rock outcrop in the north of the southern section is blocky and this is seen in the numerous block outcrops off Cliff Point.

South of Cliff Point a very strong conjugate foliation (WNW / NE) has been preferentially eroded by wave action and has resulted in the development of numerous cross-cutting gullies, these have been filled with coarse sediment. Dimensions to these gullies are in the order of 5m to 10m wide and up to 3m deep.

Length dimensions are up to 500m. This foliation changes direction at the channel like feature, and this is consistent with the change of onshore lithology from Table Mountain Group to Gariep rocks. The Gariep Rocks display more of a coast parallel foliation (NW) and have less of the large gully systems developed. Smaller gullies are more numerous but dimensions are not as impressive as in the large systems. Gully-fill is again coarse sediment. The seafloor for the entire southern rocky area is low to moderate with patches of subdued sediment veneered rock. Rugged shoals/pinnacles are present especially in the south. In general the area displays more ruggedness than the northern rocky area.

1.1.6.2 Regional Geological setting:

Diamondiferous palaeoplacers along the west coast of Namaqualand occur at different elevations up to 95 m above sea level, stretching more than 10 km inland in places (Hallam,1964; Keyser, 1976; Gresse, 1988). They occur in sediments representing beach and shoreface deposits associated with Tertiary and Quaternary sealevel high stands (Pether, 1986). These "terrace" deposits are found on wave-cut platforms at different but specific elevations above sealevel (Fig. 4). Terrace deposits were mostly laid down during regressive events when sealevel dropped and may abut sea-cliffs on their landward side.
Terraces landward of about 10 m.a.s.l. are of Pliocene to Early and Middle Pleistocene age and their deposits have been divided into essentially three successions known as the 30m, 50m and 90m Packages (Pether, 1986) based on elevation, stratigraphy and age (mostly inferred there from interrelationships and palaeontology).

Terraces below 8-10 m elevation are of Late Quaternary age.

Many rivers along the West coast markedly the Orange, Buffets and Olifants, but also the Groen, Swartlintjies and Spoeg Rivers, brought diamondiferous gravels down from inland sources. The diamonds were spread along the coast by wave action and deposited on marine terraces both above and below present sealevel. Palaeo-river channels crossed the coastal strip at different times during the geological history as sealevel rose and fell in response to glaciation and global tectonics.

Depending on the age of the channels, they either eroded existing diamondiferous gravels leaving only barren bedrock or acted as traps for diamonds in original fluviai deposits or marine sediments deposited during subsequent sealevel high stands. The result is that none of the packages are continuous along the entire Namaqualand coastline; they are preserved as erosional remnants in geographically favourable areas, covered by younger terrestrial deposits. River point sources are marked by significant increased diamond content and size in the immediately adjoining terrace and surf zone deposits. Both diamond size and content decrease steadily away from the river entry points, more so to the south than to the north - a result of the prevailing northerly wave, wind, and current action along the west coast (cf. Rogers et al., 1990). Longshore sand transport by these same agents results in blockages of river mouths and a general northward migration of river entry points (e.g the Olifants and Orange Rivers).

2 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

2.1.1 Listed and specified activities

Table 3: Listed and specified activities

NAME OF ACTIVITY **(E.g. For prospecting -** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc** **E.g. for 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.)	**Aerial extent of the Activity Ha or m²**	**LISTED ACTIVITY** (Mark with an **X** where applicable or affected).	**APPLICABLE LISTING NOTICE** (***GNR 983, 984, 985***	**WASTE MANAGEMENT AUTHORISATION** (Indicate whether an authorisation is required in terms of the Waste Management Act). **(Mark with an X)**
GNR 983 Listing Notice 1: Activities requiring an environmental authorisation subject to a Basic Assessment				
The development of – (ii) channels exceeding 100 square metres in size (iv) dams where the dam including infrastructure and water surface area, exceeds 100 square meters in size (vi) bulk storm water outlet structures exceeding 100 square metres in size; (xii) Infrastructure or structures with a physical footprint of 100 square meters or more. ***Relevance: Slimes and coffer dams will be constructed.***	10 ha	X	**GNR 983 Listing Notice 1:** Activity 12	N/A
The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more;	10 ha	X	**GNR 983 Listing Notice 1:** Activity 9	N/A
The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more;	10 ha	X	**GNR 983 Listing Notice 1: Activity 10**	N/A
The development of a road where no reserve exists where the road is wider than 8 meters but excluding roads which are identified and included in activity 27 in listing Notice 2 of 2014. ***Relevance: Access roads will be upgraded, and mine haul roads constructed.***	20km	X	**GNR 983 Listing Notice 1:** Activity 24	N/A
Any activity including operation of that activity which requires an amendment or variation in terms of Section 102 of the MPRDA s well as any other activity as contained in this Listing Notice or Listing Notice 3 of 2014, required for such amendment	9950 hectares	X	**GNR 517 Listing Notice 1: Activity 21D**	N/A
GNR 984Listing Notice 2: Activities requiring an environmental authorisation subject to a Scoping and Environmental Impact Assessment.				
The development of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	1000m³	X	**GNR 984 Listing 2:** Activity 4	N/A

Relevance: Hydrocarbon fuels				
The clearance of an area of 20 hectares or more of indigenous vegetation ***Relevance: clearing of mining area***	50ha	X	GNR 984 Listing 2: Activity 15	N/A
Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including— (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource [,] ; or (b) [including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)] the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing. **Relevance: Mining activity**	9950 hectares	X	GNR 984 Listing 2: Activity 17	N/A
Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening, and washing **Processing Plants**	5 ha	X	GNR 984 Listing 2: Activity 21	N/A
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) GN 921				
CATEGORY B Disposal of waste on land (7) The disposal of any quantity of hazardous waste to land. (8) The disposal of general waste to land covering an area in excess of 200m2 and with a total capacity exceeding 25 000 tons	There will be disposal of slimes, effluent, wastewater from the processing plant to coffer dams			X
B (10) The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	There will be construction of waste management facilities			X
B (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Residue stockpiles or residue deposits	Reside deposit will be deposited onto the beach and other mined out areas for rehabilitation purposes.			X

2.1.2 Description of the activities to be undertaken

2.1.2.1 Basic overview of the mining method

Diamondiferous gravels along the South African west coast are not distributed evenly on the ocean floor. They have discrete distribution patterns which can vary dramatically, both horizontally and vertically. Deposits tend to concentrate on, and immediately above, bedrock in gullies and potholes. In reality therefore diamondiferous gravels occur in only a small proportion of the available concession area. They are usually covered by overburden which first must be stripped away to gain access to the mineralized sediments. However, due to difficulties in conducting geophysical surveys and

sampling in the surf-zone and shallow water environments, it is not possible to accurately determine where viable deposits are concentrated, with the result that beach and shallow-water mining in themselves become the prospecting tools. To improve mining success, nearshore operations are using sophisticated tracking and positioning systems to help focus efforts on the more productive areas. Nonetheless, shallow-water diamond mining remains opportunistic in nature being highly dependent on weather and sea conditions. These effectively limit the periods in which mining can take place. Five days of mining per month by diver-operated systems are considered a good average for the South African west coast although longer individual periods may be workable, particularly in the summer months. Sea conditions also control where safe operations can be conducted, as these often have to be in areas with some wave shelter. Swell conditions and underwater visibility can vary enormously over small spatial and temporal scales, making it necessary to choose appropriate mining sites on specific days rather than sequentially mining a concession from one end to the other. A phased approach to mining the surf-zone and (a)-concessions is thus not possible, leading to the public misconception that shallow- water mining is conducted in an ad hoc fashion, and impacts the entire concession area.

The concession areas under the jurisdiction of Moonstone are mined by smaller contractors who mine specific areas on behalf of the company.

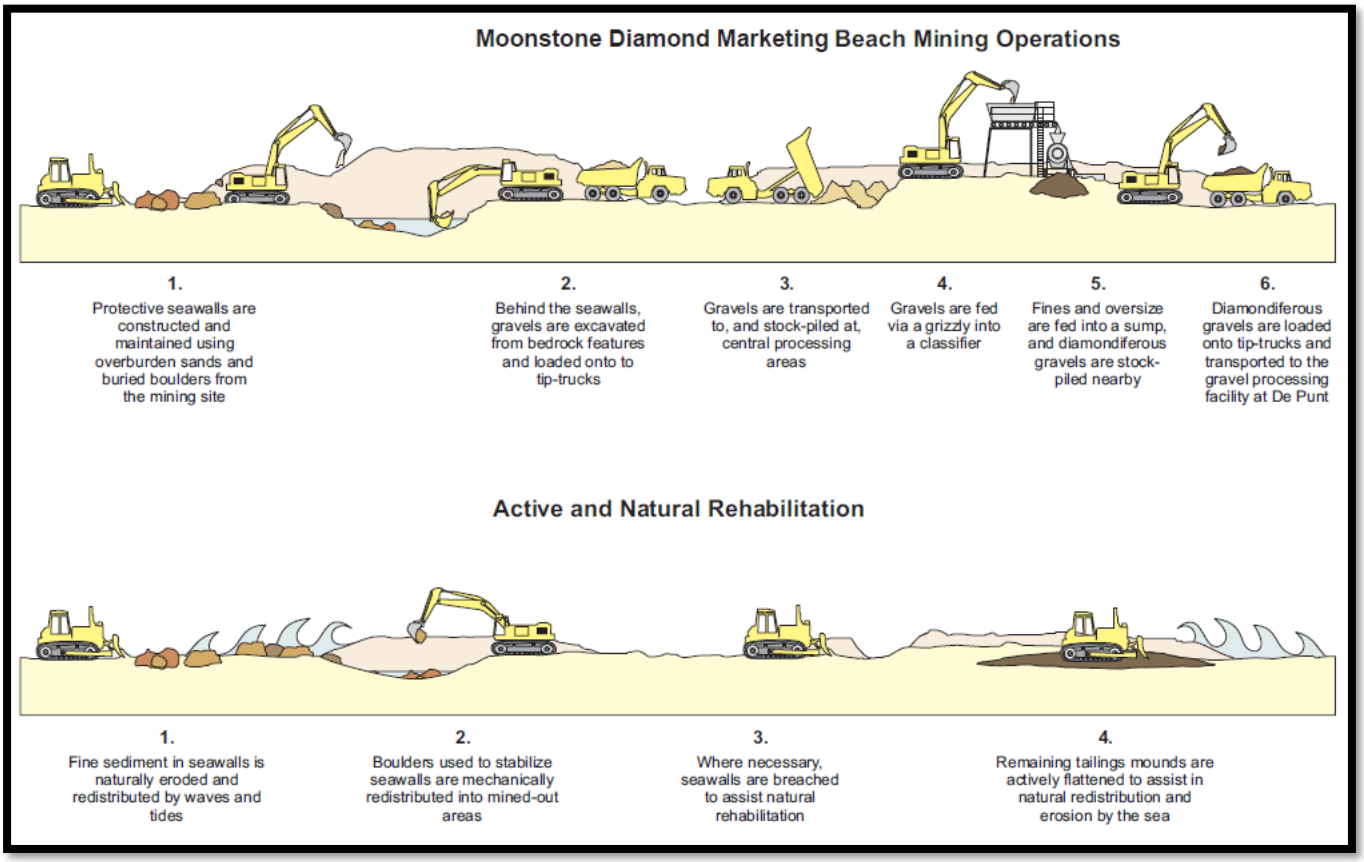


Figure 13: Overview of beach mining operation

The mining methods employed in the extraction of diamondiferous ores in concessions 11A, 12A, 13A and the corresponding surfzones and admiralty strips, are divided according to their area of operation on the shore. The three methods used to mine marine gravels are described in detail below.

2.1.2.2 Beach Mining

Beach mining operations are typically conducted between the high-water mark (HWM) and low water mark (LWM), during spring low tides, on tidally exposed sandy and mixed (rock and sand) beaches. The target beaches to be prospected and mined by contractors are in the Weskus surf-zone concession adjacent to 12(a), and the Doringbaai surf-zone and admiralty strip concession opposite 13(a). The coastline in the Geelwal area is characterised by medium to fine-grained beaches of medium incline. In most target areas, these beaches are backed at the HWM by steep clay and sandstone cliffs. Mineralization in shallow-water and surf- zone areas is generally erratic. The lack of suitable technology to effectively sample these zones furthermore prevents definitive ore reserve delineation. Consequently, the beach mining practiced by Moonstone's contractors more closely resembles prospecting operations than full-scale mining per se. Only once a bedrock feature yielding a viable reserve has been identified, do operations take on a larger, and more permanent scale by sequentially mining blocks following the feature. The modus operandi and scale of operation in beach mining therefore depends largely on whether the contractor is prospecting or mining and on the depth of overburden that needs to be removed before the target gravels can be accessed. In the Weskus concession, the overburden is composed primarily of beach sands, often containing embedded boulders. Target beaches in Strykloof, and at Hollebaksfontein opposite concession 13A are, however, composed primarily of pebbles and boulders. Mining targets are gravel beds underlying the beach sand, gravel overlying bedrock, as well as gravel in gullies and/or potholes in the bedrock. Depending on the degree of sand inundation on the beaches at the time of mining, the overburden layer may vary in thickness from <1 m to as much as 3 m. Natural sedimentary cycles are discussed in detail below.

Heavy machinery such as bucket-shovels, bulldozers or front-end loaders are used to expose gravels rapidly over low tide periods. Overburden is moved to immediately above the low tide level to prevent rapid re-covering of the target gravels. The underlying gravels are subsequently extracted using one of three basic approaches.

1. Removal of overburden sands or boulders creates an excavation. In order to prolong the time available for gravel extraction in this excavation during low tide periods, small protective seawalls are constructed with the overburden to provide shelter from waves and the rising tide, for divers and equipment. However, despite being protected from the sea, the excavation fills with water. The submerged target gravels are mined by two diver-guided 20 cm suction hoses which feed to a tractor modified to drive a centripetal pump and rotary classifier. The classifier, which is positioned in the intertidal area, sorts the pumped material and extracts the size fraction of interest. The diamondbearing gravel is bagged and transported on a daily basis to the central De Punt processing facility for diamond extraction. Large size fraction tailings (+25 mm) are accumulated around the classifier and the fine tailings (-2 mm) are returned directly to the sea as a sediment slurry. These fines may form turbid plumes in the nearshore but are generally rapidly dissipated by wave action. The oversize tailings heaps which accumulate around the classifier are dispersed during the high tide, or mechanically redistributed over the beach at the end of mining operations. Operations are illustrated in Plate 1_Annexure 1.

2. Alternatively, the gravels are extracted from the mine area by bucket-shovel and transferred to dump-trucks. The trucks transport the gravel along the beach and deposit it into a second excavation, centrally situated and protected from the sea by a large seawall. Although this wall is likewise constructed of locally sourced beach sands, for greater stability and resilience the base of the wall is reinforced using rocks and boulders excavated from the mining area. This creates a small cofferdam which provides a protected shallow-water environment for prolonged diver-operated gravel extraction. As in the previous operation, mined gravel is delivered to a classifier positioned below the HWM within the protected confines of the seawall. Oversize tailings are accumulated around the classifier and the fines are returned to the cofferdam. As the seawall required for such an operation is extensive and must by necessity be situated relatively far up the beach (around the mid-tide mark), the extremities of the wall tend to encroach onto the cliff-base. As this has been identified as a sensitive area on the cliffed coast, this type of large–scale cofferdam mining has been discontinued. Operations are illustrated in Plate 2 _Annexure 1.

3. The larger scale beach mining operations more recently involve the placing of a grizzly and classifier below the HWM in a central position on the beach. The equipment is elevated on a platform built of locally sourced material and protected by a small seawall. Gravel is extracted from the mine area by bucket-shovel and transferred to dump-trucks. The mine area is protected by a rock-stabilized seawall. The trucks transfer the gravel to the central processing area where it is stock-piled before being fed by a bucket-shovel or front-end loader into the classifier via the grizzly. Oversize tailings are accumulated around the classifier and the fines are returned to the sea across the beach. Alternatively, tailings are deposited into a sump sunk into the beach. Operations are illustrated in Plate 3_Annexure 1.

2.1.2.3 Shore-based operations

For the purposes of marine diamond mining the surf-zone is defined as that area extending from the high-water mark to 31.49 m (100 Cape feet) beyond the low water mark. Mining in this zone, and to depths of 10 m in the (a)-concessions, is primarily shore- based. The operations are confined to small bays, and are typically conducted using small-scale, diver-assisted suction equipment, as described above. Large size fraction tailings (+25 mm) are accumulated around the classifier and the fine tailings (-2 mm) are returned to the sea across the intertidal zone as a sediment slurry. Care is taken to deposit oversize tailing below the HWM to allow natural redistribution by wave action. A shore-based operation typically consists of 2-4 divers, their assistants, and a tractor-driven classifier. The divers operate on surface supplied air and guide the distal end of the suction hose into the gravel deposits, which are sucked up and delivered directly to the classifier (Plate 4_Annexure 1). Target ore bodies are subtidal gravels residing in gullies and potholes, and to access these, the divers may need to remove large rocks and boulders. In areas of dense kelp (Laminaria pallida) coverage, kelp may need to be cut to allow easy movement of the suction hoses and airlines when attempting to reach the diamondiferous deposits in the surf-zone and beyond. There are currently 4 shore-units operational in the surf-zones adjacent to concessions 11A and 12A, although the number of contractors varies constantly.

Mining rates for diver/tractor systems are about 0.25 m3 of gravel supplied to the classifier per hour. Because of the tidal cycle and weather/sea state limitations plants operate for less than 6 hours per day for an average of 5–6 days per month.

Consequently, each diver/tractor unit processes approximately 100 m3 of gravel per year. The overall extent of the concessions mined is low, being estimated as <0.03% per year of the available A-concession area. To gain access to the water, the contractors attempt to locate their equipment as close to the sea as possible in the supratidal and intertidal regions. The network of existing roads is more than adequate to provide contractors with access to their mining sites, and no new roads need to be created. Unlike for beach mining, substantial upgrading of these tracks will, however, not be necessary as vehicles and equipment used for shore-based operations are lighter than those used in beach mining. Nonetheless, those roads and tracks used regularly by contractors are maintained by Moonstone. The topography of the bays targeted by shore contractors, enables the storage of classifiers and hoses above the HWM on site. As classifiers and suction hoses are too cumbersome to be removed from the site each time pumping operations are interrupted for short periods, this circumvents excessive use of the tracks. The equipment storage areas are usually restricted to an area of <5 m2 and damage to strandveld vegetation is thus limited (Plate 5_ Annexure 1).

In some areas (e.g. Die Toring, cliffs between Middlestrand and Robeiland) where steep cliffs preclude access to the shore by road, small cableways have been constructed to ferry equipment and gravel to and from the mining site (Plate 6). Personnel use small paths to reach the site. At some sites it has also been necessary to erect structures, throw foundations or construct gravel platforms to access the mining sites in the littoral zone (Plate 7 _Annexure 1). However, contractors are contractually bound to remove all such infrastructure and rehabilitate the area as necessary on closure of operations. Contractors are likewise bound to acceptable environmental practices as stipulated under the environmental obligations and undertakings in their contracts with MDM.

2.1.2.4 Vessel-based Operations

The A-concessions extend from seaward boundary of the surf-zone to 1000 m offshore. Due to the physical characteristics of this zone mining is carried out by boat-based divers using similar procedures to those applied by shore-based divers. A typical boat- based operation used to mine the nearshore areas to depths of ~25 m, consists of a 12–20 metre vessel with a 8–10 man crew, of which 4-5 are divers. The vessels, which are either converted fishing boats or purpose-built catamarans, are equipped with centrifugal pumps that operate one or two suction hoses, with the duration of their activities limited to daylight hours for 3 – 10 diving days per month.

Vessel-based divers operate on surface supplied diving equipment, and due to the water depths involved, their bottom-working time is limited by decompression commitments. Similar to the surf-zone operations divers guide the pump nozzles into gullies, potholes, and basin areas to retrieve gravel. In the mining process large rocks may either be exposed or removed by divers to allow the suction nozzle to reach deeper gravel layers. The rocks are sometimes accumulated by the divers into rock piles. The gravels are processed through a classifier mounted on the vessel. Fine material (-2 mm) discharged from the screening units washes directly back into the sea whilst the oversize fraction (+19 mm) is discharged directly overboard on site. The diamond-bearing gravel is bagged, offloaded at the Lamberts Bay and/or Doringbaai jetty, and transported by road to Moonstone's processing facility at De Punt.

Boat-based mining generally only operates in exposed rocky shore areas where gravel is pumped from deeper gullies, or on the edges of sandy bays where the layer of overburden is relatively thin. For these areas the amount of gravel removed in total from the sea floor ranges from 50 – 450 m3/month, depending on the layer of overburden which needs to be removed before the diamondiferous deposits can be accessed. It is estimated that <0.02% of the total area available in the A- concessions is mined by vessels annually. There are currently between 5 and 6 vessels working in concessions 11A, 12A and 13A, although the number of contractors varies constantly.

Mining of sand areas is generally unprofitable for the small-scale operators due to the large volumes of overburden that have to be removed before it is possible to gain access to the heavier gravel. However, some vessels operating in shallower waters are fitted with blowers to displace the overlying fine surficial sediment from the seabed thereby allowing exploitation of deeper gravel deposits in areas dominated by sand which were previously uneconomic to recover.

During mining operations all the mining vessels are self-contained and self-sufficient mining units. Contractors are bound to acceptable environmental practices as stipulated under the environmental obligations and undertakings in their contracts with Moonstone.

2.1.2.5 Jack up Platform

The mining methods employed in the extraction of diamondiferous ores in concessions 11, 12 and 13 are divided according to their area of operation namely beach mining, shore-based (shallow water, a-concessions) and vessel-based (deeper water a-concessions and b-concessions).

Shallow-water 'Jack-Up Platform and dredging/barging techniques will also be employed by some of the more entrepreneurial contractors. Figure below. Jack-up Platform operational technology tested at De Punt.

Agua-walker

Jack-up Platform

The onboard equipment includes a purpose designed dredge pump mining and deployment system, operator's cabin, on-board primary processing plant, product transfer system, power generation and hydraulic system.

The processing plant will treat sand and gravel and pick out diamonds. The beaches of the West Coast have been mined by small diver operated spreads dependent on the few calm days, which occur each month. The Jack-up platform is designed for almost continuous operation, dramatically increasing productivity of a mining unit.

It is one of a range of versatile walking jack-ups, which are capable of walking and safely operating in water depths of up to 30 m. The walking platforms can move and operate completely independently in rough seas, strong currents or on beaches and other inter-tidal locations, considerably boosting the productivity of a variety of traditional jack-up platform operations.

Like traditional jack-up platforms, the platform has four jacking legs, which can be raised and lowered from fixed jacking points at each end of the platform. In addition, it has another moveable pair of jacking legs on each side of the platform. The four auxiliary legs are connected to a sliding frame, which can be jacked horizontally back and forth along the side of the platform deck.

2.1.3 High level description of the processing plant

2.1.3.1 Processing of tailings to extract Pebbles

An appointed local contractor will rework the tailings to extract different sizes of pebble stones.

1. Method of operation:

In order to screen out the material, two-barrel classifiers will be used with the primary classifier screen being -1mm and +1mm - 5mm. The secondary classifier fractions are - 8mm +5mm; -12mm +8mm; -20mm +12mm; - 50mm +20mm. The screened material will be discharged onto conveyors and stockpiled in various size fractions. This material is then packed in 20kg plastic bags in the different size fractions and stored in the stores building until shipment.

The size fractions are -5mm +1mm; -8mm +5mm; -12mm +8mm; -20mm +12mm; - 50mm +20mm. Some material will be shipped in bulk 1 tonne bags. This would also be in the same size fractions as indicated. Stones of +50mm will be hand sorted and packed.

Quantities: The estimated volume for sale is 80 tonnes per month at an average of R2 300 per ton.

2.1.3.2 Basic plant design. (Supported by a process flow diagram, of the plant).

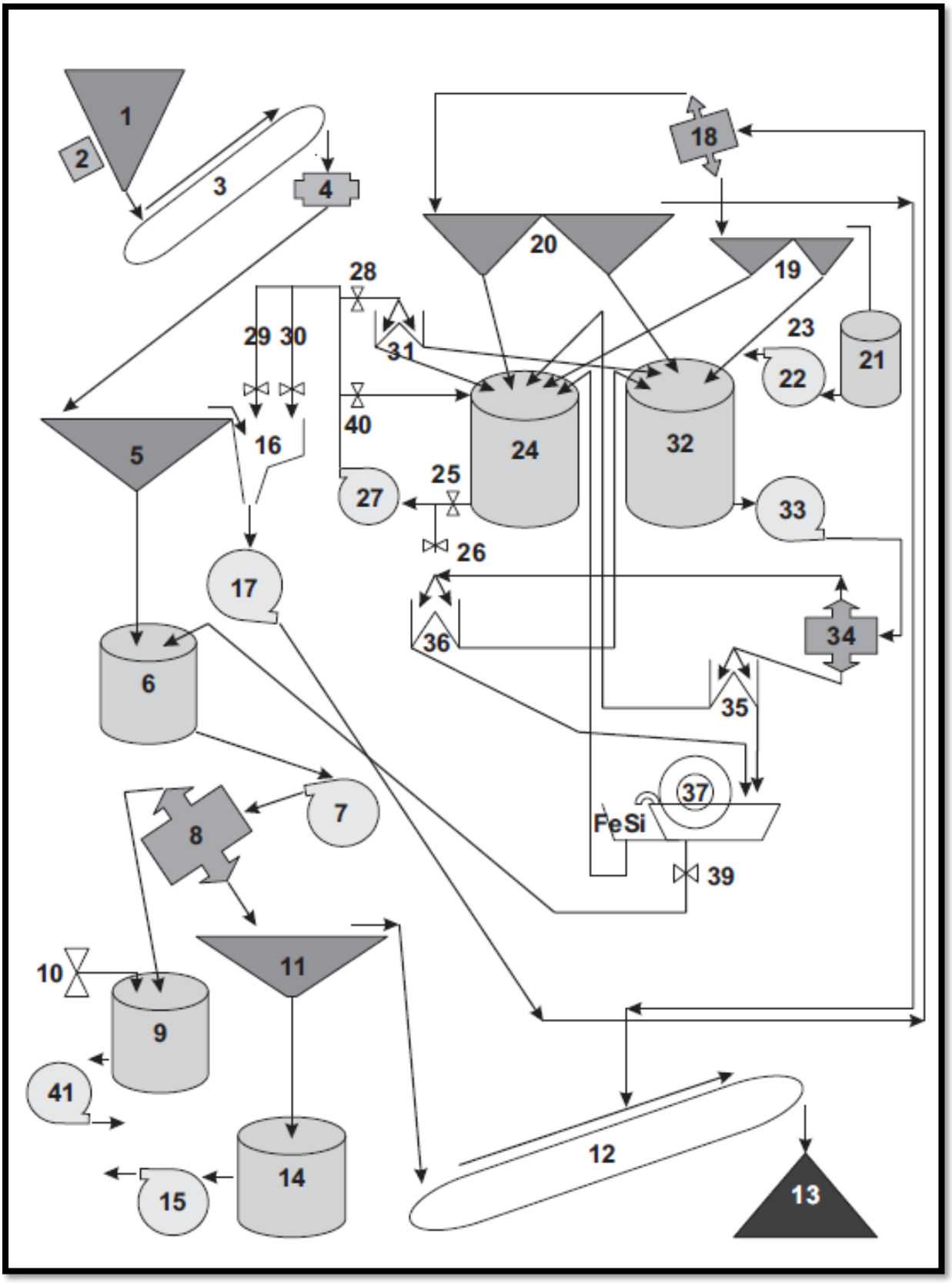


Figure 14: Process flow diagram of the plant

On the property at De Punt, Moonstone uses a 25 ton/hour dense medium separation (DMS) plant, where the gravels from all the surf- zone and marine concessions are treated (Plate 10). At full production, the De Punt gravel processing plant employs 2 workers. A diagrammatic representation of the gravel processing and ferrosilicon (FeSi) recovery operations in the plant is provided. The concentration and recovery process is described briefly below. The bagged gravel from the various production points is manually emptied through a receiver hopper (1) onto a feed conveyor belt (3) which transports the gravel via a Barmac crusher (4) onto an intake screen (5) where 10-15% (sand and crushed shelly material -1.6 mm) by volume is washed out. This fine underflow material goes to the effluent sump (6) from where it is pumped to the water recovery cyclone (8). The overflow from the water recovery cyclone (8) returns to the water supply sump (9). The underflow passes over a 1.6 mm screen (11), with material +1.6 mm reporting to the waste gravel stockpile (13) via waste conveyor belt (12). Material -1.6 mm flows to the tailing's sump (14), from where it gets pumped as a seawater slurry to a mine residue dam at the foot of the cliff (see Orthophoto A, plant flow diagram and Plate 11 – Annexure 1) where the solids settle out and the clear seawater percolates back into the ocean.

The coarser fraction (+1.6mm and -25mm) passes over the preparation screen (5) and drops into a mixing box (16) where water and FeSi are added until the correct density is reached. From there it is pumped under high pressure (approximately 190 KPa) to the washing cyclone (18) where material with a specific gravity of >2.6 g/cm3 is separated out. This constitutes the concentrate which reports to the sink side screen (19), while material with a density lower than three (tailings) flows to the float side screen (20). After passing over the sink screen (19) to the concentrate sump (21), the concentrate is forwarded to the final recovery section (23). Sorting of diamonds from the heavy fraction is done by a Flowsort wet-circuit X-ray sorter and subsequent hand-picking. The barren fraction or discards (+1.6mm) onto a float screen (20) where the FeSi is magnetically separated while the remainder of the float is fed onto a tailing's conveyor (12) and then onto the tailings dump (13).

Most of the FeSi is washed through the initial segment of the sink (19) and float (20) screens (underflow) to return into the circulating medium sump (24). The under flow from the last sections of the screens is transported to the dilute medium sump (32), from where it is pumped to the densifying cyclone (34) by the dense medium pump (33). Densifying cyclone (34) underflow passes into a splitter box (35) which can be set to direct flow to the circulating medium sump (24), magnetic separator (37) or to both. Cyclone overflow also passes through a splitter (36) where it may be fed to the dilute medium sump (32), magnetic separator (37) or to both. The magnetic separator (37) recovers FeSi and feeds it to the circulating medium sump (24).

The underflow from the magnetic separator goes to the effluent sump. The amount of flow is controlled by valve 39 to ensure there is always an overflow on the magnetic separator (37), and to prevent FeSi losses to the effluent sump.

The majority of the FeSi used in the DMS plant is recycled by magnetic separation. A proportion is lost, however, in the service water and through adhesion to shell fragments and gravel. Whilst FeSi loss will increase iron levels in the discard water, it is an inert substance. Although biological impacts of FeSi have not been quantified, they are expected to be

negligible at current loss rates. Approximately 18 t of FeSi are used annually at the De Punt processing plant, and consumption is monitored monthly.

Seawater is used as the service water for the processing facility. This is pumped into two reservoirs to the south of the plant, from a seawater intake at the base of the cliff (see Orthophoto A). Average monthly seawater usage in the plant is ~7 200 m3.

The slimes-dam situated at the base of the cliff which received the fine discarded residues from the plant, covers an area of approximately 50 m x 20 m, and has a maximum depth of 3 m. Annual slimes production amounts to 1000-1500 m3 necessitating excavation of the dam every 2-3 years using bucket-shovels and dump- trucks. Excavated slimes are used to reinforce the slimes-dam wall and re-fill old mining trenches on the De Punt property.

At current production rates, approximately 7700 m3 of tailings are produced by the plant annually. Old tailings are stockpiled near the plant and re-used as dust control around offices and housing, to stabilize the garbage disposal site, and for filling erosion gullies on roads and tracks.

2.1.3.3 Efficiency of the process. (Together with an estimate of the mineral recovery rate, and the expected mass or volume of mine waste or residues together with the manner in which it would be disposed of.)

The diamond recovery process in uncemented alluvial deposit using the plant as described above are proven to have a recovery rate more than 98% of the diamonds.
The +16mm material will be discarded onto existing tailings dumps or backfilled to mining voids and the -1.6mm slimes material will be pumped to the licensed slimes dams.

2.1.4 Minerals applied for:

- Diamond,
- Diamond (General)
- Diamond (Alluvial)
- Diamond (In Kimberlite)
- Pebble Stones.

3 POLICY AND LEGISLATIVE CONTEXT

3.1.1 The South African Constitution

This section provides an overview of the legislative requirements applicable to this project and it includes the Acts, guidelines and policies considered in the compilation of this report. The legislative motivation for this project is underpinned by the Constitution of South Africa, 1996 (Act No. 108 of 1996), which states that:
The State must, in compliance with Section 7(2) of the Constitution, respect, protect, promote and fulfil the rights enshrined in the Bill of Rights, which is the cornerstone of democracy in South Africa. Section 24 of the Constitution:

24. Environment

-Everyone has the right-

(a) to an environment that is not harmful to their health or well-being; and

(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-

(i) prevent pollution and ecological degradation;

(ii) promote conservation; and

(iii) secure ecologically sustainable development and use of natural resources while promoting a justifiable economic and social development.

Section 24 of the Constitution of South Africa (Act No. 108 of 1996) requires that all activities that may significantly affect the environment and require authorisation by law must be assessed prior to approval. In addition, it provides for the Minister of Environmental Affairs or the relevant provincial Ministers to identify:

- new activities that require approval;
- areas within which activities require approval; and
- existing activities that should be assessed and reported on.

Section 28(1) of the Constitution of South Africa (Act No. 108 of 1996) states that: *"every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring".* If such pollution or degradation cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution or degradation. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution or degradation; and
- Remedying the effects of the pollution or degradation.

Applicability: Public participation process and consultation at every stage of the EIA phase. A public participation process will be followed and consultations to be done regarding the proposed project. An EMP and awareness plan will be designed according to the issues raised during this process

3.1.2 National Environmental Management Act

The NEMA Act under sections 24(2), 24(5), 24D and 44, read with section 47A (1) (b) of National Environmental Management Act (107/1998): Environmental Impact Assessment Regulations, 2014 as amended in April 2017, is regarded as one of the important pieces of general environmental legislation as it provides a framework for environmental law reform. The main objective of this act is to ensure that ecosystem services and biodiversity are protected and maintained for sustainable development. Furthermore, Section 28 (1) of the NEMA requires that "every person who causes has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring".

NEMA strives to regulate national environmental management policy and is focussed primarily on co-operative governance, public participation and sustainable development. NEMA makes provisions for co-operative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by Organs of State and to provide for matters connected therewith.

A scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process, and must include-

(a) details of-
   - *I. the EAP who prepared the report; and*
   - *II. the expertise of the EAP, including a curriculum vitae;*

(b) the location of the activity, including-
   - *I. the 21 digit Surveyor General code of each cadastral land parcel;*
   - *II. where available, the physical address and farm name;*
   - *III. where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;*

(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-
   - *I. a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or*
   - II. *on land where the property has not been defined, the coordinates within which the activity is to be undertaken*;

(d) a description of the scope of the proposed activity, including-
   - *I. all listed and specified activities triggered;*
   - *II. a description of the activities to be undertaken, including associated structures and infrastructure;*

(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;

(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;

(h) a full description of the process followed to reach the proposed preferred activity, site and location within the site, including-

I. details of all the alternatives considered;

II. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;

III. a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;

IV. the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

V. the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-

a) can be reversed;

b) may cause irreplaceable loss of resources; and

c) can be avoided, managed or mitigated;

VI. the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;

VII. positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

VIII. the possible mitigation measures that could be applied and level of residual risk;

IX. the outcome of the site selection matrix;

X. if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and

XI. a concluding statement indicating the preferred alternatives, including preferred location of the activity;

Applicability: Baseline environmental information of the project area will be assessed. Mitigation measures and recommendations were provided according to best practice standards. This scoping report complies with the requirements of the NEMA act. The specialist report will also be compiled in line with the regulations.

3.1.3 Mineral and Petroleum Resources Development Act

The MPRDA makes provision, for persons to apply for a mining right. A mining right granted in terms of the MPRDA is a limited real right in respect of the type of resources and the land to which the right relates. The holder of a mining right is entitled to the rights referred to in the MPRDA or any other law.

The applicant requires a mining right and environmental authorisation from the DMRE. Acceptance of the application by DMRE only permits the applicant to continue with the necessary process and does not constitute authorisation. The acceptance details the outstanding requirements for the application, which includes:

- the submission of an EMP; and
- notification and consultation with IAPs, including landowners or lawful occupiers of land, on which the proposed mining is to be conducted;
- Details on how the applicant will substantially and meaningfully expand opportunities for historically disadvantaged persons.

Applicability: A mining right must have an environmental management plan that meets the requirements of applicable legislation in relation to the activities being undertaken. This report will update the EMPr.

3.1.4 National Environmental Management: Integrated Coastal Management Act 24 of 2008 (as amended)

The National Environmental Management: Integrated Coastal Management Act 24 of 2008 aims:

- to establish a system of integrated coastal and estuarine management in the Republic, including norms, standards, and policies, in order to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes, and to ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable;
- to define rights and duties in relation to coastal areas;
- to determine the responsibilities of organs of state in relation to coastal areas;
- to prohibit incineration at sea;
- to control dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment;
- to give effect to South Africa's international obligations in relation to coastal matters; and
- to provide for matters connected therewith.

The National Environmental Management: Integrated Coastal Management Amendment Act 36 of 2014 aims:

- to amend the National Environmental Management: Integrated Coastal Management Act, 2008, so as:
- to amend certain definitions;
- to clarify coastal public property and the ownership of structures erected on and in coastal public property;
- to remove the power to exclude areas from coastal public property;
- to clarify and expand the provisions on reclamation;
- to clarify definitions and terminology;
- to simplify the administration of coastal access fee approvals;
- to simplify and amend powers relating to coastal authorisations;
- to replace coastal leases and concessions with coastal use permits;
- to extend the powers of MECs to issue coastal protection notices and coastal access notices;

- to limit the renewal of dumping permits;
- to simplify the composition and functions of the National Coastal Committee;
- to clarify the powers of delegation by MECs;
- to revise offences and increase penalties;
- to improve coastal authorisation processes;
- to provide for exemptions;
- to provide for transitional matters;
- to effect certain textual alterations; and
- to provide for matters connected therewith.

Applicability: The mining will have adverse impacts on coastal processes both social and environmental which need to be assessed and mitigated. Coastal Waters Discharge Permit Regulations in terms of sections 83(1)(g), (h), (k) and (r) of the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) will be applied for.

3.1.5 National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)

The overarching aim of the National Environmental Management: Biodiversity Act, 2004 (NEMBA), within the framework of NEMA, is to provide for:

- *The management and conservation of biological diversity within South Africa as well as for the components of such biological diversity;*
- *The use of indigenous biological resources in a sustainable manner and*
- *The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources.*

As part of its implementation strategy of NEMBA, the National Spatial Biodiversity Assessment was developed. This assessment classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels. The approach used for biodiversity planning is systematic and entails the following three key principles:

- *The need to conserve a representative sample of biodiversity pattern, such as species and habitats (the principle of representation);*
- *The need to conserve the ecological and evolutionary processes that allow biodiversity to persist over time (the principle of persistence); and*
- *The need to set quantitative biodiversity targets that quantifies the degree of conservation required for each biodiversity feature in order to maintain functioning landscapes and seascapes.*

Furthermore, the South African National Biodiversity Institute (SANBI) was established by the NEMBA, its purpose being (*inter alia*) to report on the status of the country's biodiversity and the conservation status of all listed threatened or protected species and ecosystems. NEMBA provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including a

prohibition on carrying out a "restricted activity" involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 8 of the Act. Lists of critically endangered, endangered, vulnerable and protected species have been published and a permit system for listed species has been established.

It is also appropriate to undertake a Biodiversity Impact Assessments for developments in an area that is considered ecologically sensitive, and which requires environmental authorisation in terms of NEMA, with such assessment taking place during the Scoping or EIA phase. The Applicant is therefore required to take appropriate reasonable measures to limit the impacts on biodiversity, to obtain permits if required.

Applicability: Terrestrial Biodiversity Impact Assessment, Aquatic Biodiversity Impact Assessment, Plant and Animal Species Assessment will be undertaken.

3.1.6 National Forest Act, 1998 (Act 84 of 1998)

The purposes of National Forest Act, 1998 (act 84 of 1998) (NFA) includes *inter alia:*

(c*) provide special measures for the protection of certain forests and trees:*

(d) promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes.

Applicability: Impact and mitigation measures to be implemented for plant species in the assessment.

3.1.7 National Environmental Management: Air Quality Act (Act No 39 of 2004)

Section 28 (1) of NEMA places a general duty of care on any person who causes pollution, to take reasonable measures to prevent such pollution from occurring. The objective of the National Environmental Management: Air Quality Act, 2004 (NEM: AQA) is to regulate air quality to protect, restore and enhance the quality of air in the Republic, considering the need for sustainable development. Furthermore, the provision of national norms and standards regulating air quality monitoring, management and the control by all spheres of government determine that specific air quality measures should be adhered to. Dust created during the construction and operational phases of the proposed prospecting could influence air quality and thus make this legislation relevant to this development. Air quality management and mitigation measures during the operational phase will be considered to be a measure to exercise this duty of care, since it aim to minimise volumes of dust emissions emanating from the operational activities.

Applicability: An air emission license will not be required but air quality monitoring will be implemented.

3.1.8 Conservation of Agricultural Resources Act (Act 43 of 1983)

The aim of the Conservation of Agricultural Resources Act,1983 (Act 43 of 1983) (CARA) is to provide for control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants and for matters connected therewith. The EIA phase of the project will take into account the requirements of CARA as well as determine the potential direct and indirect impacts on agricultural resources as a result of the proposed prospecting development.

Applicability: The project will impact on soils and land use in the area. An Agricultural Assessment will be undertaken.

3.1.9 National Environmental Management: Waste Act (Act 59 of 2008) as amended

The National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA) and Waste Classification and Management Regulations, 2003 (GNR: 634 – 635): To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

The operational activities associated with the proposed mine works program shall be in accordance with the requirements of National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA) and Waste Classification and Management Regulations, 2003 (GNR: 634 – 635). The proposed project requires a waste management licence.

Applicability: A waste license is required for the Residue Stockpiles Waste classification and Waste Management Plan will be compiled and will be integrated in the Draft EIAr which will be available for public review during the EIA phase

3.1.10 Occupational Health and Safety Act (Act 85 of 1993)

The aim of the Occupational Health and Safety Act, 1993 (act 85 of 1993) (OHSA) is to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery ; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety as well as to provide for matters connected therewith.

Section 8 which deals with the general duties of employers and their employees states that:

1) *"Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of the employees."*
2) *''Without derogating from the generality of an employer's duties under subsection (1), the matters to which those duties refer include in particular:*
    a. *The provision and maintenance of systems of work, plant and machinery that, as far as reasonably practicable, are safe and without risk to health;*
    b. *Taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety and health of employees;*
    c. *Making arrangement for ensuring as far as reasonably practicable, the safety and absence of risks to health relating to the production, processing, use, handling, storage and transport of articles or substances;*
    d. *Establishing, as far as reasonably practicable, what hazards to the health or safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall, as far as reasonably practicable, further establish what precautionary measures should be taken with respect to such work, article,*

substance, plant or machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures;

e. *Providing such information, instruction, training and supervision as may be necessary to ensure, as far as reasonably practicable, the health and safety of employees;*
f. *As far as reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store, or transport any article or substance or to operate any plant or machinery, unless precautionary measures contemplated in paragraph (b) and (d), or any precautionary measures which may be prescribed, have been taken;*
g. *Taking all necessary measures to ensure that the requirements of this act are complied with by every person in his employment or on the premises under his control where plant and machinery is used;*
h. *Enforcing such measures as may be necessary in the interest of health and safety;*
i. *Ensuring that work is performed, and that plant and machinery is used under the general supervision of a person trained to understand the hazards associated with it and who has the authority to ensure that precautionary measures taken by the employer are implemented and*
j. *Causing any employees to be informed regarding the scope of their authority as contemplated in section 37(1)(b).''*

3.1.11 National Heritage Resources Act

National Heritage Resource Act, 1999 (Act No. 25 of 1999)

The proposed diamond prospecting project by Moonstone Diamond Marketing must comply with the requirements stipulated in the National Heritage Resources Act, 1999 (Act 25 of 1998) (NHRA). The NHRA legislates the necessity for cultural and Heritage Impact Assessment (HIA) in areas earmarked for development, which exceed 0.5 ha or linear development exceeding 300 metres in length. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).

Section 38(1) of NHRA, subject to the provisions of subsections (7), (8) and (9), requires that any person who intends to undertake a development categorised as:

(a) *The construction of **a road**, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
(b) *The construction of a bridge or similar structure exceeding 50m in length;*
(c) *Any development or other activity which will change the character of a site-*

(i)Exceeding 5 000 m^2 in extent; or

(ii)Involving three or more existing erven or subdivisions thereof; or

(iii)Involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv)The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) The re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Archaeological impact assessments (AIAs) are often commissioned as part of the heritage component of an EIA and are required under Section 38(1) of the NHRA of 1999, Section 38(8) of the NEMA and the MPRDA.

The process of archaeological assessment usually takes the form of:

1. A scoping or initial pre-assessment phase where the archaeologist and developer's representative establish the scope of the project and terms of reference for the project;
2. A Phase 1 AIA;
3. A Phase 2 archaeological mitigation proposal; and
4. A Phase 3 heritage site management plan.

Phase 1: Archaeological Impact Assessment

A Phase 1 AIA generally involves the identification and assessment of sites during a field survey of a portion of land that is going to be affected by a potentially destructive or landscape altering activity. The locations of the sites are recorded, and the sites are described and characterised. The archaeologist assesses the significance of the sites and the potential impact of the development on the sites and makes recommendations. It is essential that the report supply the heritage authority with sufficient information about the sites to assess, with confidence, whether or not it has any objection to a development, indicate the conditions upon which such development might proceed and assess which sites require permits for destruction, which sites require mitigation and what measures should be put in place to protect sites that should be conserved.

Minimum standards for reports, site documentation and descriptions are clearly set out by the SAHRA and supported by the Association of Southern African Professional Archaeologists (ASAPA). The sustainable conservation of archaeological material (*in situ*) is always the best option for any sites that are deemed to be of importance. The report needs to indicate which sites these are, explain why they are significant and recommend management measures. In certain kinds of developments which involve massive intervention (prospecting, dam construction, etc.), it is not possible to reach a conservation solution other than to develop a programme of mitigation which is likely to involve the total or partial "rescue" of archaeological material and its indefinite storage in a place of safety.

Phase 2: Archaeological Mitigation Proposal

If the Phase 1 report finds that certain archaeological sites in a development area are of low significance, it is possible to seek permission from the heritage authority for their destruction. The final decision is then taken by the heritage

resources authority, which should give a permit or a formal letter of permission, or in the case of an EIA issue a comment allowing destruction.

Phase 2 archaeological projects are primarily based on salvage or mitigation excavations preceding development that will destroy or impact on a site. This may involve collecting of artefacts from the surface, excavation of representative samples of the artefact material to allow characterisation of the site and the collection of suitable materials for dating the sites. The purpose is to obtain a general idea of the age, significance and meaning of the site that is to be lost and to store a sample that can be consulted at a later date for research purposes. Phase 2 excavations should be done under a permit issued by SAHRA, or other appropriate heritage agency, to the appointed archaeologist. Permit conditions are prescribed by SAHRA, or other appropriate heritage agencies. Conditions may include as minimum requirements reporting back strategies to SAHRA, or other appropriate heritage agencies and/or deposition of excavated material at an accredited repository.

Should further material be discovered during development, this must be reported to the archaeologist or to the heritage resources authority and it may be necessary to give the archaeologist time to rescue and document the findings. In situations where the area is considered archaeologically sensitive the developer will be asked to have an archaeologist monitor earth-moving activity.

Phase 3: Management plan for conservation and planning, site museums and displays

On occasion Phase 2 may require a Phase 3 program involving one of the following:

- The modification of the site;
- The incorporation of the site into the development itself as a site museum;
- A special conservation area; or
- A display.

Alternatively, it is often possible to re-locate or plan the development in such a way as to conserve the archaeological site or any other special heritage significance the area may have. For example, in a wilderness or open space areas where such sites are of public interest, the development of interpretative material is recommended since it adds value to the development. Permission for the development to proceed can be given only once the heritage resources authority is satisfied that measures are in place to ensure that the archaeological sites will not be damaged by the impact of the development or that they have been adequately recorded and sampled. Careful planning can minimise the impact of archaeological surveys on development projects by selecting options that cause the least amount of inconvenience and delay. The process as explained above allows the rescue and preservation of information relating to our past heritage for future generations. It balances the requirements of developers and the conservation and protection of our cultural heritage as required of SAHRA and the provincial heritage resources authorities.

Applicability: Heritage and palaeontology assessment will be conducted Proper management and mitigation measures will be recommended in the EIAR including chance find protocols.

3.1.12 National Water Act, 1998 (Act No.36 of 1998)

The National Water Act, 1998 (Act 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level.

The purpose of the NWA is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways, which take into account:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Providing for growing demand for water use;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations and
- Managing floods and droughts.

Section 21 of the National Water Act, 1998 (No. 36 of 1998) (NWA) lists water uses for which a Water Use License (WUL) must be obtained. Uses with potential relevance to the proposed prospecting include:

Section 21 (a) Taking of water from a water resource (surface or groundwater).
Section 21 (b) Storing of water (not containing waste).
Section 21 (c) Impeding or diverting the flow of water in a water course.
Section 21 (e) Engaging in a controlled activity:
Section 21 (i) altering the beds, banks, course or characteristics of a water course.

The Department of Water and Sanitation (DWS) has published various General Authorizations (GA) in terms of Section39 of the NWA which, replace the need for a water user to apply for a license in terms of the NWA for specific activities. The GAs have been revised and amended at different times.

The GAs set out specific conditions under which a water use may occur without a license and also specify the conditions or thresholds at which a user must register the use with the DWS.

Applicability: There is an existing water use and Due to the nature of activities no amendment to water use license will be required however mitigation measures for protection of water resources will be implemented.

Other Applicable National legislations

- Hazardous Substances Act, 1973 (Act No. 15 of 1973);

- Roads Ordinance Amendment Act, 1998 (Act No. 17 of 1998);
- South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);

3.1.13 Provincial Legislative Framework

Table 4: Provincial legislation, policies and guidelines considered

Western Cape Provincial Spatial Development Framework (SDF) and SDF Rural Land Use Planning & Management Guidelines (as amended)	Used in the DSR to identify Need and Desirability	Guideline considered during the assessment of the need and desirability of the proposed development, at the provincial scale.
MATZIKAMA IDP REVISION TWO 2019-2020 2017-2022	Source of background demographic and socio-economic information	Utilized as a source of demographic and socio-economic information for the Matzikama Municipal area.
The National Environmental Management: Integrated Coastal Management Act 24 of 2008	The application covers areas along the coast. Source of buffer zones and access to the beach areas.	To control dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment.
The National Environmental Management: Protected Areas Act 57 of 2003 (NEMPAA)	Identification of protected areas and ecological support areas.	Assessment and mitigation of direct impacts and cumulative impacts on protected areas.
Spatial Planning Land Use and Management Act, 2013 (No 16 of 2013) Western Cape Land Use Planning Act, 2014 (No 3 of 2014) National Environmental Management: Waste Act, 2008; List of waste management activities promulgated in GN No. 921 of 29 November 2013 (as amended); National Waste Information Regulations promulgated in GN No. R. 625 of 13 August 2012; National Norms and Standards for the Storage of Waste promulgated in GN No. 926 of 29 November2013; and Waste Classification and Management Regulations promulgated in GN No. R. 634 of 23 August 2013.		

3.1.14 International Regulations

3.1.14.1 United Nations Law of the Sea Convention (UNCLOS) of 1982

The United Nations Law of the Sea Convention (UNCLOS) of 1982 requires member states to adopt legislation to reduce marine pollution from sea-bed activities in the Exclusive Economic Zone (EEZ) and on the continental shelf (Articles 208 and 214), and from land-based sources (Articles 194 and 207). It also contains provisions relating to marine pollution resulting from dumping of waste at sea (Articles 210 and 216). Overall, the convention deals with the prevention of marine pollution and the compensation for damage caused by this pollution. It contains provisions relating to the prescription and enforcement of pollution standards; in addition, it emphasizes on unilateral action by states with regard to pollution control and provides for contingency plans against pollution.

The International Convention for the Prevention of Pollution from Ships, 1973 was adopted in 1973 (MARPOL 73). This convention was subsequently modified by the Protocol of 1978 (MARPOL 78) and hence abbreviated MARPOL 73 / 78. It provides regulations covering the various sources of ship-generated pollution (IMO, 1992). South Africa is signatory to MARPOL 73/78. Which is applicable to the activities associated with the proposed prospecting and bulk sampling

operations. Guidance on the various provisions of the MARPOL 73/78 with respect to the proposed exploration and mining activities are summarized as follows:

Management of Oil: MARPOL Annex 1: Regulations for the Prevention of Pollution by Oil, Regulation 9 (1) (b) Control of discharge of oil. Any discharge into the sea of oil or oily mixtures from ships to which this Annex applies shall be prohibited except when all the following conditions are satisfied.

- Sewage: MARPOL Annex IV: Regulations for the Prevention of Pollution by Sewage from ships, Regulation 8 Discharge of sewage. Refer to the Recommendation on International Performance and Test Specifications for Oily-Water Separating Equipment and Oil Content Meters adopted by the Organization by resolution A.393 (X);
- Galley Wastes: MARPOL Annex V: Regulations for the Prevention of Pollution by Garbage from Ships, Regulation 3(1)(b), (1)(b)(ii) and (1)(c) Disposal of garbage outside special areas; ϖ Solid waste: MARPOL Annex V: Regulation 3(1) (a) and (1) (b), and.
- Atmospheric Emissions: MARPOL Annex VI: Regulations for the Prevention of Air Pollution from Ships Regulation 12: Ozone Depleting Substances.

3.1.15 Applicable Legislation and Approvals Required

The proposed diamond prospecting project requires the following main approvals before the project may commence:

- Mining right and Environmental authorization from the Department of Mineral Resources in terms of the MPRDA (Act 28 of 2002) and National Environmental Management Act (107/1998): Environmental Impact Assessment Regulations as amended.
- Approval of an environmental management programme, in terms of the **Mineral and Petroleum Resources Development Act** (No 28 of 2002) (MPRDA), by the Department of Mineral Resources.

In addition to the main legal approvals, the following approvals will be required:

- The South African Heritage Resources Agency needs to approve a heritage assessment, to be conducted as part of the overall EIA process, in terms of the **National Heritage Resources Act** (No 25 of 1999). Permits will be required for the destruction or removal of any heritage resources affected by the development if any.
- Should protected species be affected, permits will have to be obtained for their removal, relocation or destruction. This is in terms of the **National Environmental Management: Biodiversity Act** (No 10 of 2004).

4 PROJECT ALTERNATIVES

Feasible and reasonable alternatives must be identified for a development as required by the NEMA EIA Regulations and applicable to EIA. Each alternative is to be accompanied by a description and comparative assessment of the advantages and disadvantages that such development and activities will pose on the environment and socio-economy. When no feasible and/or reasonable alternatives could be identified and investigated in terms of a comparative assessment during the Scoping phase, the EIAR will then not contain a section with alternative. Alternatives forms a vital part of the initial assessment process through the consideration of modifications in order to prevent and/or mitigate environmental impacts associated with a particular development. Alternatives are to be amended when the development's scope of work is amended. It is vital that original as well as amended alternative identification, investigation and assessment together with the generation and consideration of modifications and changes to the development and activities are documented.

The EIA Regulations defines alternatives as the different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

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

Although an array of alternatives could be investigated for each project, such alternatives will not necessarily be applicable to each project and/or project phase. However, there must always be strived to seek alternatives that maximises efficient and sustainable resource utilisation and minimise environmental impacts.

4.1.1 Motivation for the overall preferred site, activities and technology alternative.

The rights are already operation and granted hence no alternatives of the overall sites have not been considered as this is an update of the environmental management plan to be in line with the relevant legislations. Best practice alternatives will be considered in the specialist studies including buffer zones from protected CBA and surf zones.

4.1.2 Feasible alternatives

TYPE OF ALTERNATIVE: property on which or location where it is proposed to undertake the activity
Develop on an alternative property No alternatives have been investigated in terms of location due to the geological formation of the area as well as relevant studies have been done and show of the availability of a deposit as this is an EMP update for the existing operations. Extensive mining activities have been ongoing on the De Punt mining rights over the past 40 years and are ongoing.
TYPE OF ALTERNATIVE: type of activity to be undertaken

Mining Methods

Diamondiferous gravels along the South African west coast are not distributed evenly on the ocean floor. They have discrete distribution patterns which can vary dramatically, both horizontally and vertically. Deposits tend to concentrate on, and immediately above, bedrock in gullies and potholes. In reality therefore diamondiferous gravels occur in only a small proportion of the available concession area. They are usually covered by overburden which first has to be stripped away to gain access to the mineralised sediments. However, due to difficulties in conducting geophysical surveys and sampling in the surf-zone and shallow water environments, it is not possible to accurately determine where viable deposits are concentrated, with the result that beach and shallow-water mining in themselves become the prospecting tools. To improve mining success, nearshore operations are using sophisticated tracking and positioning systems to help focus efforts on the more productive areas. Nonetheless, shallow-water diamond mining remains opportunistic in nature being highly dependent on weather and sea conditions. These effectively limit the periods in which mining can take place. Five days of mining per month by diver-operated systems are considered a good average for the South African westcoast although longer individual periods may be workable, particularly in the summer months. Sea conditions also control where safe operations can be conducted, as these often have to be in areas with some wave shelter. Swell conditions and underwater visibility can vary enormously over small spatial and temporal scales, making it necessary to choose appropriate mining sites on specific days rather than sequentially mining a concession from one end to the other. A phased approach to mining the surf-zone and (a)-concessions is thus not possible, leading to the public misconception that shallow- water mining is conducted in an ad hoc fashion, and impacts the entire concession area.

The concession areas under the jurisdiction of Moonstone are mined by smaller contractors who mine specific areas on behalf of the company. The mining methods employed in the extraction of diamondiferous ores in concessions 11A, 12A, 13A and the corresponding surf zones and admiralty strips, are divided according to their area of operation on the shore.

4.1.3 Activity

The current mine plan schedules the Resources of the De Punt deposits for 10 years. This is a very conservative plan and the development of the remainder of the resources will add substantially to the LOM.

4.1.4 Design

Water management infrastructure (Slimes Dams and Coffer Dams)

The coffer dams will be sized to accommodate all dirty storm water and mine water throughout the life of mine and post closure. No other alternatives can be considered for the existing dams as it is essential in mine water management.

4.1.5 Technological

The diamond recovery process in uncemented alluvial deposit using the plant is proven to have a recovery rate in excess of 98% of the diamonds. The +16mm material will be discarded onto existing tailings dumps or backfilled to mining voids and the -1.6mm slimes material will be pumped to the licenced slimes dams.

Recycling:

The mining project will implement recycling policies and measures for optimal utilisation of resources and minimisation of waste generation.

Water and Energy:

Seawater is used as the service water for the processing facility. This is pumped into two reservoirs to the south of the plant, from a seawater intake at the base of the cliff (see Orthophoto A). Average monthly seawater usage in the plant is ~7 200 m3.

Drinking water for the De Punt facilities is pumped via an 18 km pipeline from the government canal alongside the Olifants River, with ~2 250 m³ being used per month. When necessary, this supply is supplemented by borehole water purchased from the neighbouring farm. Power (132kV) is supplied by the Eskom grid.

Power requirements are included in the total power requirements for the plants and will not exceed 3 MVA per plant. Other than the Moonstone processing plant with a electricity consumption of 3 MW, there are no other major electrical power-using equipment or activities.

Access routes

In light of the distinct difference in public accessibility and history of Moonstone involvement between the areas north and south of the Olifants river mouth, a distinction is drawn in the costing of roads and disturbance areas between the northern and southern sectors. It was noted that given that certain disturbances and especially roads are shared with or are now the total responsibility of other users MSR, the exclusion of certain disturbances are described in each of the chapters per disturbance type with notes on excluded and included disturbances where relevant prior to costing. After costing of roads making a further reduction of Moonstone Road rehabilitation responsibility for roads and tracks "used by other user groups" such as kelp harvesters, campers, fishermen and recreational divers on a percentage responsibility split for the area north of the Olifants River mouth.

TYPE OF ALTERNATIVE: No-Go, *the option of not undertaking and implementing the activity at all.*

The NO Go alternative is not an option as this is an existing operation that requires an update to the environmental management program.

4.1.6 Need and desirability of the proposed activities.

When considering an application for Environmental Authorisation (EA), the competent authority must comply with section 24O of the National Environmental Management Act, no 107 of 1998 (NEMA), and must have regard for any guideline published in terms of section 24J of the Act and any minimum information requirements for the application. This includes this need and desirability guideline. Additionally, the Environmental Impact Assessment (EIA) regulations require environmental assessment practitioners (EAPs) who undertake environmental assessments, to have knowledge and take into account relevant guidelines. A person applying for an EA must abide by the regulations, which are binding on the applicant.

This guideline contains information on best practice and how to meet the peremptory requirements prescribed by the legislation and sets out both the strategic and statutory context for the consideration of the need and desirability of a development involving any one of the NEMA listed activities. Need and desirability is based on the principle of sustainability, set out in the Constitution and in NEMA, and provided for in various policies and plans, including the National Development Plan 2030 (NDP). Addressing the need and desirability of a development is a way of ensuring sustainable development – in other words, that a development is ecologically sustainable and socially and economically justifiable – and ensuring the simultaneous achievement of the triple bottom-line. The Guideline sets out a list of

questions which should be addressed when considering need and desirability of a proposed development. These are divided into questions that relate to ecological sustainability and justifiable economic and social development. The questions that relate to ecological sustainability include how the development may impact ecosystems and biological diversity; pollution; and renewable and non-renewable resources. When considering how the development may affect or promote justifiable economic and social development, the relevant spatial plans must be considered, including Municipal Integrated Development Plans (IDP), Spatial Development Frameworks (SDF) and Environmental Management Frameworks (EMF). The assessment reports will need to provide information as to how the development will address the socio-economic impacts of the development, and whether any socio-economic impact resulting from the development impact on people's environmental rights. Considering the need and desirability of a development entails the balancing of these factors.

The identified specialist will use the following to assess the impacts of the proposed projects on the following aspects to determine the recommendation of the project go-ahead in terms of need and desirability:

- "Securing ecological sustainable development and use of natural resources"
- How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?
- How were the following ecological integrity considerations taken into account?
    1. Threatened Ecosystems
    2. Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure
    3. Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"),
    4. Conservation targets,
    5. Ecological drivers of the ecosystem,
    6. Environmental Management Framework,
    7. Spatial Development Framework, and
    8. Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)
- How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts
- How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?

- What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?
- How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?
- How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?
- How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?
- Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)
- Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)

Methods of recovering diamonds vary from shore-diving to specialised ships, namely a horizontal system, in which a seabed crawler brings diamond-bearing gravels to the vessel through flexible slurry hoses; and a vertical system, in which a large-diameter drilling device mounted on a compensated steel pipe drill string, recovers diamond-bearing gravels from the seabed following a systematic pattern over the mining block.

5 PUBLIC PARTICIPATION (Refer to Appendices for proof of preliminary consultation)

5.1.1 Public Participation Process to be followed

This section of the report provides an overview of the tasks undertaken for the PPP to date. All PPP undertaken is in accordance with the requirements of the EIA Regulations (2014). It further provides an outline of the next steps in the PPP and makes recommendations for tasks to be undertaken during the environmental assessment phase of the environmental authorisation process.

Adjacent concession holders were identified through a search conducted via online search engines accessing the DMR database. In addition to concession holders, other relevant organisations were identified and notified of the application. This includes municipal and State departments with jurisdiction in the area and Non-governmental Organisations (NGOs) with an interest.

The PPP tasks conducted for the proposed project to date include:

1. Identification of key Interested and Affected Parties (affected and adjacent landowners) and other stakeholders (organs of state and other parties);
2. Formal notification of the application to key Interested and Affected Parties (all adjacent landowners) and other stakeholders;
3. Consultation and correspondence with I&AP's and Stakeholders and the addressing of their comments; and
4. Newspaper adverts.

I&AP and Stakeholder identification, registration and the creation of an electronic database

Public Participation is the involvement of all parties who are either potentially interested and or affected by the proposed development. The principle objective of public participation is to inform and enrich decision-making. This is also its key role in this Environmental Impact Assessment (EIA) process.

Interested and Affected parties (I&APS) representing the following sectors of society has been identified:

- National, provincial and local government;
- Agriculture, including local landowners;
- Community Based Organisations;
- Non-Governmental Organisations;
- Water bodies;
- Fisheries:
- Tourism;
- Industry and mining;
- Commerce; and
- Other stakeholders.

5.1.2 Formal notification of the application to key Interested and Affected Parties (adjacent landowners) and other stakeholders

The project was announced as follows:

1. Newspaper advertisement

An advertisement was placed in a local newspaper in both English and Afrikaans announcing the release of the scoping report and the project announcement. The local newspaper Ons Kontrei, published the advert on the 27th of August 2021.

2. Site notice placement

To inform surrounding communities and adjacent landowners of the proposed development, site notices in both English and Afrikaans were erected on site and at visible locations close to the site. Site Notices were placed near the project area on the 30th of August 2021 as follows:

1. Vredendal Shoprite shopping Centre
2. Van Rhynsdorp Municipality office
3. Van Rhynsdorp Library
4. Matzikama Local Municipality (Vredendal)
5. Vredendal Library
6. Matzikama Museum
7. Vredendal Spar shopping Centre
8. Vredendal Taxi Rank
9. Vredendal Clinic
10. Vredendal Post office
11. Vredendal Police station
12. Doring Bay Municipality office
13. Doring bay Police station
14. Strandfontein Waterslide
15. Strandfontein Camp site
16. Strandfontein West Coast information Centre
17. Strandfontein Municipality office
18. Doring Bay Clinic
19. Doring Bay Fueling Station
20. Lutzville library and Koekanap.

3. Written notification

I&AP's and other key stakeholders will be notified of the project. A background information document was sent out to the identified I&AP's. The draft scoping report is available for comment for at least 30 days from 30th of August to the 29th of September 2021.

4. Background Information Document

A Background Information Document (BID) in English and Afrikaans was distributed (on the 30th of August 2021). The BID provides information concerning the proposed project and invites IAPs to register and to attend the public meeting. IAPs should distribute the documents to other parties who may be interested or affected by the project.

5. Public Meeting

Due to Covid -19 the Public Participation Meetings for the scoping phase will be held online. Interested and affected parties are requested to register so that they can receive a link prior to the meeting planned to be held on the 24th of September 2021. Another public meeting will be held regarding the EIA phase and I&AP's will be notified via email and newspaper advertisement.

5.1.3 Consultation and correspondence with I&AP's and Stakeholders and the addressing of their comments (continuous).

To date there has been a few acknowledgements from I&APs, queries or registration requests have been received from stakeholders.

5.1.4 Release of the revised and amended Scoping Report to I&AP's and stakeholders for review and comment.

This scoping report has been released to the public for public review and comment. All stakeholders and I&AP's were notified of the report's availability for comment for 30 days from the 30th of August to the 29th of September 2021.

Additional electronic and or hard copies will be made available to interested and affected parties and stakeholders who request for them.

5.1.5 Next Phases of the Public Participation Process

All comments and responses received and sent throughout the entire process will be updated and included in the comments and responses report which will be submitted to the Department of Mineral Resources. Note that this PPP Report shall be updated at each phase as required.

The draft and final EIAR/EMPr will be released for public review for 30 days each excluding public holidays. A final Consultation report with stakeholder comments from each phase will be submitted.

5.1.6 Summary of issues raised by I&AP's

All comments and responses received and sent throughout the entire process will be updated and included in the comments and responses report which will be submitted to the Department of Mineral Resources. Note that this PPP Report shall be updated at each phase as required.

6 BASELINE RECEIVING ENVIRONMENT

6.1.1 Regional Setting

This chapter provides a description of the biophysical and socio-economic environment likely to be affected by the proposed project in the study area.

The Matzikama Municipality is located on the north-west coast of the Western Cape. The Municipality borders the Atlantic Ocean to the west, the Kamiesberg and Hantam Municipalities in the Northern Cape to the north and east respectively and the Cederberg Municipality in the Western Cape to the south. The geographical area of the Municipality increased from roughly 8000 km2 to 12900 km2. The municipal area comprises 18 towns and or villages. These towns and villages include Doring Bay, Strandfontein, Papendorp, Ebenaeser, Lutzville-West, Lutzville, Koekenaap, Vredendal, Klawer, Vanrhynsdorp, Nuwerus, Bitterfontein, Kliprand, Put-se-Kloof, Rietpoort, Molsvlei and Stofkraal.

Matzikama is characterized by an arid environment but is served by a life-giving arterial namely the Olifants River. The river with its associated canal systems supports a flourishing agricultural sector that is mainly built on viniculture. Apart from the previously district-municipality managed area to the north as well as the towns of Doring Bay, Strandfontein and Vanrhynsdorp the rest of the population is concentrated along the river and canal system. Vredendal is by far the largest town in the area and it is also centrally located rendering it the logical economic and administrative centre of the municipal area.

6.1.2 Air Quality

The air quality of the study area is mostly influenced by activities from mining operations, farming activities, domestic fires, vehicle exhaust emissions and dust entrained by vehicles. These emission sources vary from activities that generate relatively coarse airborne particulates (such as farmland preparation, dust from paved and unpaved roads) to fine PM such as that emitted by vehicle exhausts, diesel power generators and dryers.

Emissions from unpaved roads constitute a major source of emissions to the atmosphere in South Africa. Dust emissions from unpaved roads are a function of vehicle traffic and the silt loading on the roads. Emissions generated by wind erosion are dependent on the frequency of disturbance of the erodible surface. Every time that a surface is disturbed e.g. by mining, agriculture and/or grazing activities, its erosion potential is restored.

The wind data discussed herein was taken from the nearest data station at Lamberts Bay which is locates South East of the concession area. As per the seasonal windroses, the strongest and intensely clustered winds are generally from the south, south-west. It is expected that such winds have low dust generation capacities in the alluvial sands given the relatively coarse

particle size as was found at the other sites noted in the surrounding land use impact assessment based on the studies conducted in the Western Cape.

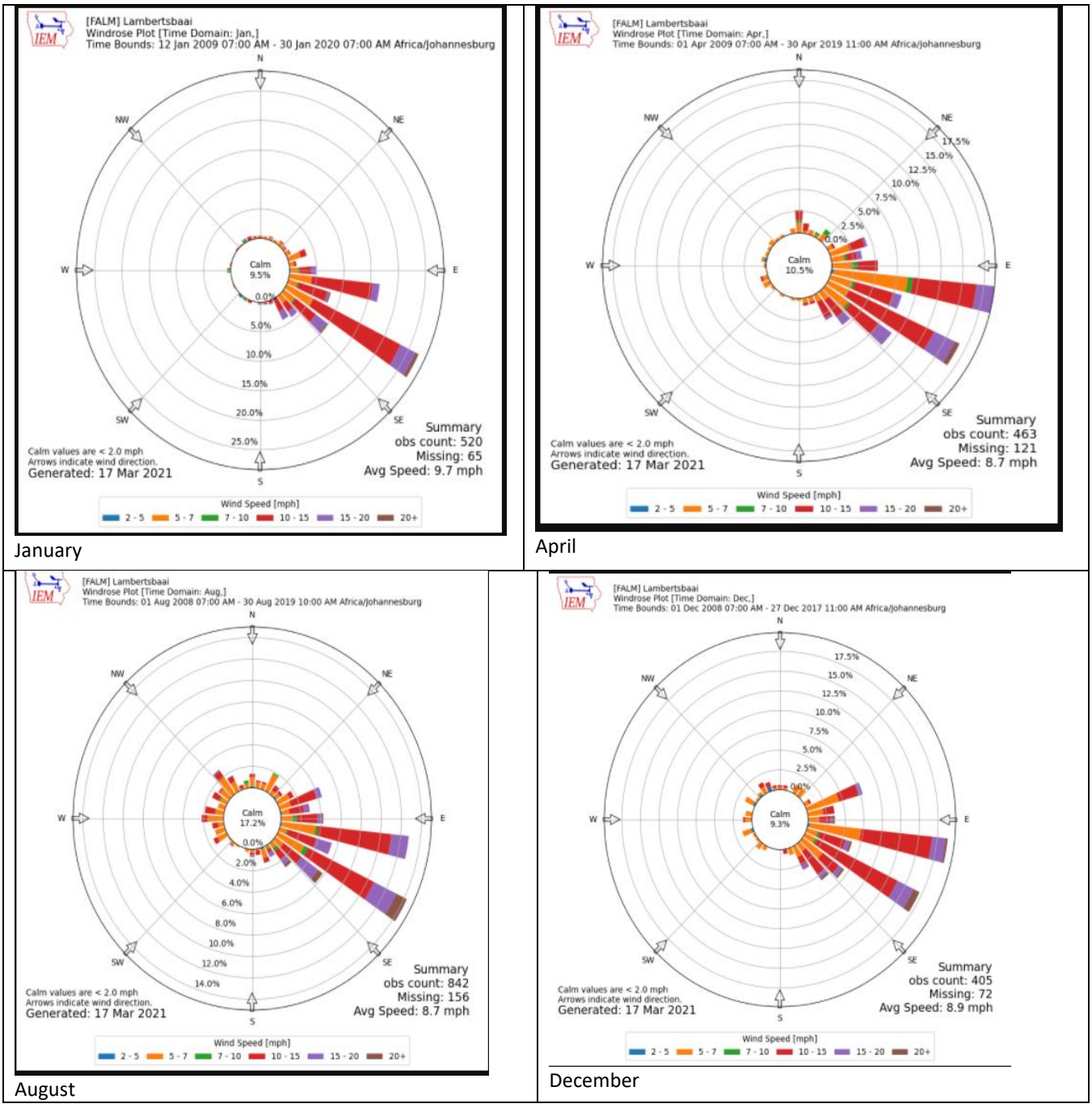


Figure 15: Monthly Wind roses measured from Lamberts Bay Data Station

It can be accepted that the closer areas to the coast will receive slightly increased south, south-west winds than the areas 25km inland where a percentage south westerly as at Lutzville will dominant.

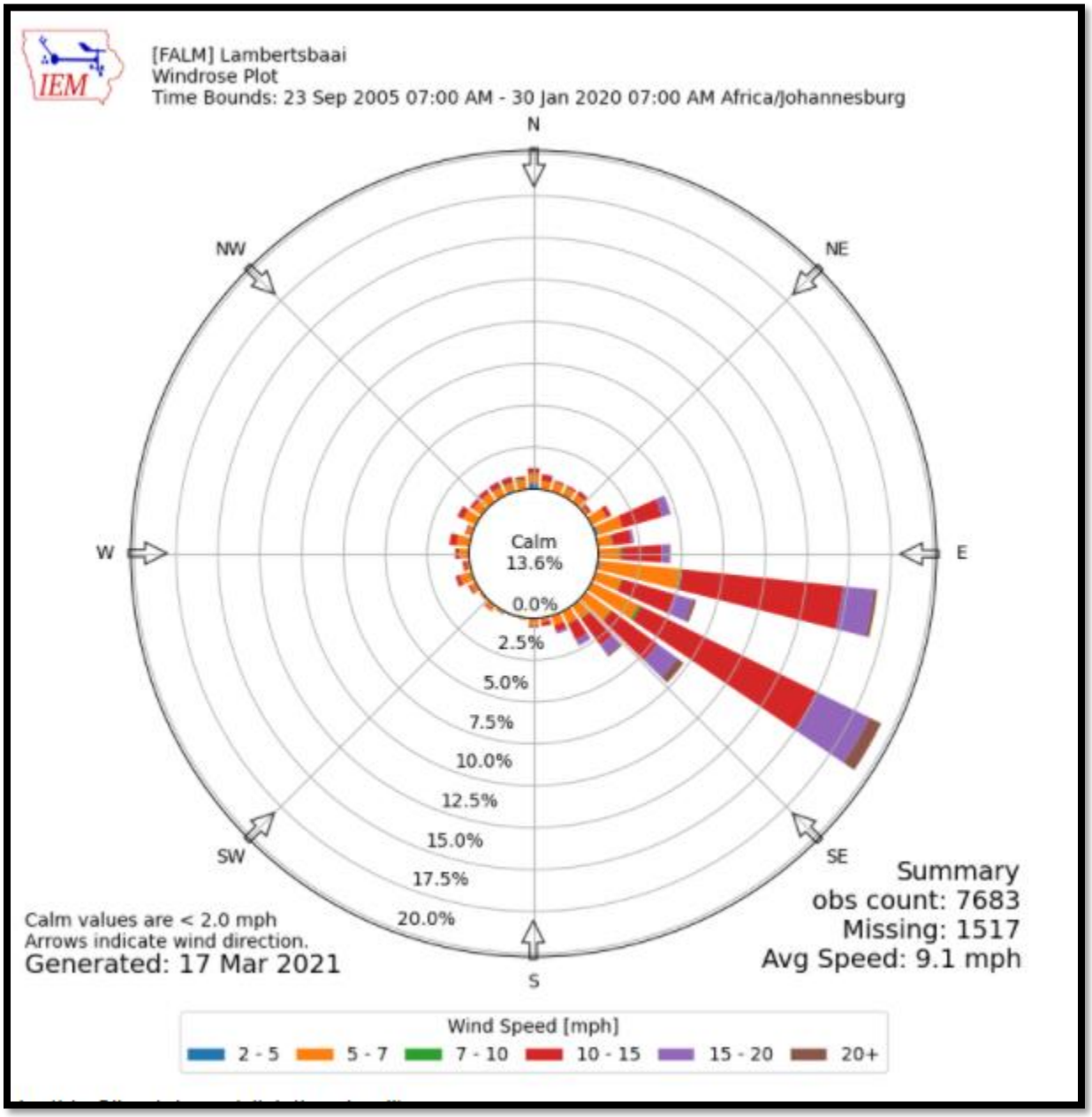


Figure 16:Annual Windrose of Lamberts Bay (Source: https://mesonet.agron.iastate.edu/)

6.1.3 Marine Environment

The application area requires an overview of the physical and biological oceanography and human utilisation of South African West Coast and a general descriptions of the marine environment although it will not be physically impacted .Key aspects of

the baseline environment that are likely to impact on the scope of the impact assessment and management measures that are implemented as well as project decisions regarding alternatives are listed below.

6.1.3.1 Climate

The study area falls within the Winter Rainfall Region of the Western Cape Province. It generally experiences a Mediterranean-type climate with cool to cold, wet winters and hot, dry summers. The climate diagram for Strandfontein, the nearest town indicates that rain is experienced throughout the year with a definite peak in winter (May to August). Temperatures are highest in February and lowest in June and July. The climate diagram for Namaqualand Strandveld shows approximately the same pattern for temperature and precipitation. The mean annual precipitation is notably very low (MAP= 112 mm).

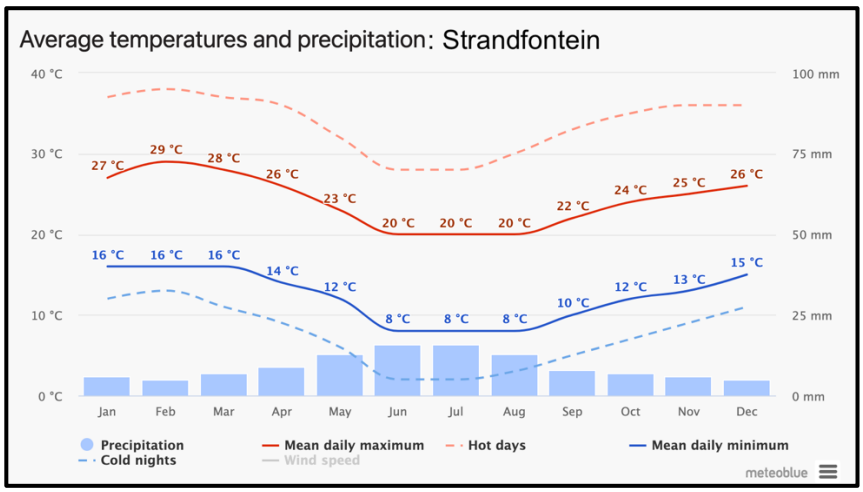


Figure 17*:* Average temperature and rainfall for Strandfontein.

The West Coast region is arid with a dry and relatively cool climate, moderated by effects of the Atlantic Ocean upwelling system. Oceanic fog is common, occurring on an average of 123 days per year. Rainfall occurs mainly in winter and increases from north to south varying from ~40 mm/year at Alexander Bay to ~59 mm/year at Port Nolloth to ~200 mm/year at Elandsbaai. Moderate to strong south-easterly winds caused by the South Atlantic subtropical anticyclone are typical in summer as are gale force westerly winds in winter, which can produce sandstorms. Highest temperatures (>30°C) tend to occur in summer during 'berg' wind conditions. As is typical of the West Coast, the coastline opposite the 13b concession experiences strong wave action, except in a few bays and where there are extensive kelp beds.

Wind and weather patterns along the West Coast are primarily due to the South Atlantic high-pressure cell and the eastward movement of mid-latitude cyclones (which originate within the westerly wind belt between 35° to 45°S), south of the subcontinent. The study area lies within the southern zone of the Benguela Current region and is characterised by the cool Benguela upwelling system (Shillington 1998; Shannon 1985). A conceptual model of the Benguela system is shown below:

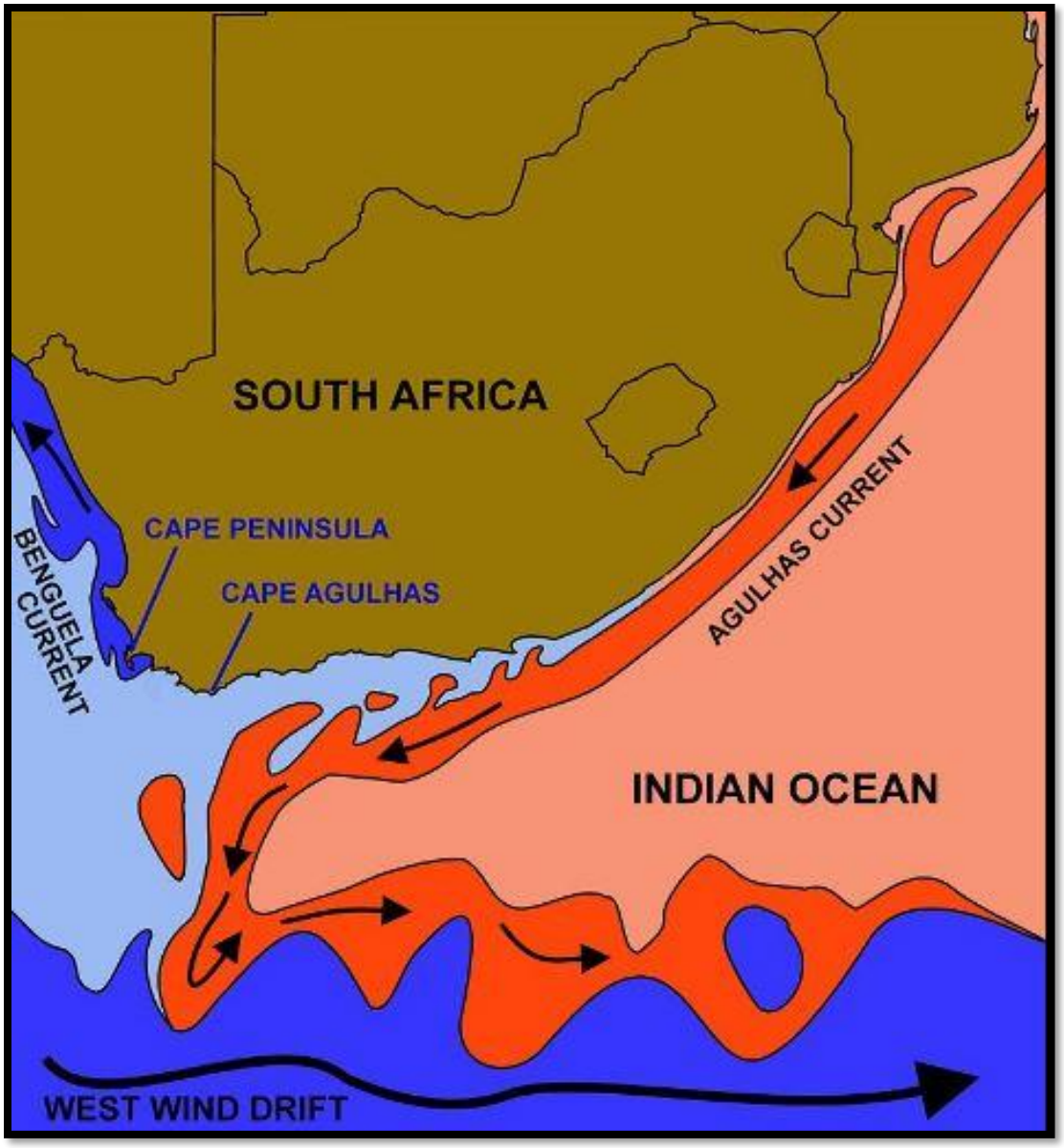


Figure 18: Benguela Current

The courses of the warm Agulhas current(red) along the east coast of South Africa, and the cold Benguela current (blue) along the west coast. Note that the Benguela current does not originate from Antarctic waters in the South Atlantic Ocean, but from upwelling of water from the cold depths of the Atlantic Ocean against the west coast of the continent. The two currents do not "meet" anywhere along the south coast of Africa, except as random eddies from the two currents, that arise and intermingle west of Cape Agulhas.

The South Atlantic high-pressure cell is perennial, but strongest during austral summer when it attains its southernmost extension to the south and south-west (approximately 30°S, 05°E) of the subcontinent. Linked to this high-pressure in summer

is a low-pressure cell that forms over the subcontinent due to strong heating over land. The pressure differential of these two systems induces moderate to strong south-easterly (SE) winds near the shore during summer. Furthermore, the southern location of the South Atlantic high-pressure cell limits the impact that mid-latitude cyclones have on summer weather patterns so that, at best, the mid-latitude cyclones cause a slackening of the SE winds (CCA Environmental, 2015).

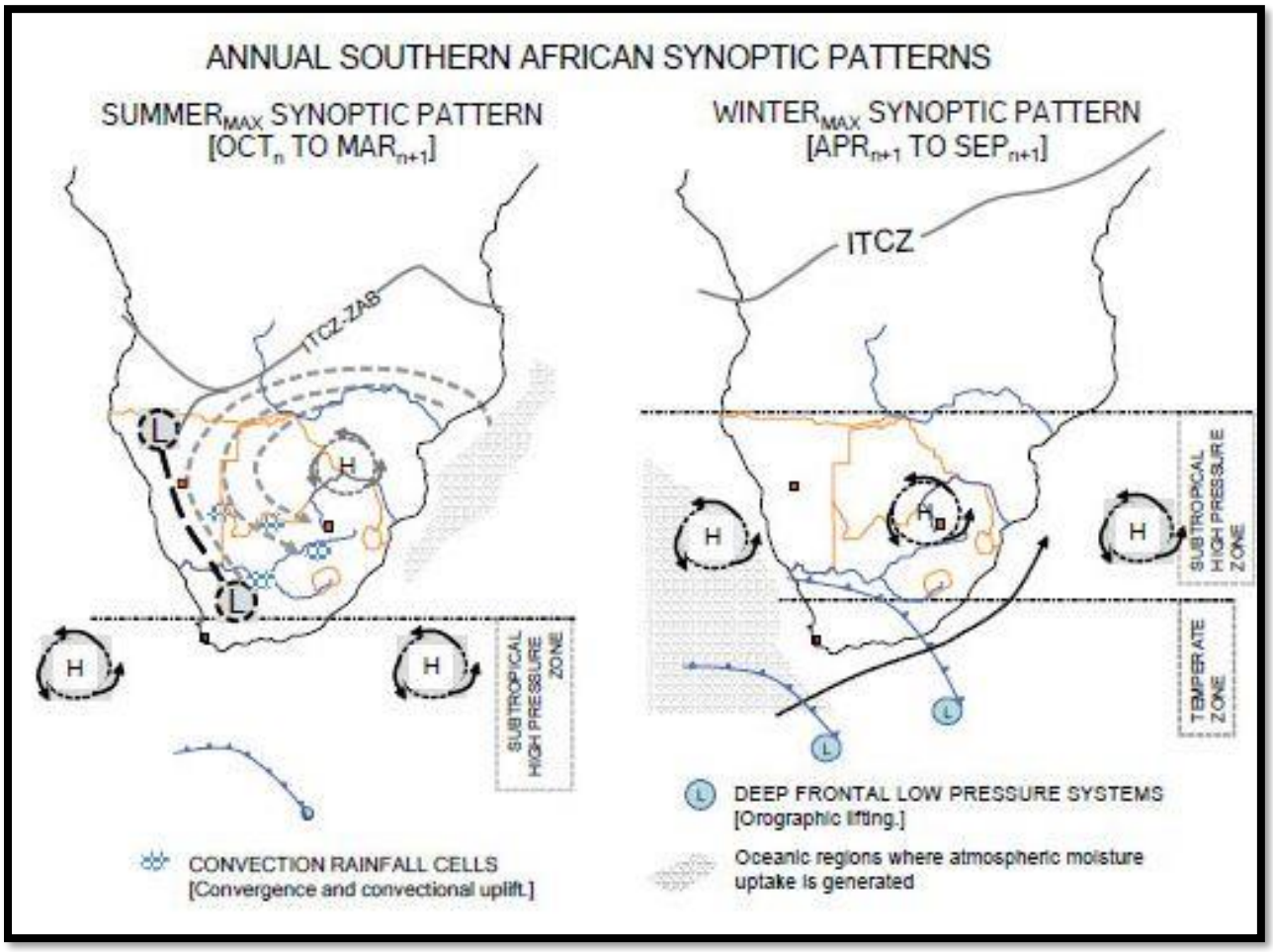


Figure 19: Pressure Zones

Strong north-westerly (NW) to south-westerly (SW) winds result from mid-latitude cyclones passing the southern Cape at a frequency of 3 to 6 days. Associated with the approach of mid-latitude cyclones is the appearance of low-pressure cells, which originate from near Lüderitz on the Namibian coast and quickly travel around the subcontinent (Reason and Jury 1990; Jury, Macarthur and Reason 1990). A second important wind type that occurs along the West Coast are katabatic 'berg' winds during the formation of a high-pressure system (lasting a few days) over, or just south of, the south-eastern part of the subcontinent. This results in the movement of dry adiabatically heated air offshore (typically at 15 m/s). At times, such winds may blow along a large proportion of the West Coast north of Cape Point and can be intensified by local topography. Aeolian transport of fine sand and dust may occur up to 150 km offshore (CCA Environmental, 2015).

6.1.4 Geology and Bathymetry

The northern rocky area is found in the northern 10km of the concession. It is backed mostly by a sandy beach shoreline with occasional rocky reefs comprising of rocks from the Gariep Supergroup. The shoreline in turn is backed by a cliff of variable height. The seafloor of this area comprises mostly subdued to low relief rock outcrop with occasional moderate shoals. The lithology is interpreted to comprise phyllites and greywackes. Three structural foliation directions are observed: NW, NNE and WSW. These foliation directions have been preferentially eroded to produce sediment-filled gullies.

Generally a large amount of sediment veneer is associated with the rock outcrop in this northern area. The seaward edge of this northern area is overlain by fine sediment with occasional coarse sediment streamers. This fine sediment wedge onlaps and encroached the rock outcrop. This encroachment is most probably seasonal with larger winter swells resulting in a net offshore movement in the fine sediment with normal sea conditions causing a net onshore movement.

The central area begins in the south at Cliff Point and runs into the northern area. Like the northern area, it is backed by a sandy beach but has a more prominent cliff line. The seafloor in this area comprises mostly fine sediment with minor patches of rock outcrop being confined to the seaward boundary. Rock outcrop is associated with a subdued relief and coarse sediment veneer. Sub-bottom chirp profiles across this region shows the sediment to be at least 5m thick with some internal structure as reflected by the multiple reflectors observed in some of the records. However due to the nature of the sediment and possibly this internal structure, depth to bedrock is not clearly discernible. This sediment pile is interpreted to be part of the onlapping nearshore wedge that should coarsen slightly as the shore face is approached.

The southern area extends from Cliff Point to the southern boundary. The shoreline consists of a combination of rocky reef/beach, sea cliffs and small sandy beaches. The onshore lithologies comprise rocks of the Gariep and Cape Supergroups. More specifically the Cape Supergroup outcrops around Cliff Point and comprises the Table Mountain Group. There are three sediment embayments in the southern rocky area and are situated in the north just south of Cliff Point, in the centre of the southern area and in the south. The sediment in these embayment's is fine with a fringe of coarse sediment and sediment veneer onlapping the rock. A cross cutting channel-like feature is observed just north of Rob Eiland, and is filled with fine sediment. The rock outcrop in the north of the southern section is blocky and this is seen in the numerous block outcrops off Cliff Point.

South of Cliff Point a very strong conjugate foliation (WNW / NE) has been preferentially eroded by wave action and has resulted in the development of numerous cross-cutting gullies, these have been filled with coarse sediment. Dimensions to these gullies are in the order of 5m to 10m wide and up to 3m deep.
Length dimensions are up to 500m. This foliation changes direction at the channel like feature, and this is consistent with the change of onshore lithology from Table Mountain Group to Gariep rocks. The Gariep Rocks display more of a coast parallel foliation (NW) and have less of the large gully systems developed. Smaller gullies are more numerous but dimensions are not

as impressive as in the large systems. Gully-fill is again coarse sediment. The seafloor for the entire southern rocky area is low to moderate with patches of subdued sediment veneered rock. Rugged shoals/pinnacles are present especially in the south. In general the area displays more ruggedness than the northern rocky area.

Regional Geological setting:

Diamondiferous palaeoplacers along the west coast of Namaqualand occur at different elevations up to 95 m above sea level, stretching more than 10 km inland in places (Hallam,1964; Keyser, 1976; Gresse, 1988). They occur in sediments representing beach and shoreface deposits associated with Tertiary and Quaternary sealevel high stands (Pether, 1986). These "terrace" deposits are found on wave-cut platforms at different but specific elevations above sealevel (Fig. 4). Terrace deposits were mostly laid down during regressive events when sealevel dropped and may abut sea-cliffs on their landward side.
Terraces landward of about 10 m.a.s.l. are of Pliocene to Early and Middle Pleistocene age and their deposits have been divided into essentially three successions known as the 30m, 50m and 90m Packages (Pether, 1986) based on elevation, stratigraphy and age (mostly inferred there from interrelationships and palaeontology).

Terraces below 8-10 m elevation are of Late Quaternary age.

Many rivers along the West coast markedly the Orange, Buffets and Olifants, but also the Groen, Swartlintjies and Spoeg Rivers, brought diamondiferous gravels down from inland sources. The diamonds were spread along the coast by wave action and deposited on marine terraces both above and below present sealevel. Palaeo-river channels crossed the coastal strip at different times during the geological history as sealevel rose and fell in response to glaciation and global tectonics.

Depending on the age of the channels, they either eroded existing diamondiferous gravels leaving only barren bedrock or acted as traps for diamonds in original fluviai deposits or marine sediments deposited during subsequent sealevel high stands. The result is that none of the packages are continuous along the entire Namaqualand coastline; they are preserved as erosional remnants in geographically favourable areas, covered by younger terrestrial deposits. River point sources are marked by significant increased diamond content and size in the immediately adjoining terrace and surf zone deposits. Both diamond size and content decrease steadily away from the river entry points, more so to the south than to the north - a result of the prevailing northerly wave, wind, and current action along the west coast (cf. Rogers et al., 1990). Longshore sand transport by these same agents results in blockages of river mouths and a general northward migration of river entry points (e.g the Olifants and Orange Rivers).

6.1.5 Fauna and Flora

The marine flora and fauna in the concession areas are typical of the Namaqua biogeographic province.

6.1.5.1 Intertidal and Subtidal Communities

Benthic communities on sandy beaches in the supralittoral zone (above HWM) comprise isopods (Tylos and Niambia sp.) and amphipods (Talorchestia spp) most of which feed on wrack deposited near the drift line. Further down the beach in the turbulent zone below the LWM, the benthos includes mysids (Gastrosaccus spp); ribbon worms and the cumacean (Cumopsis robusta). The carnivorous gastropod (snail) Bullia digitalis, may also be present in large numbers. Below 2 m depth, amphipods (Cunicus sp) and numerous burrowing polychaete species may be present. Other polychaetes and the three spot swimming crab (Ovaiipes punctatus) may occur below 5 m.

Benthic communities on rocky shores in the supralittoral zone are dominated by the tiny gastropod Littorina africana and red algae. Further down the shore, numerous species of anemones, limpets and a diversity of gastropods and algae occur. Mussels (Choromytilus meridionalis and/or Mytilus galloprovincialis) occur on more exposed shores. From the sublittoral fringe to 5-10 m depth, the benthos is dominated by algae, including kelp (Ecklonia maxima and Laminaria schinzii). In the sublittoral zone, fauna is dominated by suspension and filter feeders (e.g. redbait, mussels, sponges, and sea cucumbers). Flere, grazers include sea urchins, limpets, isopods and amphipods, and starfishes, feather and brittle stars and gastropods also become more common.

Fish habitats and representative species include intertidal rock pools (klipfish and sucker fish); rocky reefs (hottentot, galjoen, snoek, maned blennies, harder and pilchard); surf zones (29 species have been recorded, dominated by harders, silverside, stumpnose, False Bay klipfish and two species of goby); nearshore soft sediments (shallow water hake and gurnards, West Coast sole, kob, St Josef sharks and hound sharks) and inshore pelagic zones (beyond breakers) (shoals of anchovy, pilchard, round herring, chub and horse mackerels).

The inshore zone of concessions 13 is susceptible to disturbance from natural upwelling of oxygen deficient water (which may cause lobster walkouts); oil pollution; flooding and sediment inputs from the Olifants River, and physical disturbance caused by diamond mining.

6.1.5.2 Plankton

The phytoplankton community on the continental shelf is typical of temperate coastal upwelling systems in that it is dominated by large-celled diatoms and dinoflagellates. During periods of water column stability, the large-celled community is replaced by a small-celled community dominated by flagellates.

Dinoflagellates can cause red tide ‘blooms’ that discolour the water. These blooms may be toxic and can on occasion, seriously deplete the already low oxygen concentrations in nearshore waters. Red tides are ubiquitous features of the nearshore Benguela system in late summer and autumn, although they are more common south of Lamberts Bay.

The zooplankton comprises of mesozooplankton (200-1600 pm) dominated by copepoda, and macrozooplankton (>1600 pm) dominated by euphausiids. Most of the zooplankton species typically occur in the phytoplankton-rich upper mixed layer of the water column, with some species having developed adaptive life histories maintaining their association with nearshore waters.

Ichthyoplanktonic stages (fish eggs and larvae) of the commercially important fish stocks are limited in the area. The commercially important pelagic fish species predominantly spawn south of Cape Columbine. Although hake have been recorded to spawn on the continental shelf north of Cape Columbine, the specific localities of spawning maxima are not yet known.

6.1.5.3 Deep-water Benthic Invertebrates

The marine benthos comprises all organisms that live on or in, in the case of sands, muds etc. the seabed. The inner continental shelf (30-60 m depth) is dominated by molluscs, polychaete worms and cnidarians. Sediment texture at this depth is almost exclusively dominated by fine sands.

The midshelf mudbelt (80-120 m depth) is a particularly rich benthic habitat, and the fauna is dominated by both scavenging and carnivorous polychaete worms, as well as cnidarians. The comparatively high benthos biomass in this region represents a food resource to carnivores such as the mantis shrimp, cephalopods and demersal fish species. The sediment texture is dominated by silts and clays and very fine sands.

On the outer shelf (280 m depth) Crustacea increase in relative importance with amphipods comprising the major component. Sediment texture is dominated by very fine sands. At 400 m depth echinoderms dominate the fauna.

6.1.5.4 Jellyfish

In late summer, hydrozoan jellyfish have been observed to congregate in ‘swarms’ in the mid-shelf (100 m - 200 m) with decreasing densities towards the coast and offshore. Although jellyfish ‘swarms’ have been observed off Port Nolloth, the centre of distribution of the two species concerned is further north from Luderitz to Walvis Bay.

6.1.5.5 Cephalopods

Cuttlefish are a presently unexploited resource which occur on mud and muddy sand sediments on the mid and outer continental shelf, in association with their major prey item; mantis shrimps.

6.1.5.6 Fish

The offshore fish communities consist of pelagic species and demersal species. Pelagic species include anchovy, pilchard, round herring, chub and horse mackerel, which spawn mainly south of St Helena Bay downstream of major upwelling centres in spring and summer. Their eggs and larvae are subsequently carried up the West Coast in northward flowing waters.

Recruitment success relies on the interaction of oceanographic events, and is thus subject to spatial and temporal variability. Consequently the abundance of adults and juveniles of these small pelagic fish is highly variable both within and between species.

Large pelagic species include tunas, billfish and pelagic sharks which migrate throughout the southern oceans, between surface and deep waters (>300 m) and have a highly seasonal distribution in the Benguela.

Demersal communities comprise deepwater species (>380 m) such as deepwater hake, monkfish, and kingklip and more shallow water species dominated by Cape hake and including jacopever, white squid and catshark. The distribution of the latter shelf community varies seasonally.

6.1.5.7 Pelagic and Coastal Seabirds

49 species of pelagic seabirds, including numerous species of albatrosses, shearwaters, petrels and gulls, have been recorded in the region; 14 are resident, 10 originate from the northern hemisphere and 25 from the southern ocean. The West Coast area supports 35% of the total Benguela system population. Highest bird densities occur offshore of the shelf-break in winter.

Coastal birds endemic to the region and liable to occur most frequently especially in the nearshore regions include Cape Gannets, Kelp Gulls, African Penguins, African Black Oystercatcher; Bank, Cape and Crowned Cormorants, and Hartlaub's Gull. Of these the Black oystercatcher and Bank cormorant are rare. Caspian and Damara terns and Chestnutbanded Plovers are likewise rare and breed in the study area, especially in the wetland and saltpan areas associated with the Sout River Olifants River estuary. The White Pelican is a rare, non-breeding resident.

In total, fourteen species of seabirds are known to breed in southern Africa; Cape Gannet, African Penguin, four species of Cormorant, White Pelican, three Gull and four Tern species. The breeding areas are distributed around the coast with islands being especially important. The number of successfully breeding birds at the particular breeding sites varies with food abundance. Although no offshore islands with breeding colonies of birds occur in, or shoreward of, concession area 11(b) the Elephant Rocks Marine Reserve in Concession 12(a) serves as a breeding site for Crowned (Phalacrocorax coronatus) and Cape Cormorants (P. capensis). The estuarine habitats around the Olifants River mouth also provide important nesting and foraging areas for coastal birds, and the River mouth area has been proclaimed a bird sanctuary.

6.1.5.8 Marine Mammals

Four seal species occur in the region of which the most abundant is the Cape fur seal. This species forages throughout the area and breeds at 25 sites on the mainland and on nearshore islands and reefs along the West Coast. There is also a non-breeding colony of seals to the north at Strandfontein Point. These have important conservation value since they are largely undisturbed at present, as public access to the coast in this area is limited.

The species characteristic of the west coast offshore community are long-finned pilot whale, Gray's beaked whale and bottlenose dolphin. The west coast inshore community includes dusky dolphin, Heavisides dolphin, common dolphin, and

southern right whale dolphin. The dusky and Heaviside's dolphins are found in the extreme nearshore regions between northern Namibia and Cape Point.

All of the eight species of southern hemisphere large baleen whales have been recorded along the West Coast. Many of these whales are highly migratory and found off the West Coast in winter and early spring (June to September). Migrations of these species occurs primarily off the continental shelf, although limited numbers of southern right whales may also occur in inshore waters. In contrast, humpback whales use the coastal waters (inshore of the 200 m isobaths) as a migratory corridor between their summer polar feeding grounds and winter breeding grounds in lower latitudes. Their main west coast migration route strikes the sub-continent to the north of Saldanha Bay, from where they continue northwards. As they have been recorded off the south-western Cape and Namibian coasts during the summer, humpbacks are therefore considered as semi-residents.

6.1.6 Assessment of the Radioactivity Sediments

6.1.6.1 Existing Radiation Sources:

The distribution of high radioactivity sources in the southern Namaqualand West Coast have relevance noting:

1) Bedrock origins
2) Secondary sediments from mining processing or natural concentration
3) Highly radioactive heavy mineral sediment concentrations in streams and beaches
4) Concentrated heavy mineral deposits now being mined, especially as at the Namakwa Sands (Tronox) and MSR Mines.
5) Locality of processing plants/ loading facilities where concentrates of heavy minerals with radioactivity occur

Namakwa Sands (Tronox) Mine recovery facility at Brand se Baai and its secondary screening and rail-loading facility at Koekenaap. MSR processing and loading facility at MSR mine near Geelwal. shows:

1) The distribution of main bedrock related sources of radioactivity to be:
    - Steenkampskraal Mine on a Monazite Dyke.
    - The Uilklip Monazite Dyke north-east of Steenkampskraal
    - The green east-west metamorphic rock south east of Bitterfontein where it was mined as dimension stone until abandoned due to high radiation levels of the rock.
    - The volcanic plugs of planned rare-earth mines west of Bitterfontein.
    - The granites of Paarl, yielding the high levels of Radon gas in the Paarl church from the granites mined as dimension stone on the slopes of Paarl Rock in Paarl.

2) The current river sediments of the Sout River, which drains the Steenkampskraal area to later enter the Olifants River at Lutzville.

3) The beaches north of Port Nollath, which reflect heavy mineral deposits in their purple-coloured sands, which are the basis of mining heavy minerals of the beaches.

4) Concentrated heavy mineral deposits such as occur at the Namakwa Sands Mine.

5) Locality of processing plants and transport loading facilities, including:

- Namakwa Sands (Tronox) Mine facility at Brand Se Baai and the secondary processing and rail-loading facility at Koekenaap.
- Processing and loading facility at the MSR Mine at Geelwal.

6.1.7 Hydrology

All of these DWS quaternary catchments are within the Olifants/Doorn Water Management Area.

6.1.7.1 Strategic Water Source Areas for Surface Water and Groundwater

A SWSA is one where the water that is supplied is considered to be of national importance for water security. Surface water SWSAs are found in areas with high rainfall and produce most of the runoff. Groundwater SWSAs have high groundwater recharge and are located where the groundwater forms a nationally important resource. There are 22 national-level SWSAs for surface water (SWSA-sw) and 37 for groundwater (SWSA-gw). The SWSA-sw in South Africa, Lesotho and Swaziland occupy 10% of the land area and generate 50% of the mean annual runoff. They support at least 60% of the population, 70% of the national economic activity, and provide about 70% of the water used for irrigation. The SWSA-gw cover 9% of the area of South Africa, account for 15% of the recharge, 46% of the groundwater used by agriculture and 47% of the groundwater used by industry.

6.1.7.2 South African National Wetland Map

A South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was established during the National Biodiversity Assessment of 2018 (Van Deventer *et al.* 2018). The SAIIAE offers a collection of data layers pertaining to ecosystem types and pressures for both rivers and inland wetlands. National Wetland Map includes inland wetlands and estuaries, associated with river line data and many other data sets within the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) 2018. Mapping the locality of wetlands is essential so that they may be classified into the different wetland ecosystem types across the country, which in turn can be used along with other data to identify wetlands of conservation significance. The South African National Wetland Map (NWM) utilises the latest spatial data to portray the extent and ecosystem types of the estuarine and inland wetlands, collectively known as wetlands, and informs decision makers in assessing development applications, land use and conservation planning and policy making. According to this data, the Olifants River is classified as a cool temperate estuary system, while the Sandlaagte is classified as a channelled valley bottom wetland habitat .

6.1.7.3 Aquatic habitat assessment

Three watercourses have potential to be impacted cumulatively, namely the Olifants Estuary, Sandlaagte River, and a small depression wetland, as they are located in the broader study area around the focus sites. The systems are therefore assessed in further detail below.

6.1.7.3.1 HGM 1 – Olifants River Estuary

The reach of the Olifants River that is in closest proximity to the Ebenezer site contains estuarine habitat. It is classified as a predominantly open estuary within the cool temperate bioregion (Van Niekerk et al. 2019). The Estuary Component of the National Biodiversity Assessment 2018 (SANBI) identified the Olifants Estuary as a core biodiversity priority system with high biodiversity importance. The present ecological state (PES) falls within the 'C' category, which is indicative of a moderately modified ecosystem, and the recommended management objective is to maintain this level of PES). According to the Olifants River Estuarine Management Plan (Western Cape Government, Department of Environmental Affairs & Development Planning, 2017), the Olifants River Estuary is one of the largest of South Africa's 279 estuaries, with a total area of 702 ha of typical estuarine habitat plus 797 ha of floodplain saltmarsh, together making up 1499 ha. The estuary drains one of the largest catchments in the country . It is one of the most important estuaries in the country from a conservation perspective. Birds are noted as one of the most important components of the estuary's biodiversity. The diversity and numbers of birds are very high, due to the size and diversity of habitats on the estuary, and its lack of disturbance.

*Figure 20**: Photographs of the Olifants River system showing the river mouth and estuary (left) and the characteristics of the upper river reaches (right)***

Summarizes the various pressures identified in the NBA 2018 for the Olifants Estuary and quantifies the existing threats to the estuary's ecological health. The mean annual runoff reaching the estuary is approximately 34% less than in the natural state. Both low flows and winter flood peaks have been reduced, reducing the input of sediment to the estuary. There is currently little development of the estuary margins, though there has been some loss of saltmarsh. There is significant use of the open water for fishing, which, when, coupled with alien invasive species, pollution and reduced flow, can result in pressure on the ecosystem

*Figure 21**: Photograph showing the Clanwilliam Dam wall on the Olifants River, which contributes to reduced flow to the lower reaches***

*Table 5**: Estuary condition and biodiversity (conservation) priorities summary from the National Biodiversity Assessment- Estuary Component (SANBI, 2018)***

Name	Present Ecological State	Recommended Ecological Condition	Biodiversity Importance Rating	Biodiversity priority core set (national and/or CAPE)	Biodiversity Priority Rating	Ramsar status	IBA	EBSA	DAFF Important Fish Nurseries
Olifants	C	C	High Importance	SA/CAPE/WC	Priority	-	Yes	-	High

*Table 6**: Estuary pressure assessment summary from the National Biodiversity Assessment- Estuary Component (SANBI, 2018)***

Name	Cumulative	Flow	Pollution	Habitat loss	Fishing Effort	Artificial Breaching	Invasive Aliens Plants	Invasive Aliens: Fish	Natural MAR (MCM)	Present MAR (MCM)	Fish Catches (t)
Olifants	M	M	H	H	VH	0	H	VH	1 070.1	715.0	121.1

6.1.7.3.2 HGM 2 – Sandlaagte River

The Sandlaagte River is an ephemeral upper foothills river which flows from the east to join the ocean through a micro-outlet type estuary. According to the spatial rivers dataset (which is part of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) released with the National Biodiversity Assessment (NBA) 2018), the river falls within the 'E' category of PES. The river PES has therefore not changed since it was recorded as 'Seriously Modified' in DWA's data from 1999. The reach of the Sandlaagte River under assessment contains a channelled valley bottom wetland of the Namaqualand Sandveld Bioregion. According to the NWM5 2018 database, the wetland shares the Seriously Modified PES rating with the associated river data. The Ecosystem Threat Status (ETS) of the wetland is Critically Endangered and the Ecosystem Protection Level (EPL) shows that it is not afforded any protection.

Namaqualand Strandveld would be located in an ecosystem with Least Threatened (LT) conservation status whereas those in the Lamberts Bay Strandveld would be located in a Vulnerable (VU) ecosystem. The areas where the prospecting sites are located in Vulnerable zones have lost strandveld vegetation to agriculture.

6.1.8 The vegetation in context

Essentially all the original natural vegetation in the study area is mapped for the SA Vegetation Map as **Namaqualand Strandveld and Namaqualand Sand Fynbos** (Mucina & Rutherford 2012;, with areas of **Namaqualand Salt Pans**). The SA vegetation mapping in this area is basically supported by my site observations.

Namaqualand Sand Fynbos is currently listed as **Least Threatened** on a national basis (DEA 2011). This vegetation type has about 96% of its total original extent remaining, about 2% of its original extent is protected (within the Namaqua National Park), and a national conservation target of 29% (Mucina & Rutherford 2006). This means that the unit is still very vulnerable to further loss, particularly mineral sand mining.

Namaqualand Strandveld is currently listed as **Least Threatened** on a national basis (DEA 2011). This vegetation type has 91% of its total original extent remaining, less than 3% of its original extent is protected (within the Namaqua National Park), and a national conservation target of 26% (Mucina & Rutherford 2006). This means that the unit is also still vulnerable to further loss

Namaqualand Salt Pans are also listed as **Least Threatened** on a national basis (DEA 2011). This vegetation type still has about 98% of its total original extent remaining, 0% of its original extent is protected, and a national conservation target of 24% (Mucina & Rutherford 2006). The unit is very poorly conserved, and hence vulnerable to loss (mainly to salt mining).

6.1.8.1 Namaqualand Strandveld

This vegetation type is found on deep, brownish sands, or on loamy soils. Typical Namaqualand Strandveld occurs in its pure form close to the coast, and then again on younger sands inland of the Fynbos strip, bordering on the Hardeveld. Strandveld also occurs as a mosaic with the Sand Fynbos in numerous areas on site most of these mosaic areas are generally classified as Sand Fynbos. These mosaic areas are thus ecotones, where one vegetation type changes over to another, and are often diffuse and poorly defined, and mapping thus becomes subjective. Features of true Namaqualand Strandveld include a high percentage of succulents and leaf deciduous shrubs, moderate bulb diversity, and no Restionaceae (riete) or *Stoebe nervigera*. Rare or threatened plant species are also usually not a major feature of this vegetation type. Perennial plant cover ranges from fairly low (30-40%) to fairly high (60%), and average height from 0.6m to 1.0m. Typical species in this area include *Zygophyllum morgsana, Othonna cylindrica, Tetragonia fruticosa* (kinkelbossie), *Justicia cuneata, Calobota sericea* (fluitjiesbos), *Ruschia floribunda, Osteospermum incanum* (grysbietou), *Cissampelos capensis, Conicosia elongata, Helichrysum tricostatum, Othonna coronopifolia, Eriocephalus racemosa* (kapok; roosmaryn), *Asparagus* spp., *Hermannia scordifolia*, and *Trachyandra falcata* (kool). Scattered larger woody shrubs are a feature in some areas, and may include *Putterlickia pyracantha*, *Searsia longispina*, *Gymnosporia buxifolia* (pendoring), *Melianthus elongatus*, *Diospyros austro-africana*, and *Euclea racemosa* (sea guarrie). Grasses may be prominent after rains, mainly *Stipagrostis zeyheri*. Bulbs include *Babiana thunbergii* (rooihanekam), *Babiana grandiflora*, *Lachenalia unifolia*, *L. anguinea*, *Oxalis flava*, *O. obtusa*, *Trachyandra divaricata, Drimia elata* and *Boophone haemanthoides* (gifbol).

6.1.8.2 Namaqualand Sand Fynbos

As noted, this vegetation type forms an ecotonal mosaic with Strandveld in many places on site, but also occurs as a virtually pure vegetation type, particularly in dune areas, where sands are leached. A number of variations are found, the most notable of which is the Renosterbos (*Elytropappus rhinocerotis*) community on shallow, ferricrete soils.

True Sand Fynbos is characterised by the presence of the following species: *Macrostylis decipiens* (fynblaar buchu), *Diosma ramosissima*, *Wiborgia obcordata*, *Calobota lotononoides, Thesium strictum, Lachnospermum fasciculatum, Trichogyne repens, Leucospermum rodolentum* (Sandveld speldekussing), *Restio vimineus, R. macer, Nenax arenicola*, *Psammotropha quadrangularis*, *Muraltia obovata* and *Aspalathus spinescens* ssp. *lepida*. The following species are often common in this vegetation type, and are restricted to Fynbos habitats, but in themselves are not diagnostic of pure Sand Fynbos (ie. they also occur in Strandveld ecotones): *Willdenowia incurvata, Thamnochortus bachmanii, Stoebe nervigera*, and *Elytropappus rhinocerotis* (renosterbos). *Willdenowia incurvata* is often dominant on dune ridges (see Plate 1), with *Thamnochortus bachmanii* dominant on the flats between. In true Fynbos areas succulents are rare, and the only prominent species is *Ruschia subpaniculata*.

6.1.8.3 Namaqualand Salt Pans

Many small (<25ha) pans occur in the greater study area, but these are not true salt pans as the surface is either sandy and well drained or they are hardpan (dorbank) exposures. The former seldom, if ever, support any standing water, but the latter

do hold some water for short periods in good rainfall seasons. Some pans are quite poorly defined and are either just being exposed or are being gradually infilled by erosive forces. The largest pan in the area is Witvlakte, which is on the northern border of the greater study areas and is about 400ha in extent, and this is a true salt pan, although large parts of it are partly vegetated (see Plate 3). About 80% of this pan is within the current greater study area. Although vegetation cover is often low in these pans and they thus appear barren (especially in the summer dry season), they may support a number of interesting species, including two threatened species (*Romulea lutea* and *Lachenalia barkeriana*;

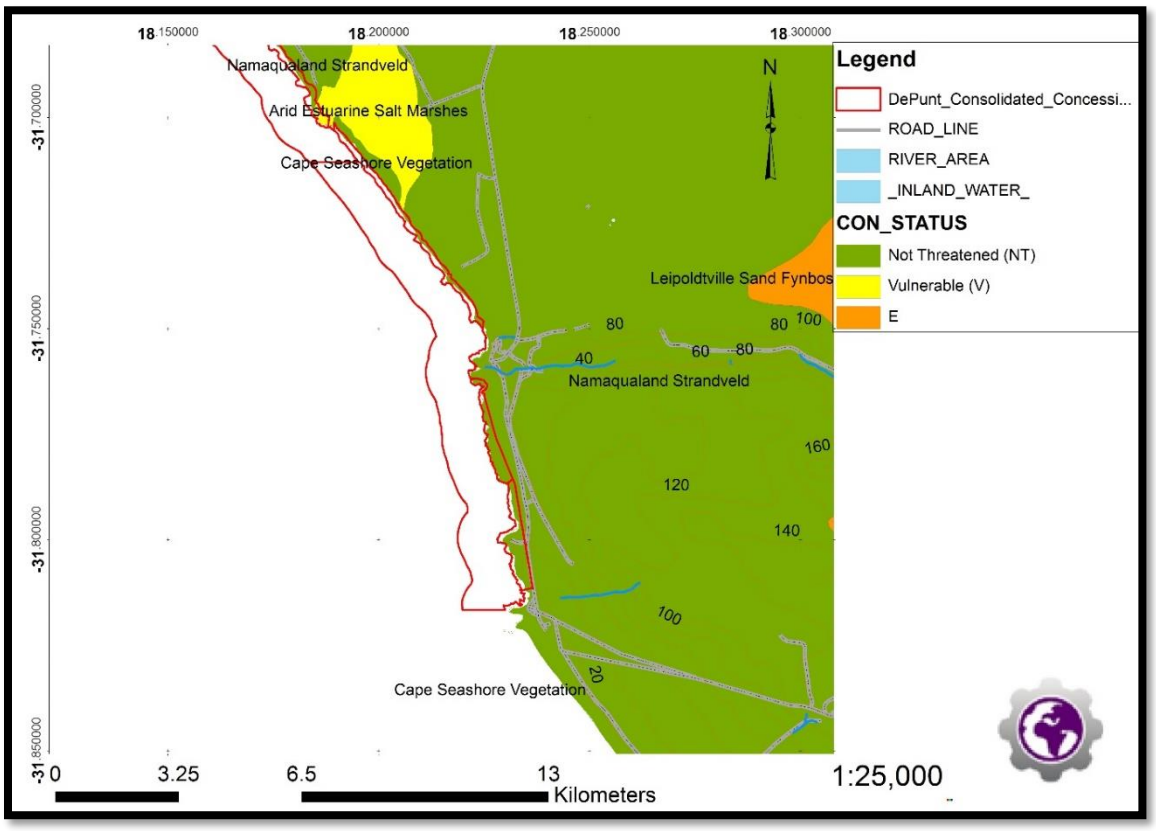


Figure 22: Vegetation along the stretch of the consolidated application area

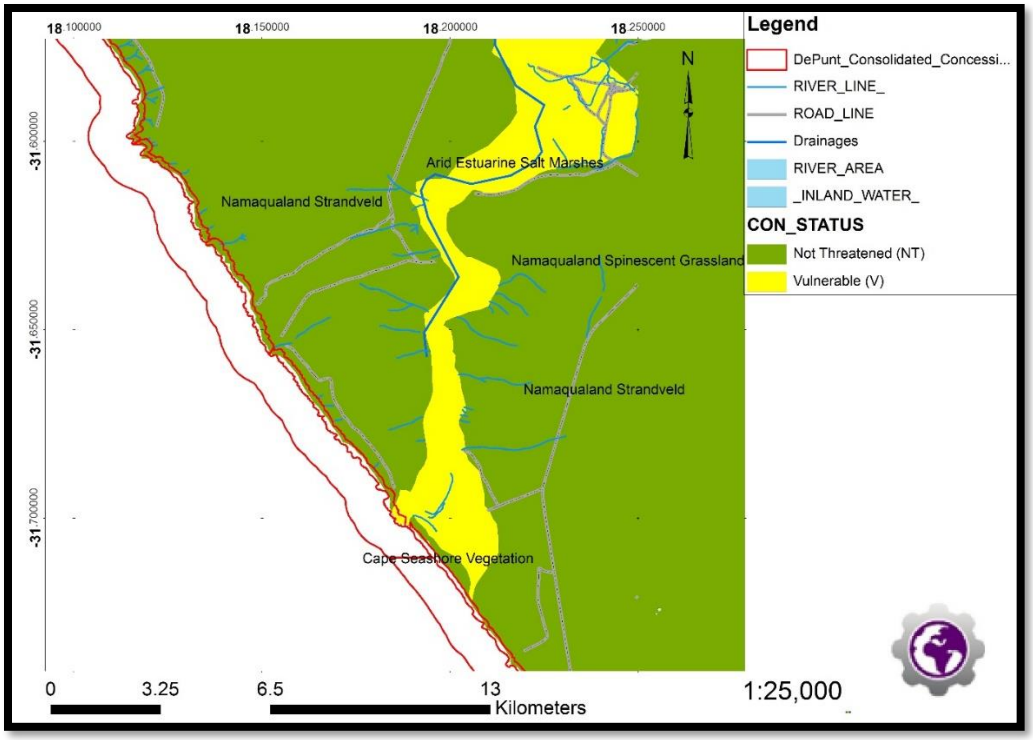


Figure 23: Vegetation along the stretch of the consolidated application area

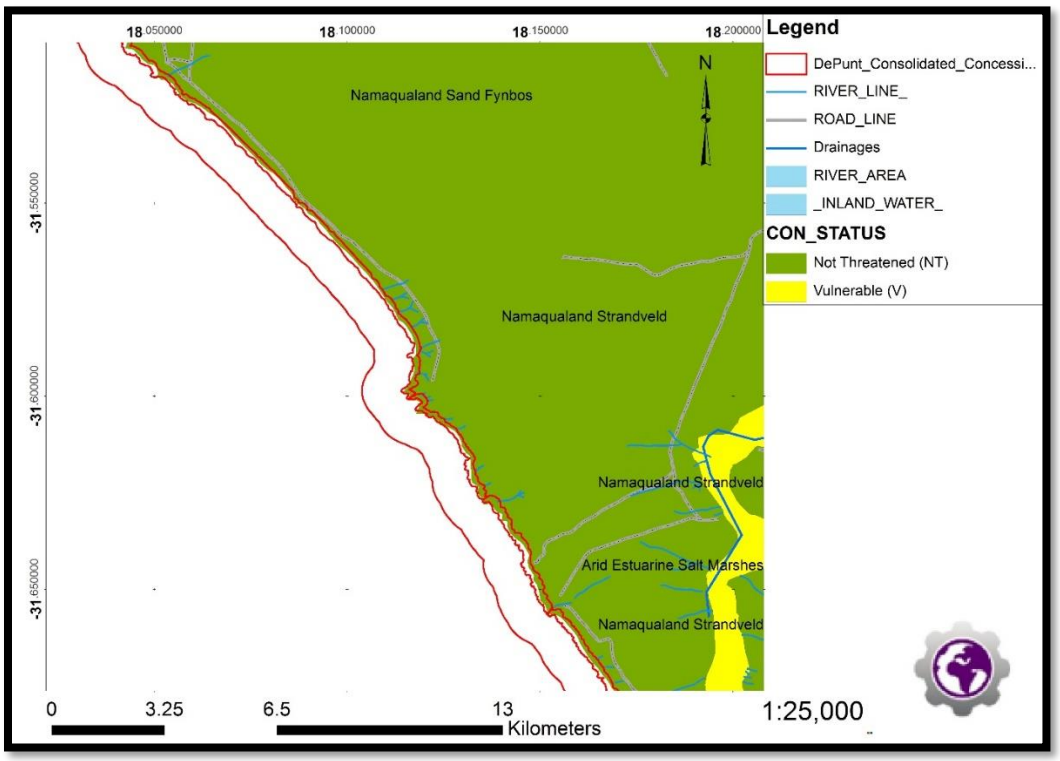


Figure 24: Vegetation along the stretch of the consolidated application area

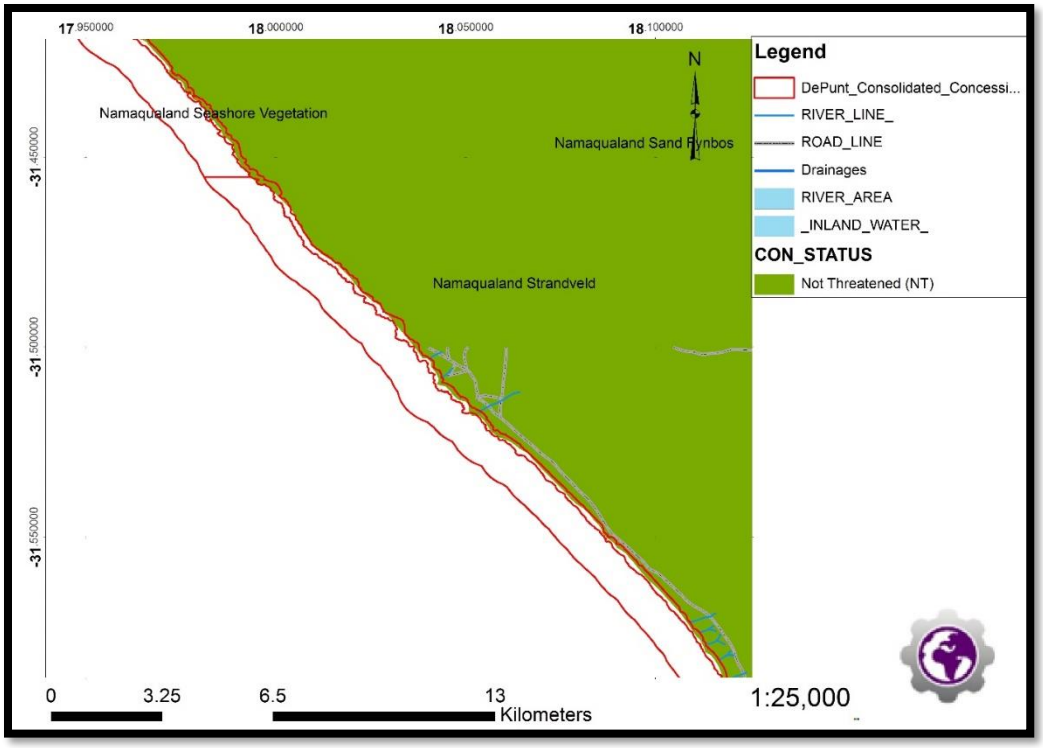


Figure 25: Vegetation along the stretch of the consolidated application area

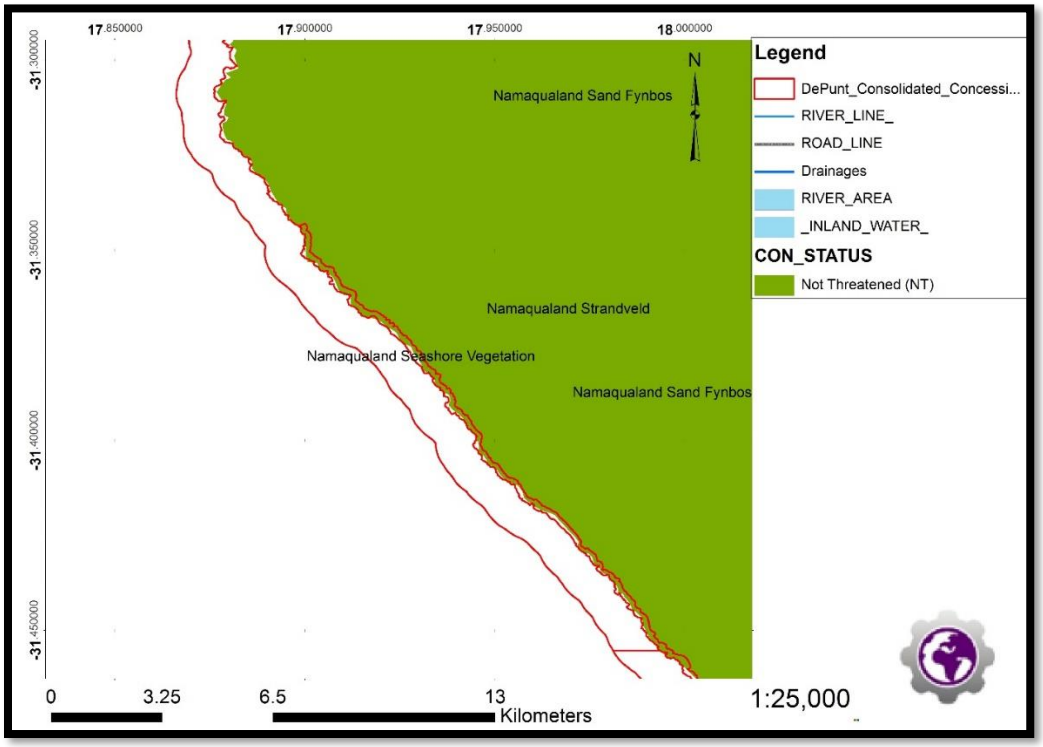


Figure 26: Vegetation along the stretch of the consolidated application area

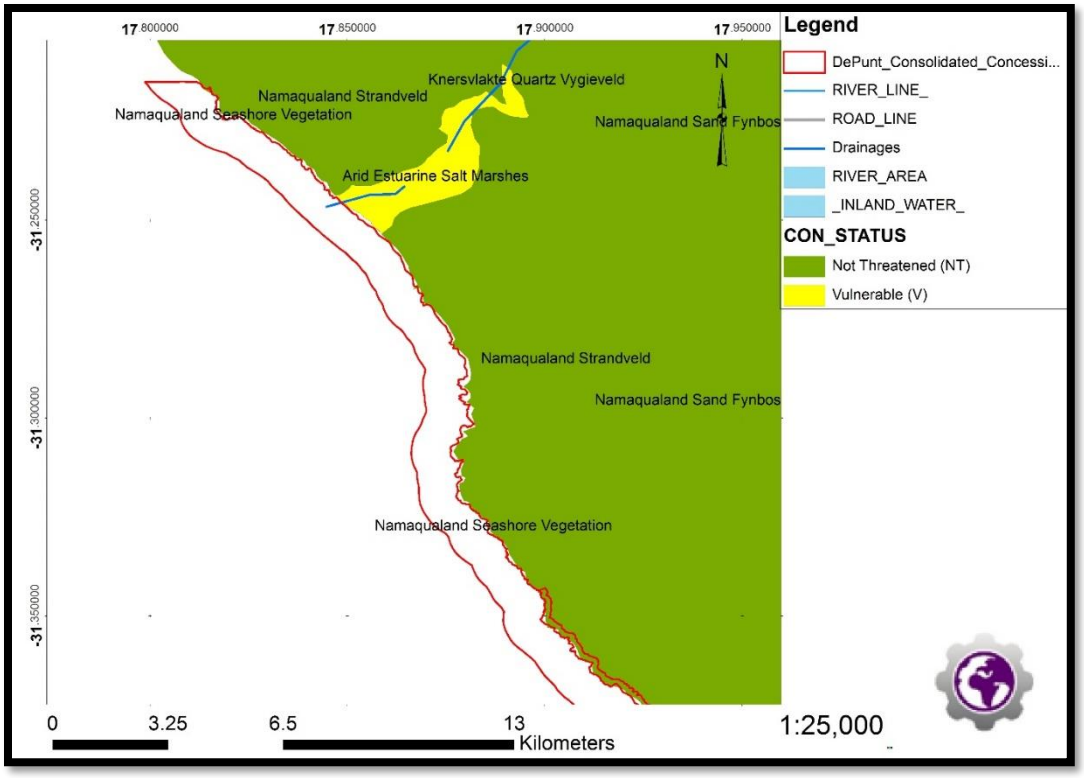


Figure 27: Vegetation along the stretch of the consolidated application area

1.1.1.1 Western Cape Biodiversity Spatial Plan

The primary purpose of a map of Critical Biodiversity Areas and Ecological Support Areas is to guide decision-making about where best to locate development. Critical Biodiversity Areas (CBA's) are required to meet biodiversity targets. These areas have high biodiversity and ecological value and therefore must be kept in a natural state without further loss of habitat or species. Low-impact, biodiversity sensitive land uses are the only land uses allowed in CBA's. The WCBSP made a distinction between areas likely to be in a natural condition (CBA1) and areas that could be degraded (CBA2). Ecological Support Areas (ESA's) are not essential for meeting biodiversity targets but are important as they support the functioning of CBA's and Protected Areas (PA's). ESA's support landscape connectivity surrounds ecological infrastructure that provide ecosystem services and strengthen resilience to climate change. These areas include Endangered vegetation; water source and recharge areas; and riparian habitat around rivers and wetlands. The WCBSP also made a distinction between ESA's in a functional condition (ESA1) and degraded areas in need of restoration (ESA2). There are numerous reasons provided for the ESA delineation on the sites, however primary reasons include the sites being located along a climate change adaptation corridor (Ebenezer), all sites located within the extent of Namaqualand Strandveld vegetation and for watercourse protection of the western coastal belt. The ESA Aquatic areas follow topographically very slightly lower areas mapped along surface runoff accumulation lines and do not necessarily represent watercourses. The land use advice handbook stipulates that mining or prospecting within an Ecological Support Area either terrestrial or aquatic is not permissible as a desired land use.

6.1.9 Geohydrology

In relation to the broader application area, De Punt shares the mining area with Tormin and the ground water observations from the mine have been used below. Tormin MR farm is overlain by sandy deposits of Quaternary age with known heavy mineral deposits (predominantly ilmenite and garnet), with calcareous deposits in the south-west. Underlying this are the schists and phyllites of the Gariep Supergroup, while to the north-west along the beaches, augen gneisses outcrops are evident, derived from biotite granites of the Little Namaqualand Suite. According to the 1:500 000 scale groundwater maps produced by DWS (2000), the area contains three classifications of groundwater aquifers:

- The area to the north of Tormin Mine is listed as intergranular and fractured, with an average borehole yield of 0.1 - 0.5 litres per second (L/s);
- The area south of the Tormin processing plant is listed as a karstic aquifer, with an average borehole yield of 0.5 – 2 L/s. Based on field observations and supplied drilling data, the geology does not seem to be that associated with a karst aquifer, but is rather fracture aquifer geology consisting mainly of schist, phyllite and greywacke with an overlying sand layer. No water was found in any of the hydrocensus boreholes visited in this area; and
- The karstic aquifer then becomes a fractured aquifer, further south near the Olifants River, with an average borehole yield of 0.5 – 2 L/s.

6.1.9.1 Hydrocensus

There are no groundwater discharge points, such as springs, located in the study area. Two equipped and closed boreholes were identified (TMB01 and TMB04) but are no longer in use. The water from these boreholes was highly saline and, as they are both approximately 150 m from the sea, it is likely that these boreholes may have intersected intruding sea water.

Source: GEOSS, 2018

6.1.9.2 Groundwater Quality

The regional groundwater quality varies greatly with the associated geologies of the area, and ranges from good to very poor. The groundwater electrical conductivity (EC) associated with the project area, as provided by DWAF (2000), ranges from 70 to 1000 mS/m. There are no existing groundwater contaminants thought to be present in the study area, as the land is not utilised for any activities that interact with the subsurface (i.e. groundwater users, agricultural activities and large infrastructure).

6.1.10 Socio economic

6.1.10.1 2018 Socio-economic Profile: Matzikama Municipality

The municipal area comprises 17 towns and or villages that is divided into 8 wards. These towns and villages include Doring Bay, Strandfontein, Papendorp, Ebenaeser, Lutzville-West, Lutzville, Koekenaap, Vredendal, Klawer, Vanrhynsdorp, Nuwerus, Bitterfontein, Kliprand, Put-se-Kloof, Rietpoort, Molsvlei and Stofkraal. Matzikama is characterized by an arid environment but is served by a life-giving arterial namely the Olifants River. The river with its associated canal systems supports a flourishing agricultural sector that is mainly built on viniculture. Apart from the newly incorporated area to the north as well as the towns of Doring Bay, Strandfontein and Van Rhynsdorp the rest of the population is concentrated along the river and canal system

Figure 28: Matzikama Municipality

A comparison between the 2011 and 2019 estimates show a notable increase in the number of people within the working age and aged cohorts whilst the aged grouping experiences a similar trajectory across the same reference period. The notable increase in the aged category is expected to
raise the dependency ratio.

A relatively marginal increase in the child cohort between 2019 and 2024, coupled with notable growth in the working and aged categories is expected to modest increase in the dependency ratio in Matzikama.
Households

In order to ensure basic service delivery to all, municipal budget allocations should be informed by credible and accurate assumptions regarding the number of households within a municipal area. According to Census 2011, there were 18 835 households within the greater Matzikama region in 2011. As per the 2016 Community Survey estimates, the number of households increased to 20 821 in 2016 which equates to 10.54 growth of the 2011 base.

Age Cohorts
Matzikama was initially expected to have decreased dependency ratios of 49.4, 48.5 and 48.2 for the respective years of 2011, 2017 and 2023, however a notable increase in the aged category is expected to raise the dependency ratio putting higher pressure on social systems and delivery of basic services.
At the municipal level, this increase will also result in a smaller base from which local authorities can collect revenue for basic services rendered and will necessitate the prioritization of municipal spending.

6.1.10.2 Ward 8:

Koekenaap, Bitterfontein, Nuwerus, Kliprand, Stofkraal, Molsvlei, Put-Se-Kloof and Rietpoort
The projections calculated for Ward 8, using the municipal growth rate of 8.2%, shows an unrealistically high demand for housing and associated requirements for land provision. Therefore, another projection has been calculated for this ward using the Municipal average growth rate of 2.17% and it is believed that this more accurately reflects the future housing demand in this part of the municipality.

The SDF of 2018 identifies sufficient land to accommodate the existing and future projected demand. It must be noted that Rietpoort, Put-Se-Kloof, Molsvlei and Stofkraal are Act 9 areas, and subjected to planning process in terms of related legislation. These processes have not commenced yet and until such time that the process will be completed, the settlements fall outside of the jurisdiction of the municipality. Currently therefore no housing delivery projects can be initiated by the municipality in these settlements.
An analysis of the population growth rate per town shows that Rietpoort is the fastest growing settlement in this ward (growth rate of 3.57%) in 2018, while Kliprand's population was found to actually be diminishing (growth rate of – 2%). We

are currently busy with the following Top structure projects, Kliprand 9, Nuwerus 44 and Bitterfontein 70 and if more land can be obtained the waiting list of Bitterfontein of 130 will be accommodated. There are also a significant number of households that are accommodated in backyard dwellings. A very high growth rate is evident in the rural population.

6.1.11 Commercial Fishing Activities

Line fishing effort in the region is centred around Doringbaai and the Olifants River mouth targeting mainly snoek and hottentot. Fishing is conducted primarily from tiny rock lobster bakkies belonging to the local rock lobster factories, although larger deckboats from Lamberts Bay and further south may visit the area during the snoek and yellowtail season. As most of the fishing is undertaken after the rock lobster nets have been deployed, or during the rock lobster closed season, the boats operate very close to the shore. The inshore catch of line fish in Concession area 11 amounts to <5 t/km/yr, whereas 10-15 t/km coastline/year are landed from the area between Olifants River mouth to south of Doringbaai. Catches increase further southwards towards Lamberts Bay.

The treknet and drift net fishery in the region is centred around the Olifants River, where there is an increasing reliance on the sea by residents of Ebenhaeser, who undertake subsistence fishing near the river mouth. Targeted species include harders and St Joseph sharks, but the by-catch may contain a variety of other pelagic species. The distribution of permitted trek- and drift-nets along the coastline of concession 11b and 1b3 is estimated at only 0.5 nets/km, although netting effort is likely to be higher as the result of the large numbers of illegal nets used on the West Coast.

Commercial catches of rock lobster in the area around Lamberts Bay, Doringbaai and Hondeklipbaai are confined to shallower water (<30 m) with almost all the catch being taken in <15 m depth between Doringbaai and Donkin Bay. Lobster fishing is conducted with hoopnets from a fleet of small dinghies/bakkies. The majority of these work close to the shore within a few nautical miles of the harbours, with only 30% of the total numbers of bakkies partaking in the fishery being deployed from larger deck boats. These larger boats may occasionally set rock lobster traps out to 50 m depth. All subtidal reefs are potential rock lobster habitats, but the areas north of the Olifants River are seldom visited by rock lobster fishermen. Although the lobster industry is an important income source for West Coast fishermen, catches from the concession area amount to well below 1% of the total allowable catch for the area.

Pelagic fishing effort is primarily concentrated south of the 11(b) and 13b, although in some years, depending upon the quotas and their distributions in terms of allowable by-catch, more effort may be concentrated around the Oliphant's River, and further north to the Groen and Brak Rivers. The pelagic fishery operates primarily in depths of 60 m to 90 m. Fishing occurs to 30 nm offshore, but usually focuses between 10 nm from the coast to close inshore. Purse-seine vessels which roam the region following fish stocks may, however, venture into <30 m depth over sandy substrates in the concession areas, but shallower nearshore areas along rocky coastlines are generally avoided. Interaction between prospecting in 13(b) and the

pelagic fishery is thus minimal. The demersal and pelagic longline fisheries operate to the south, and offshore of the (b)-concessions at water depths exceeding 200 m, and their efforts are likewise concentrated to the south of the concession area. This likewise applies to demersal and pelagic longlining which operate primarily in depths of 60 m to 90 m.

6.1.12 Screening tool Description of specific environmental features and infrastructure on the site.

Refer to Appendix 2 for the full Screening report for the mining right application areas. The sensitive features identified have recommended the specialist studies identified below:

6.1.12.1 Environmental sensitivity screening.

(Show all environmental, and current land use features)

The Screening Tool Report generated from the National Web Based Environmental Screening Tool in accordance with the latest NEMA Minimum Requirements and Protocol for Specialist Impact Assessment as contained in the "Procedures to be followed for the assessment and minimum criteria for reporting of identified environmental themes of Section 45 (a) and (h) of the National Environmental Management Act, 1998, when applying for Environmental Authorization" (10 May 2020).

- Nearby wind or solar developments found
- Environmental Management Frameworks relevant to the application
- Relevant development incentives, restrictions, exclusions or prohibitions
- Focus Areas for land-based protected areas expansion

6.1.12.2 Specialist assessments identified

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report. It is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the site situation.

- Agricultural Impact Assessment
- Landscape/Visual Impact Assessment
- Archaeological and Cultural Heritage Impact Assessment
- Palaeontology Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Aquatic Biodiversity Impact Assessment
- Hydrology Assessment
- Noise Impact Assessment
- Radioactivity Impact Assessment

- Traffic Impact Assessment
- Geotechnical Assessment
- Climate Impact Assessment
- Health Impact Assessment
- Socio- Economic Assessment
- Ambient Air Quality Impact Assessment
- Seismicity Assessment
- Plant Species Assessment
- Animal Species Assessment

7 ENVIRONMENTAL IMPACT ASSESSMENT

7.1.1 Assessment Criteria

The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure.

7.1.2 Extent

The physical and spatial scale of the impact is classified as:

a) Footprint

The impacted area extends only as far as the activity, such as footprint occurring within the total site area.

b) Site

The impact could affect the whole, or a significant portion of the site.

c) Regional

The impact could affect the area including the neighbouring properties, the transport routes and the adjoining towns.

d) National

The impact could have an effect that expands throughout the country (South Africa).

e) International

Where the impact has international ramifications that extent beyond the boundaries of South Africa.

7.1.3 Duration

The lifetime of the impact, that is measured in relation to the lifetime of the proposed development.

a) Short term

The impact would either disappear with mitigation or will be mitigated through natural processes in a period shorter than that of the construction phase.

b) Short to Medium term

The impact will be relevant through to the end of the construction phase.

c) Medium term

The impact will last up to the end of the development phases, where after it will be entirely negated.

d) Long term

The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.

e) Permanent

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

7.1.4 Intensity

The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself. The intensity is rated as:

a) Low

The impact alters the affected environment in such a way that the natural processes or functions are not affected.

b) Medium

The affected environment is altered, but functions and processes continue, albeit in a modified way.

c) High

Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

7.1.5 Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length during the life cycle of the activity, and not at any given time. The classes are rated as follows:

a) Impossible

The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).

b) Possible

The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.

c) Likely

There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.

d) Highly likely

It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.

e) Definite

The impacts will take place regardless of any provisional plans, and or mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100%.

7.1.6 Mitigation

The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

7.1.7 Determination of significance – Without Mitigation

Significance is determined through a synthesis of impacts as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact "without mitigation" is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as "positive". Significance is rated on the following scale:

a) No significance

The impact is not substantial and does not require any mitigation action.

b) Low

The impact is of little importance, but may require limited mitigation.

c) Medium

The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

d) High

The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

7.1.8 Determination of significance – With Mitigation

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation is rated on the following scale:

a) No significance

The impact will be mitigated to the point where it is regarded as insubstantial.

b) Low

The impact will be mitigated to the point where it is of limited importance.

c) Low to Medium

The impact is of importance however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.

d) Medium

Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.

e) Medium to High

The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.

f) High

The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

7.1.9 Assessment weighting

Each aspect within the impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it is necessary to weigh and rank all criteria.

7.1.10 Ranking, Weighting and Scaling

For each impact under scrutiny, a scale weighting Factor is attached to each respective impact (refer to Figure 29: Description of biophysical assessment parameters with its respective weighting), The purpose of assigning such weight serve to highlight those aspects considered most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspects criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance.

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2		Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4		Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

Figure 29: Description of biophysical assessment parameters with its respective weighting

7.1.11 Identifying the Potential Impacts without Mitigation (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1:

Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

7.1.12 Identifying the Potential Impacts with Measures (WM)

In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it was necessary to re-evaluate the impact.

a) Mitigation Efficiency (ME)

The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation effectiveness (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2:

Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency

Or WM = WOM x ME

b) Significance Following Mitigation (SFM)

The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all considerations taken into account.

7.1.13 Impacts identified

A number of negative impacts on the bio-physical environment could result from disturbances during prospecting. The significance of any potential impact is largely limited by the small physical size and short duration of the prospecting, but also by the sensitivity of the receiving environment or receptor(s).

Potential impacts resulting from the proposed project were identified using input from the following:

- Views of I&APS which will be ascertained during the consultation process;
- Existing information;
- Screening report and
- Legal and policy requirements that need to be fulfilled for the proposed project

Impact statement

The following key issues and potential impacts (direct and cumulative) were identified during the Scoping phase, which will together with potential cumulative impacts, be assessed during the Environmental Impact Assessment phase of the project and appropriate mitigation measures to reduce the identified impacts will be proposed.

Table 7: List of Potential Impacts

Activity	Alternative	Aspect	Potential Positive and negative impacts
Basic overview of the mining method	Type of mining and areas mineable	Geology	(-) Due to the shallow nature of ore body, it is only feasible to mine opencast (-) Including the areas without 10m buffer from the cliff toe increases the extent to which the geology is altered
		Groundwater	(-) groundwater quality will also be affected by polluting elements
		Surface water	(-) Increased sedimentation due to erosion
		Topography	(-) The topography of the coastal area is altered by the mining (-) temporary storage of stockpiles and topsoil will temporarily distort the topography
		Soil	(-) Excluding 10m cliff buffer and riparian areas from the open pit mining will reduce the footprint of the mining area.

Activity	Alternative	Aspect	Potential Positive and negative impacts
			(-) Soil will be lost during excavations and erosion even if mitigation measures are implemented
		Land Capability	(-) The land capability will be lost in areas where excavation and open pits will be located. (-) the chemical properties of the soil will be altered due to pollution from hydrocarbons, oils, overspills etc
		Land Use	(-) the land use will be lost from that of a conservation value, however with proper mitigation the land can be rehabilitated to an acceptable level
		Flora	(-) Not mining in CBA and protected areas minimises impacts on flora (-) the vegetation clearing will lead to significant loss of indigenous species (-) increased encroachment of alien invasive species on cleared land
		Fauna	(-) the loss of these vegetation leads to loss of habitats for fisheries, birds, mammals and herpetofauna (-) displacement of fauna due to increased human activity like noise, vehicles, human behaviour and poaching
		Air	(-) Increased air pollution from the mining activities, site clearing, vehicle movement and fumes and fugitive dust
		Noise	(-) Increased noise polluting from earthmoving equipment, heavy vehicles and machinery, processing plant.
		Heritage	(-) Artefacts unearthed during construction and operations can be lost if no proper heritage induction is undertaken and proper mitigation measures are not put in place
		Climate change	(-) Due to vegetation clearing, particulate matter from vehicles and machinery, increased fugitive dust it is expected that the climate will be locally affected by the increase in aerosols in the atmosphere as well as increased reflective surfaces
		Socio- Economic	(-) I&AP's concerned over the pollution of coastal areas and loss of tourism revenue (-) I&AP's concerned about the proximity of the mining area to fishing and farming areas (Abalone and Sheep) (+) Through local hiring and promoting of local SME's the project will

Activity	Alternative	Aspect	Potential Positive and negative impacts
			have a positive impact on the local economy.
Slimes dams, Coffer Dams and related infrastructure	Location and size	Geology	(-) The excavations will remove certain bedrock which will be discarded or used to rehabilitate the open pits but will be lost to the original stratigraphy
		Groundwater	(-) The excavation of the area will change drainage patterns as well as infiltration and runoff
		Surface water	(-) The CD with a 110% capacity will be located at least 500m from the rivers with a dirty water containment system in place in case of spillage
		Topography	(-) The CD will be constructed in a low lying flat area and will not alter the topography
		Soil	(-) Soil loss through clearing of land for the pollution control dam
		Land Capability	(-) Land capability lost for the pollution control dam
		Land Use	(-) Current land use lost as land capability is directly affected by the reduction in area due to infrastructure as well as loss in visual appearance land for infrastructure and roads
		Flora	(-) Vegetation will be lost during site clearing and construction.
		Fauna	(-) The clearance of vegetation will lead to a loss in habitat for birds, mammals and herpetofauna (-) displacement of fauna due to increased activity and noise
		Air	(-) increased dust levels, PM10, fumes during the construction phase
		Heritage	(-) The CD will be located at least a 100m from heritage buffer zones. (-) loss of archaeological artefacts might be lost due to poor environmental management during the construction phase
		Noise	(-) Increased noise levels are expected during construction
		Social	(-) Increased visual disturbance to the residents and tourists (-) I&AP concerns for overspills and spillages contaminating the groundwater (+) Potential local economy growth through hiring of architectural and engineering companies in the areas to provide the services (+) Skilled and unskilled labour creations
Storm Water		Geology	(0) the stormwater management features will have negligible effect on

Activity	Alternative	Aspect	Potential Positive and negative impacts
Management features (Clean and dirty water separation)			the geology as there will be no alterations to the bedrock
		Groundwater	(+) The stormwater management features will contain contaminated water separating it from clean water which is released to rivers. This contains contaminated water in a localised area
		Surface water	(+) The stormwater management features will contain contaminated water separating it from clean water which is released to the rivers (-) the construction of the stormwater management features will alter drainage patterns
		Soil	(-) Soils will be lost albeit in minimal quantities where the features will be built
		Land Capability	(-) There will be minimal land use lost due to the infrastructure
		Land Use	(-) There will be minimal land capability lost due to the infrastructure
		Flora	(-)Where possible the features will be constructed around vegetation of high conservation value. In cases where this is not possible there will be loss in flora
		Fauna	(-) the construction of the features will cause a loss in vegetation therefore habitats are lost (-) changes in animal routine might be affected by the features
		Air	(-) Aside from temporary fugitive dust and PM10 emissions during construction no residual air quality impacts are anticipated
		Heritage	(0) Storm water features will be designed around heritage features
		Noise	(-) There will be temporary noise pollution during construction but this will subside once complete
		Social	(+) Potential local economic growth through hiring of architectural and engineering companies in the areas to provide the services (+) Skilled and unskilled labour creations
Processing plant		Geology	(+) The processing plant will not affect the geology
		Groundwater	(-) the vegetation clearing, compaction and infrastructure will change drainage patterns and rates of infiltration
		Surface water	(-) the vegetation clearing, compaction and infrastructure will change drainage patterns and rates of infiltration
		Topography	(0) The plant is on relatively low flat land which has already been disturbed and this will not impact the topography

Activity	Alternative	Aspect	Potential Positive and negative impacts
		Land Capability	(-) The land capability of the plant foot print will be altered and lost
		Land Use	(-) The operations of the plant will have an impact on coastal access.
		Flora	(-) Vegetation loss due to site clearing and construction. However, it is recommended that the plant be constructed on already existing clearances to minimise vegetation loss
		Fauna	(-) The clearance of vegetation will lead to a loss in habitat for birds, mammals and herpetofauna (-) displacement of fauna due to increased activity and noise
		Heritage	(0) The processing plant will be located at least a 100m away from any areas of cultural significance
		Air	(-) Air emissions from the use of chemicals and generators
		Noise	(-) Increased noise levels from the processing plant
		Social	(-) Increased visual disturbance to the communities from the plant (-) Increase noise levels in the area might disturb the community (+) Potential local economy growth through hiring of architectural and engineering companies in the areas to provide the services (+) Skilled and unskilled labour creations
Mine related Infrastructure including Roads, Workshops, powerlines, workshops etc.	Location on site and route options	Geology	(+) The construction of infrastructure and roads will not affect the geology
		Groundwater	(-) increased compaction will negatively impact runoff and infiltration which impacts the groundwater recharge. (-) Oils spillages during construction and use of roads will negatively impact the groundwater quality
		Surface water	(+) All of the infrastructure and roads will not be constructed within 500m of the river
		Topography	(+) The infrastructure will be constructed on relatively low flat land which has already been disturbed and this will not impact the topography
		Soil	(-) Soil loss through clearing of land for infrastructure and roads
		Land Capability	(-) Land capability lost for infrastructure and roads
		Land Use	(-) Current land use lost as land capability is directly affected by the reduction in area due to infrastructure as well as loss in visual appearance land for infrastructure and roads

Activity	Alternative	Aspect	Potential Positive and negative impacts
		Flora	(-) Loss of vegetation through site clearing for infrastructure
		Fauna	(-) The clearance of vegetation will lead to a loss in habitat for birds, mammals and herpetofauna (-) displacement of fauna due to increased activity and noise (-) Electrocution of birds by power lines and at substations
		Heritage	(+) The infrastructures will be located at least a 100m away from any areas of cultural significance
		Air	(-) Increased air pollution during construction activities, site clearing and during the operation phase from vehicle movement and fumes and fugitive dust
		Noise	(-) Temporary increase in levels during construction (-) Noise level increases from haul trucks on and off the site
		Social	(-) The I&AP's see the infrastructure as a disturbance to the visual character of the area. (+) Potential local economy growth through hiring of architectural and engineering companies in the areas to provide the services (+) Skilled and unskilled labour creations
No-go project option	Delineation of mining area that fall within protected areas.	Air	(0) Air quality would not be compromised during the construction, operations and rehabilitation through the proposed mining activities by the generation of dust from exposed surfaces as well as the generation of exhaust fumes from machinery.
		Noise	(+) Noise would not be generated during the construction, operations and rehabilitation through the mining related activities.
		Topography, groundwater and surface water	(+) Sensitive landscapes will not be compromised including groundwater or surface water quality or quantity
			(+) The landscape will not be altered by the depressions which will be caused by the open pits mining and removal of ore however successfully rehabilitated.
		Flora and Fauna	(+) No Loss of indigenous vegetation and habitats
		Soil and Land Capability	(+)The land capability will not be changed and no soil losses through the construction, operations and rehabilitation through the mining related activities

Activity	Alternative	Aspect	Potential Positive and negative impacts
		Visual aspects	(+) The visual landscape and sense of place attributes would not be compromised.
		Land Use	(+) The current land use is approved existing mining.
		Heritage	(+) The sites of historical and cultural importance would not be affected by the construction, operations and rehabilitation through the mining related activities
		Social and Economic Impacts	(-)Loss of potential investment opportunities in the project area and income generated from the sale of the product
			(-) Loss of potential employment creation and opportunities for local service providers
			(-) There would be direct losses to government through a loss in revenue from the mine (through taxes).
			(-) There would be direct losses to government through a loss in revenue from the mine (through taxes).
		I&APs	(-) / (+) I&APs may be positively or negatively affected by the various impacts described above

Table 8: ***Potential Cumulative Impacts identified***

IMPACT	
Traffic	Increased traffic volumes within the project area and surrounding communities.
Air Quality	Decrease in air quality in the immediate surroundings of the prospecting site
Hydrological	Cumulative loss of surface water functionality as a result of an increase in pollutants.
	Cumulative impact of hydrological modifications
Ecology, Biodiversity and fisheries	Cumulative destruction of sensitive habitat.
	Cumulative impact of faunal habitat and displacement.
	Cumulative loss of fisheries
	Cumulative impact on natural migratory routes and faunal dispersal patterns.
Visual	Cumulative impact of visual distrubances
Agriculture	Cumulative impact on loss of agriculture land capability

IMPACT	
Coastal Access	Cumulative negative loss of coastal access to the public
Tourism	Cumulative loss in tourism revenue form loss of coastal access and mining related impacts onshore and offshore
Climate	Cumulative impacts on global warming stressors
Noise	Cumulative impact of construction and operational noise as well as noise due to prospecting vessels and goehpysical survey
	Cumulative impact of noise and vibrations
Socio-Economical	Postivie - Cumulative impact of development on the surrounding communities.
	Positive - Cumulative impact of development on the economic environment.
	Positive - Cumulative impact of the employment opportunities provided.
	Negative – Cumulative Loss of income from tourism and other coastal activities
	Negative- Cumulative Loss of income from affected fisheries

7.1.13.1 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.

During the EIA phase all potential negative and potential impact will be identified, ranked and mitigation measures will be prescribed. These will be developed based on the findings of the specialist studies assessments.

7.1.14 The possible mitigation measures that could be applied and the level of risk.

During the EIA phase all possible impacts will be assessed and an EMP outlining the risk and mitigation measures will be compiled. These will be developed based on the finding of the specialist studies assessments.

7.1.15 Final Site Layout Plan

The Final Layout Plan will be provided in the EIA/EMP after public consultation as well as specialist studies findings, delineation of sensitive environments and buffers.

7.1.16 Plan of study for the Environmental Impact Assessment process

A plan of study for undertaking the environmental impact assessment process to be undertaken will include-

- a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;
- a description of the aspects to be assessed as part of the environmental impact assessment process;
- aspects to be assessed by specialists;
- a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;
- a description of the proposed method of assessing duration and significance;
- An indication of the stages at which the competent authority will be consulted;
- particulars of the public participation process that will be conducted during the environmental impact assessment process; and
- a description of the tasks that will be undertaken as part of the environmental impact assessment process;
- Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

The EIA phase will comprise of the following activities;

- Stakeholder Engagement;
- Assessing of Alternatives;
- Baseline and consideration of potential Specialist Studies;
- Identification of potential impacts
- Impact Assessment;
- Identification and Description of mitigation measures; and
- Reporting and decision-making.

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

The authorization process to be followed has been designed to meet the requirements of the MPRDA (Act 28 of 2002) and National Environmental Management Act (107/1998): Environmental Impact Assessment Regulations, 2014.The authorization process will include:

- Scoping Phase:
- Stakeholder Notification;
- Authority Consultation;
- Capturing of Issues and Concerns;
- Compilation of a Stakeholder Database;
- Identification of Potentially Significant Impacts;

- Identification of Potentially Sensitive Environmental Aspects;
- Identification of Required Specialist Studies;
- Compilation of a Scoping Report (this document), including:
- Plan of Study for EIA/EMP Amendment.
- Issues Report; and
- Stakeholder Review of Documentation;
- Submission and approval of Scoping Report by relevant authorities.
- Impact Assessment Phase:
- Undertake necessary specialist studies;
- Assessment of environmental impacts;
- Compilation of management plans;
- Compilation of an EMP Report;
- Stakeholder document review and comment;
- Submission of final report for decision-making.

The EMP Report will include a description of the proposed project, a list of identified environmental aspects that will potentially be impacted upon by the prospecting project, an Impact Assessment for these aspects, and an Environmental Management Programme for the mitigation and management of the identified impacts.

A plan of study for undertaking the environmental impact assessment process to be undertaken will include-

- a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;
- a description of the aspects to be assessed as part of the environmental impact assessment process;
- aspects to be assessed by specialists;
- a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;
- a description of the proposed method of assessing duration and significance;
- An indication of the stages at which the competent authority will be consulted;
- particulars of the public participation process that will be conducted during the environmental impact assessment process; and
- a description of the tasks that will be undertaken as part of the environmental impact assessment process;
- Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

7.1.18 Specialist Studies

7.1.18.1 Site Sensitivity Verification and Minimum Report Content Requirements

Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration identified by the national web based environmental screening tool (screening tool), where determined, must be confirmed by undertaking a site sensitivity verification.

The screening tool can be accessed at: https://screening.environment.gov.za/screeningtool.

- The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.
- The site sensitivity verification must be undertaken through the use of:

  (a) a desk top analysis, using satellite imagery;

  (b) a preliminary on-site inspection; and

  (c) any other available and relevant information.

- The outcome of the site sensitivity verification must be recorded in the form of a report that--

(a) confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;

(b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and

(c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations (EIA Regulations).

7.1.18.2 Specialist Assessment and Minimum Report Content Requirements

Where a specialist assessment is required and no specific environmental theme protocol has been prescribed, the required level of assessment must be based on the findings of the site sensitivity verification and must comply with Appendix 6 of the EIA Regulations. In order to assess the environmental, social and cultural impacts of the proposed diamond prospecting activity, a number of specialist studies will be commissioned. The findings of these studies will be incorporated into the Environmental Impact Assessment Report (EIR). The specialist studies consider the proposed structure and activities of the operations, as well as the associated risks to the receiving physical and socio-cultural environment.

The following aspects of the biophysical environment will be considered in the baseline studies:

- Agricultural Impact Assessment
- Landscape/Visual Impact Assessment
- Archaeological and Cultural Heritage Impact Assessment
- Palaeontology Impact Assessment

- Terrestrial Biodiversity Impact Assessment
- Aquatic Biodiversity Impact Assessment
- Hydrology Assessment
- Noise Impact Assessment
- Radioactivity Impact Assessment
- Traffic Impact Assessment
- Geotechnical Assessment
- Climate Impact Assessment
- Health Impact Assessment
- Socio- Economic Assessment
- Ambient Air Quality Impact Assessment
- Seismicity Assessment
- Plant Species Assessment
- Animal Species Assessment

7.1.19 Description of aspects to be assessed by specialists

The identified specialists will use the following gazetted protocols available on the link provided in the table below:

No	Specialist assessment	Assessment Protocol
1	Agricultural Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Agriculture_Assessment_Protocols.pdf
2	Landscape/Visual Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
3	Archaeological and Cultural Heritage Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
4	Palaeontology Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
5	Terrestrial Biodiversity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf
6	Aquatic Biodiversity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Aquatic_Biodiversity_Assessment_Protocols.pdf
7	Hydrology Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
8	Noise Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Noise_Impacts_Assessment_Protocol.pdf
9	Radioactivity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
10	Traffic Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf

11	Geotechnical Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
12	Climate Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
13	Health Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
14	Socio- Economic Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
15	Ambient Air Quality Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
16	Seismicity Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_General_Requirement_Assessment_Protocols.pdf
17	Plant Species Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Plant_Species_Assessment_Protocols.pdf
18	Animal Species Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/Gazetted_Animal_Species_Assessment_Protocols.pdf

A general view of the existing socio-economic structures of the project area will be addressed to identify relevant social aspects and predict the anticipated future social developments and/or changes in the receiving human environment;

- Provide a baseline study describing the environmental socio-economic factors of the affected population;
- Assess negative and positive impacts associated with the project;
- Identify feasible mitigation measures and benefits related with the project.

7.1.20 Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

Methodology for Assessing Environmental Issues and Alternatives

According to National Environmental Management Act (107/1998): Environmental Impact Assessment Regulations, 2014), the environment is described as the surrounding within which human 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 well-being.

Impact Assessment Methodology

(a) Nature of the impact

The NATURE of an impact can be defined as: "a *brief description of the impact being assessed, in terms of the proposed activity or project, including the socio-economic or environmental aspect affected by this impact*".

(b) Extent of the impact

The EXTENT of an impact can be defined as: "*a brief description of the spatial influence of the impact or the area that will be affected by the impact*".

EXTENT Extent or spatial influence of impact	**Footprint**	Only as far as the activity, such as footprint occurring within the total site area
	Site	Only the site and/or 500m radius from the site will be affected
	Local	Local area / district (neighbouring properties, transport routes and adjacent towns) is affected
	Region	Entire region / province is affected
	National	Country is affected

(a) Magnitude of the impact

The MAGNITUDE of an impact can be defined as: "*a brief description of the intensity or amplitude of the impact on socio-economic or environmental aspects".*

MAGNITUDE Magnitude / intensity of impact (at the specified scale)	**Zero**	Natural and/or social functions and/or processes remain *unaltered*
	Very low	Natural and/or social functions and/or processes are *negligibly* altered
	Low	Natural and/or social functions and/or processes are *slightly* altered
	Medium	Natural and/or social functions and/or processes are *notably* altered
	High	Natural and/or social functions and/or processes *severely* altered

(b) Duration of the impact

The DURATION of an impact can be defined as: "*a short description of the period of time the impact will have an effect on aspects*".

DURATION	**Short term**	Construction phase up to 3 years after construction

Duration of the impact	**Medium term**	Up to 6 years after construction
	Long term	More than 6 years after construction

(c) Probability of the impact occurring

The PROBABILITY of an impact can be defined as: "the *estimated chance of the impact happening*".

PROBABILITY	**Unlikely**	*Unlikely* to occur (0 – 25% probability of occurring)
	Possible	*May* occur (26 – 50% chance of occurring)
	Probable	*Likely* to occur (51 – 75% chance of occurring)
	Definite	Will *certainly* occur (76-100% chance of occurring)

(d) Degree to which impact can be reversed

The REVERSABILITY of an impact can be defined as: *"the ability of an impact to be changed from a state of affecting aspects to a state of not affecting aspects*".

REVERSABILITY	**Reversible**	Impacts can be reversed through the implementation of mitigation measures
	Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures

(e) Degree to which impact may cause irreplaceable loss of resources

The IRREPLACEABILITY of an impact can be defined as:" the amount of resources that can (not) be replaced".

IRREPLACEABILITY Irreplaceable loss of resources	**No loss**	*No* loss of any resources
	Low	*Marginal* loss of resources
	Medium	*Significant* loss of resources
	High	*Complete* loss of resources

(f) Degree to which the impact can be mitigated

The degree to which an impact can be MITIGATED can be defined as: "the effect of mitigation measures on the impact and its degree of effectiveness".

MITIGATION RATING	**MITIGATED** Degree impact can be mitigated	**High**	*Impact 100% mitigated*
		Medium	*Impact >50% mitigated*
		Low	*Impact <50% mitigated*

(g) Confidence rating

CONFIDENCE in the assessment of an impact can be defined as the:" *level of certainty of the impact occurring*".

CONFIDENCE RATING	**CONFIDENCE**	**Unsure**	Amount of information on and/or understanding of the environmental factors the potentially influence the impact is *limited*.
		Sure	Amount of information on and/or understanding of the environmental factors the potentially influence the impact is *reasonable and relatively sound.*
		Certain	Amount of information on and/or understanding of the environmental factors the potentially influence the impact is *unlimited and sound*.

(h) Cumulative impacts

The effect of CUMULATIVE impacts can be described as:" the effect the combination of past, present and "reasonably foreseeable" future actions have on aspects".

CUMULATIVE RATING	**CUMULATIVE EFFECTS**	**Low**	*Minor* cumulative effects
		Medium	*Moderate* cumulative effects
		High	*Significant* cumulative effects

7.1.21 The stages at which the competent authority will be consulted

The competent authority will be consulted during the

- Scoping phase
- Public Review of Documents
- EIA phase and release of the EMP
- Further Consultation after the EIA/EMP has been submitted if there are comments from I&AP's

8 PUBLIC PARTICIPATION DURING THE EIA PHASE

8.1.1 Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

Public participation is an essential and regulatory requirement for an environmental authorization process and is guided by Regulations promulgated under NEMA, specifically the EIA Regulations. NEMA EIA Regulations defines the "Public Participation Process" as a process in which potential interested and affected parties (I&APs) are given an opportunity to comment on, or raise issues relevant to, specific matters".

The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

During the Scoping Phase:

- Raise issues of concern and suggestions for enhanced benefits;
- Verify that their issues have been recorded;
- Assist in identifying reasonable alternatives; and
- Contribute relevant local information and traditional knowledge to the environmental assessment.

During the Impact Assessment Phase:

- Contribute relevant information and local and traditional knowledge to the environmental assessment;
- Verify that their issues have been considered in the environmental studies; and
- Comment on the findings of the environmental assessments.

The identified Interested and Affected Parties during the scoping phase will be made aware of the availability of the EIA report VIA

- A notification letter
- Emails and SMS
- Press advertisements
- Site Notices
- Public and Stakeholder Meetings
- The EIA will be made available for review to all IAPs for 30days. All registered IAPs will be notified by email, fax, SMS, or post of the report's availability. Hard copies of the draft report will be placed at:
- Public Libraries, Municipal Offices and other accessible places.

8.1.2 Details of the engagement process to be followed

- In addition to land owners, other relevant organisations will be identified and notified of the application. This includes municipal and State departments with jurisdiction in the area and Non-governmental Organisations (NGOs) with an interest.
- A notification letter with the details of the availability of the EIA will be distributed (by email, fax or post) to all land owners. All IAPs will be asked to distribute the documents to anyone who may be interested or affected by the project.
- Site Notices
- Public and Stakeholder Meetings
- Register of IAPs during the scoping report will be used to notify the availability of the EIA
- EIAR/EMPr will be released for public review for 30 days each excluding public and school holidays.
- Hard copies of the draft report will be placed at: Public Libraries, Municipal Offices and other accessible places.
- A final Consultation report with stakeholder comments from each phase will be submitted.

Framework of a Stakeholder Engagement Plan

Regulations and requirements;

- Summary of previous engagement;
- Project stakeholders inclusive of an analysis and categorisation of all project stakeholders;
- Stakeholder engagement process inclusive of the regulatory process and separate engagement processes (i.e. with neighbouring facilities, or international NGOs);
- Timetable;
- Resources and responsibilities;
- Grievance mechanism;
- Key messages (code of conduct);
- Monitoring and reporting – i.e. comments and response tracking; and
- Management functions.

8.1.3 Description of the information to be provided to Interested and Affected Parties

Once the competent authority has approved the SR, the Impact Assessment Phase will commence. Stakeholders will receive notification of the start of the Impact Assessment Phase and opportunities for public review and comment.

Public participation during the Impact Assessment Phase revolves around a review of the findings of the EIA, presented in the Draft EIA Report. This report will be made available for public comment for a period of 30 days.

Stakeholders will be invited to comment on the Draft EIA Report and EMP in the following ways:

- By completing a comment sheet made available together with the report at the public places, and by submitting additional written comments, by email or fax, or by telephone, to the public participation office; and
- The Draft EIA Report and EMP Report and its accompanying Specialist Studies will be distributed for comment to public places in the project area, to everyone who requests a copy email.

The documents will contain a project location, map as well as detailed legislations triggered by the project and a project description as well as reference number of the project.

The scoping report will be made available to the public for review at public libraries. The scoping report will entail potential impacts, mitigation measures as well as specialist reports to be undertaken to supplement the background information of the proposed project.

8.1.4 Description of the tasks that will be undertaken during the environmental impact assessment process

The Environmental Impact Assessment Phase will include the following activities:

1) Undertake necessary specialist studies;
2) Assessment of environmental impacts;
3) Compilation of management plans;
4) Compilation of an EMP Amendment Report;
5) Stakeholder document review and comment;
6) Submission of Scoping and EIA report for decision-making

The EIA report must contain:

- A description of the property on which the activity is to be undertaken and the location of the activity on the property;
- A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;
- Details of the public participation process conducted including
    - Steps undertaken in accordance with the plan of study;
    - A list of persons, organisations and organs of state that were registered as interested and affected parties;
    - A summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and
    - Copies of any representations and comments received from registered interested and affected parties;

- A description of the need and desirability of the proposed activity;
- A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;
- An indication of the methodology used in determining the significance of potential environmental impacts;
- A description and comparative assessment of all alternatives identified during the environmental impact assessment process;
- A summary of the findings and recommendations of any specialist report or report on a specialized process;
- A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- An assessment of each identified potentially significant impact, including:
    - Cumulative impacts;
    - The nature of the impact;
    - The extent and duration of the impact;
    - The probability of the impact occurring;
    - The degree to which the impact can be reversed;
    - The degree to which the impact may cause irreplaceable loss of resources; and
    - The degree to which the impact can be mitigated;
- A description of any assumptions, uncertainties and gaps in knowledge;
- A reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- An environmental impact statement which contains:
    - A summary of the key findings of the environmental impact assessment; and
    - A comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;

A draft environmental management programme containing;

- Copies of any specialist reports and reports on specialised processes; and
- Any specific information that may be required by the competent authority

9 MITIGATION MEASURES

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

Table 9: Mitigation Measures

Potential Environmental Impacts & Sources	Measures to prevent, mitigate, minimize or manage the impacts
CONSTRUCTION PHASE	
Activity: establishment/construction of camp site Impact: **Air pollution** (dust, gaseous emissions) Source: Establishment of camp site, movement of vehicles.	• Dust suppression measures such as spraying with water • Speed limits will be established and enforced • Equipment and vehicles equipped with standard exhaust systems which minimize the amount of emissions
Activity: food preparation Impact: **Destruction of fauna and flora** Source: Open fires	• Restrict open fires • Prohibit hunting and poaching • Collection of firewood will be prohibited • Maintain firebreaks
Activity: maintenance of vehicles Impact: **Water pollution (surface water, groundwater)** Source: spillages from vehicles	• Use oil trays • Use modern vehicles in good working condition • Take vehicles to accredited workshop in town • Use absorbents to trap hydrocarbons
Activity: Disposal of Waste Impact: **Land degradation, land-use and capability** Source: Poor waste management	• Place waste receptacles at strategic points • Monitor housekeeping behaviour and insist on corrective action • Waste will be disposed off in approved site
Activity: establishment/construction of camp site Impact: **Safety and security** Source: Employees	• Employ locals who will be transported home after hours • Make necessary arrangements with the landowner for security measures, access to site and other logistical matters
OPERATIONAL PHASE	
Activity: Preparation of mining area Impact: **Land degradation, land-use and capability** Source: Poor waste management	• Mined areas will be rehabilitated and re-vegetated • Debris will be removed and disposed off in approved site • Areas which do not form part of mining site will not be disturbed.
Activity: Disposal of Waste Impact: **Land degradation, land-use and capability** Source: Poor waste management	• Place waste receptacles at strategic points • Monitor housekeeping behaviour and insist on corrective action • Waste will be disposed off in approved site
Activity: mining and lubrication of equipment Impact: **water pollution** (surface water, groundwater) Source: leaks, spillages from equipment and vehicles	• Operate outside 100 m distance from stream or any water body • Control and manage storm water • Prevent soil erosion and keep water channel clean, monitor groundwater
Activity: Vehicle movement during operational hours Impact: **Ecological degradation** Source: Uncontrolled vehicle movement and poor rehabilitation	• Most of the biodiversity will be restored after closure • Re-vegetation of the sites • Movement of vehicles will be restricted to designated areas
Activity: Accidental spillages Impact: **Land pollution** Source: Lack of proper house keeping	• Trays used to trap hydrocarbons • Absorbent agents to be used to trap hydrocarbons and grease

	• Any spillage will be recorded and remedial action taken immediately • Reporting of significant hazardous spillages
Activity: Mining Impact: **Noise** Source: Machine and Vehicle engines	• The operation will comply with the provisions of the Mine Health and Safety Act, 1996 (Act 29 of 1996) and its regulations as well as other applicable legislation regarding noise control • Employees will be equipped with ear plugs and other protective gear. All vehicles will be equipped with silencers and maintained in a roadworthy condition
Activity: Mining Impact: **Aesthetic pollution** Source: visibility of site	• Site selection to prioritize areas not to exposed to the public or local residences • Visual impact will be temporary
Activity: Establishment of tailings Impact: **Land degradation** Source: visibility of site	• Backfilling in accordance with original soil profile • Sloping and levelling of land • Re-vegetation of the sites
Activity: Establishment of pads Impact: **Destruction of fauna and flora** Source: visibility of site	• Most of the biodiversity will be restored after closure • Re-vegetation of the sites • Re-introduction of local species where applicable
Activity: Bulk Excavation Impact: **Land degradation** Source: visibility of site	• Backfilling in accordance with original soil profile • Sloping and levelling of land • Re-vegetation of the sites
Activity: Rehabilitation Impact: **Land degradation** Source: visibility of site	• Backfilling in accordance with original soil profile • Sloping and levelling of land • Re-vegetation of the sites
DECOMMISSIONING AND CLOSURE PHASE	
Activity: De-establishment / removal of infrastructure Impact: **Air pollution** (dust, gaseous emissions) Source: movement of vehicles.	• Speed limits will be established and enforced • Very temporary in nature
Activity: De-establishment / removal of infrastructure Impact: **Noise** Source: vehicle movement	• The operation will comply with the provisions of the Mine Health and Safety Act, 1996 (Act 29 of 1996) and its regulations as well as other applicable legislation regarding noise control • Employees will be equipped with ear plugs and other protective gear. All vehicles will be equipped with silencers and maintained in a roadworthy condition

9.1.2 Other Information required by the competent Authority

Additional consultation and studies might be requested by the relevant authorities.

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

The socio-economic conditions will be identified and described as part of the EIA process. Preliminary it can be assumed that livelihoods of the adjacent landowners will be impacted by the disturbances on agriculture fisheries and tourism.

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

In terms of the National Heritage Resources Act, 1999 (Act no. 25 of 1999) an Archaeological Impact Assessment will undertaken in order to establish if any localities of heritage and paloentological significane are present.

9.1.5 Potential Cumulative impact and mitigation measures

Table 10: Cumulative Impacts and Mitigation Measures

TRIGGERS	POTENTIAL CUMULATIVE IMPACT	SIGNI-FICANCE	MITIGATION AND MANAGEMENT MEASURES	SIGNI-FICANCE (with mitigation)
Beach and surf zone mining, use of hazardous substances (hydrocarbons), soil erosion	Contamination of water resources	Low	Avoidance of hazardous substances Prevention of spillages Proper house keeping Prevent soil erosion Concurrent rehabilitation	Low
Soil erosion	Reduction of land capability	High	Restriction on vehicular circulation Immediate rehabilitation of disturbed sites	Low
Loss of sense of place and serenity	Reduction of land land-use potential Reduction in tourism	High	Reduction of noise and visual aspects Immediate rehabilitation of disturbed sites Conducting the invasive prospecting off tourism peaks	Medium
Sea Concession Mining	Loss of fisheries	High	Mining should be conducted in cognisance with migratory patterns to minimise disturbances	Medium
Lack of supervision and site surveys	Loss of biodiversity, marine habitats and heritage resources	Moderate	Use of existing roads and tracks. Limited vehicular movement Prospect in one area at a time to systematically and other land uses	Low
Improper use of machinery and vehicles	Generation of dust, smog and noise	Moderate	Maintenance of machinery and vehicles Operate within prescribed working hours	Moderate
Perception of job opportunities	Conflict between project team and the local community	Moderate	Employ local people, communicate the right messages about the project	Negligible

10 RECOMMENDATIONS

The scoping report outlines the studies to be undertaken and the protocols to be used in assessing the impacts and recommendation of best practice measures across all the mining right. The risks that have been identified need to be

mitigated. The AEP recommends the acceptance of the scoping report and plan of study with the inputs from commenting authorities and interested and affected parties.

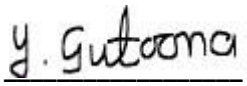
10.1.1 Undertaking Regarding Correctness of Information

DECLARATION OF INDEPENDENCE

I, Yvonne Gutoona, on behalf of Archean Resources (Pty) Ltd in my capacity as an environmental consultant, hereby declare that I:-

- Act as an independent consultant;
- Do not have any financial interest in the undertaking of this project, other than remuneration for the work performed in terms of the National Environmental Management Act EIA Regulations Amendment of 2021;
- Have and will not have vested interest in the proposed activity nor will I engage myself in any conflicting interest associated with this project
- I undertake to disclose and provide to the competent authority any material or information at my disposal regarding this project as required in terms of National Environmental Management Act (EIA regulations of June 2021);
- Based on the information provided to me by the client and in addition to information obtained during the course of this study, I have presented the results and conclusion with regard to this project to the best of my professional ability;

I Yvonne Gutoona **herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.**



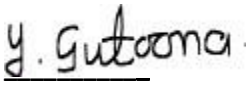
Signature of the EAP

DATE:

30 August 2021

UNDERTAKING REGARDING LEVEL OF AGREEMENT

I Yvonne Gutoona **herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.**



Signature of the EAP

DATE:

30 August 2021- Draft Release Date