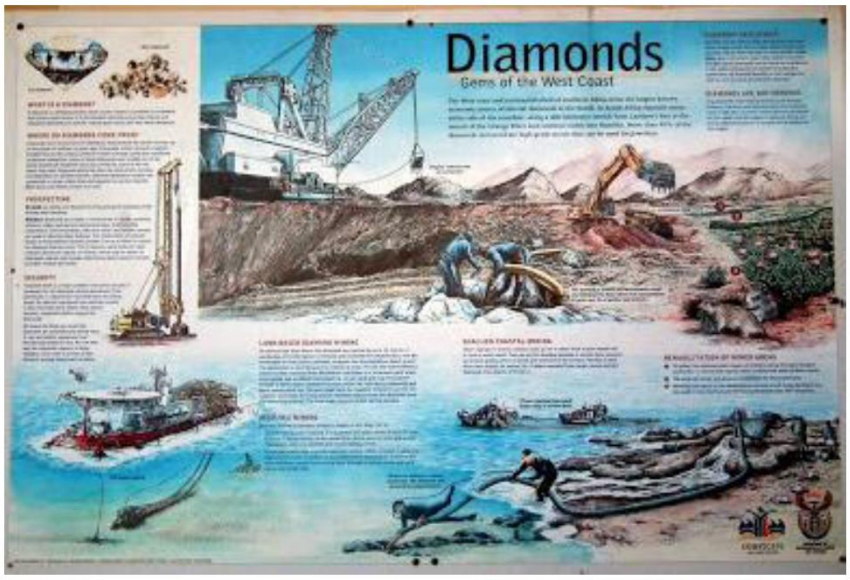

Draft Scoping Report

Proposed Prospecting Right with Bulk Sampling over Sea Concession 12B, Western Cape

Reference Number: WC 30/5/1/1/2/10424 PR

September 2022

Revision Status

DOCUMENT NAME:

Proposed Prospecting Right with Bulk Sampling over Sea Concession 12B, Western Cape

PROJECT NUMBER:

WC 30/5/1/1/2/10424 PR

DATE:

September 2022

REPORT STATUS:

DRAFT REPORT

CARRIED OUT BY:

GroenbergEnviro (Pty) Ltd

COMMISSIONED BY:

Nisarox (Pty) Ltd

CLIENT CONTACT DETAILS:

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P.O. Box 127
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AUTHOR(S):

Helene Botha

SYNOPSIS:

See Below.

PREPARED BY:

GroenbergEnviro (Pty) Ltd

Rev No.	Issue Date	Author	Technical Review	Report Review
0	September 2022	H. Botha	H. Badenhorst	H. Badenhorst

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

SCOPING REPORT

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

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

NAME OF APPLICANT: **Nisarox (Pty) Ltd**
TEL NO: **0794994743**
FAX NO: **086 666 5915**
POSTAL ADDRESS: **P.O. Box 127, Port Nolloth, 8280**
PHYSICAL ADDRESS: **P.O. Box 127, Port Nolloth, 8280**

DMR REFERENCE NUMBER: **WC 30/5/1/1/2/10424 PR**

IMPORTANT NOTICE

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

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

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

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

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

OBJECTIVE OF THE SCOPING PROCESS

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

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

_____

Statement of Qualification and Independence

GroenbergEnviro (Pty) Ltd (GBE) has no interest in the outcome of this Report, nor does this company have any interest that could be regarded as being capable of affecting its independence.

The opinions expressed in this report have been based on the information supplied to GBE by the Applicant. GBE has exercised the necessary attention in reviewing the supplied information, with conclusions from the review being reliant on the accuracy and completeness of the supplied data. Professional environmental opinions presented in this report apply to the site conditions and features as they existed at the time of GBE's investigations, and those realistically anticipated. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which GBE had no prior knowledge nor had the opportunity to assess in the context of the Report. GBE does not accept responsibility for any errors or omissions in the information provided and does not accept any consequential liability arising from commercial decisions or actions resulting from them.

EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

NAME	Helene Botha	Pieter Badenhorst
RESPONSIBILITY ON PROJECT	Preparation of Environmental Impact Assessment Report, Public Participation Documentation, Final Closure, Decommissioning and Rehabilitation Plan	
QUALIFICATIONS	B. Sc. (Zoology & Genetics) B. SC. Hons. (Animal Behaviour) M. Env. Man (Masters' Degree in Environmental Management)	B. SC. B. Eng. (Civil) M. Eng. (Irrigation) B. Hons. (B&A) MBA
PROFESSIONAL REGISTRATION	Registration with Environmental Assessment Practitioners Association of South Africa (EAPASA): Reg. No.: 2019/558 IAIAsa	Professional Engineer, member of the Engineering Council of South Africa Member of the South African Institute of Civil Engineers Member of the International Association of Impact Assessment (South Africa) Registration with Environmental Assessment Practitioners Association of South Africa (EAPASA): Reg. No.: 2019/1108
EXPERIENCE (YEARS)	7 years	47 years
EXPERIENCE & EXPERTISE	The consultant has more than 7 years of experience in project management and reports writing. Ms Botha has worked on numerous Environmental Impact Assessments, Basic Assessments, S24G Rectifications, and Water Use Licenses and has considerable experience in the preparation and compilation of Environmental Impact Reports, Environmental Management Programmes, and project management. Refer to CV Summary attached at **Appendix 1, page 75**.	The consultant has more than 47 years of experience in project management and reports writing. He worked at the CSIR in environmental and estuarine management for 16 years. During that time, he was part of the team that developed coastal management guidelines; the first process for EIA's and undertook numerous environmental studies for DEAT in collaboration with a team of ecologists. The past couple of years he has worked in environmental control and environmental impact assessments and has completed EIAs for many projects. He has also attended an EIA peer review on a major development for DEAT and is a member of IAIAsa. The practitioner has attended or organised many meetings/workshops/open days to identify issues for similar projects at the CSIR; Blue Flag for DEAT as well as other DEAT projects. The Blue Flag and other projects required interaction with large groups of stakeholders. Refer to CV Summary attached at **Appendix 1, page 75**

DECLARATION OF INDEPENDENCE

I, Helene Botha, declare that –

- I act as the independent environmental assessment practitioner in this role as EAP;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the activity;
- I will comply with the Act, Regulations, and all other applicable legislation;
- I will perform the work relating to the role of EAP in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I will take into account, to the extent possible, the matters listed in Regulation 13 of the Regulations when preparing the reports comprising the Environmental Impact Assessment;
- I undertake to disclose to the applicant and the Competent Authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the Competent Authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the Competent Authority, unless access to that information is protected by law, in which case it will be indicated that such information exists and will be provided to the Competent Authority;
- I will perform all obligations as expected from an environmental assessment practitioner in terms of the Regulations; and,
- I am aware of what constitutes an offence in terms of Regulation 48 and that a person convicted of an offence in terms of Regulation 48(1) is liable to the penalties as contemplated in Section 49B of the Act.

Disclosure of Vested Interest (delete whichever is not applicable)

- I do not have and will not have any vested interest (either business, financial, personal, or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations.

Signature of the Environmental Assessment Practitioner
Name of Company: GroenbergEnviro (Pty) Ltd
Date: 13 September 2022

EXECUTIVE SUMMARY

Nisarox (Pty) Ltd is applying for a prospecting right with bulk sampling on Sea Concession 12 B to prospect for and remove and dispose of diamond (alluvial). As per the Prospecting Works Programme (2022): Diamonds were introduced to the continental shelf via several river systems draining the interior of southern Africa. The Orange. Buffels and Olifants Rivers and their pre-cursors, have supplied the majority of diamonds to the west coast by eroding the kimberlite pipes from the interior.

The offshore deposits are the product of repeated reworking of material derived from the hinterland during a series of marine regressions and transgressions over the continental shelf. The formation of the offshore deposits has been controlled by marine coastal and near shore processes (PWP, 2022).

The concession is situated off the Olifants River mouth and extends approximately 25 kilometres northward and two kilometres southward from the river mouth. The shoreward boundary of the concession is one kilometre from the shore, whereas the western boundary is defined by a straight line between two points situated 34.6 kilometres apart as 31 27' 18"S, 17 56' 37'' E and 31 42' 37"S,18 09' 20"E, and which lie approximately five kilometres from the South African coast. The concession varies in width between 4.3 kilometres and 2.5 kilometres (average 3.5 kilometres) and encompasses an area of approximately 116 square kilometres. The water depth in the concession ranges from 15 meters to 75 meters.

The activities associated with the prospecting and bulk sampling are described in Section 4.3.

The **policy and legislative context**, including the table of EIA listed activities is included in Section 5 followed by the section on the **need and desirability** of the proposed mining right activities included in Section 6.

The **project alternatives** are described in Section 7, and the Preferred Alternative is summarised as the prospecting and bulk sampling for diamonds over Sea Concession 12B shown in **Figure 2.**

- **The Preferred Alternative is the Prospecting of Diamonds, as per the area depicted by Sea Concession 12B shown in Figure 2.**
- The preferred and only **location** alternative of the prospecting activity is as per **Figure 2**, which indicates the prospecting areas. No electricity powerline connections are required.
- The preferred **technology and operational** alternative are the use of geophysical surveys, drill sampling, bulk sampling.

The **preferred alternatives** described above will be included the impact assessment in the EIA phase, together with the mandatory “no-go” alternative that must be assessed for comparison purposes as the environmental baseline. The public participation process initiated in this scoping phase will serve to inform the selection of alternatives for detailed impact assessment in the EIA Phase.

The **public participation process** chapter is described in Section 9, and the copy of the I&AP Notice is included in Appendix B. The 30-day comment period will start on the **14 September 2022 and ended on 14 October 2022**. Comments and requests to be registered are required to be submitted in writing. The email notification will provide the link to the documents available online.

The **receiving environment** is described in Section 10 and provides a desk-top assessment using reference material and databases to identify the land uses, marine environment, protected areas, and the socio-economic environment. A Marine Ecology Impact Assessment and an Offshore Palaeontological Impact Assessment & a Maritime Archaeology Impact Assessment will be included in the DEIR.

A **preliminary impact and aspect identification** process per project phase is included in Section 11 and broad level mitigation measures are included in Section 13.

The **Plan of Study for Impact Assessment** is included in Section 12, provides the outline of the consultation process that will be followed and the specialist reports that will be prepared for inclusion in the DEIR.

The following specialist assessments have been identified for further assessment and inclusion in the DEIR Report:

- **Marine Ecology Impact Assessment and**
- **Offshore Palaeontological Impact Assessment & a Maritime Archaeology Impact Assessment will be included in the EIA Phase.**

The Plan of Study for Impact Assessment Phase is described in Section 12, and can be divided into **key steps** as outlined further below:

- Consultation with relevant authorities
- Detailed specialist study on heritage resources & marine ecology
- Completion of the EIA Report and an EMPr, including a Closure, Decommissioning and Rehabilitation Plan;
- Stakeholder engagement; and,

- Submission of the Final EIA Report, EMPr and Closure, Decommissioning and Rehabilitation Plan to the competent authority, DMR.

DEFINITIONS

Alternatives - In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to –
i. The property on which or location where it is proposed to undertake the activity;
ii. The type of activity to be undertaken;
iii. The design or layout of the activity;
iv. The technology to be used in the activity, and;
v. The operational aspects of the activity.

Baseline - Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.

Basic Assessment Process – This is the environmental assessment applied to activities listed in Government Notice No. R 983 (Listing 1) as amended by GNR 327 (dated 7/04/2017) and No. R985 (Listing 3) as amended by GNR 324 (dated 7/04/2017)**.** These are typically smaller scale activities of which the impacts are generally known and can be easily managed. Generally, these activities are considered less likely to have significant environmental impacts and, therefore, do not require a full-blown and detailed Environmental Impact Assessment (see below).

Biodiversity - The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity.

Borehole - Includes a well, excavation, or any other artificially constructed or improved groundwater cavity which can be used for the purpose of intercepting, collecting, or storing water from an aquifer; observing or collecting data and information on water in an aquifer; or recharging an aquifer.

Community - Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities, and other occasional users of the area.

Construction Phase - The stage of project development comprising site preparation as well as all construction activities associated with the development.

Consultation - A process for the exchange of views, concerns, and proposals about a project through meaningful discussions and the open sharing of information.

Critical Biodiversity Area - Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.

Cumulative Impacts - Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.

Environment - The surroundings within which humans exist and that are made up of
i. The land, water, and atmosphere of the earth;
ii. Micro-organisms, plant, and animal life;
iii. Any Part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Authorisation (EA) – The authorisation by a competent authority of a listed activity.

Environmental Assessment Practitioner (EAP) – The person responsible for planning, management and co-ordination of environmental impact assessment, strategic environmental assessments, environmental management plans or any other appropriate environmental instrument introduced through regulations.

Environmental Impact Assessment (EIA) – In relation to an application to which scoping must be applied, means the process of collecting, organizing, analysing, interpreting, and communicating information that is relevant to the consideration of that application. This process necessitates the compilation of an Environmental Impact Report, which describes the process of examining the environmental effects of a proposed development, the anticipated impacts and proposed mitigatory measures.

Environmental Impact Report (EIR) - A report assessing the potential significant impacts as identified during the Scoping phase.

Environmental Management Programme (EMPr) - A management programme designed specifically to introduce the mitigation measures proposed in the Reports and contained in the Conditions of Approval in the Environmental Authorisation.

Gross Domestic Product (GDP) by region - represents the value of all goods and services produced within a region, over a period of one year, plus taxes minus subsidies.

Hazardous waste – means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical, or toxicological characteristics of the waste, have a detrimental impact on health and the environment.

High Water Mark of the sea – means the highest line reached by coastal waters, but excluding any line reached as a result of – (a) exceptional or abnormal weather or sea conditions; or (b) as estuary being closed to the sea, as defined by the defined by the National Environmental Management: Integrated Coastal Management Act, Act 24 of 2008 (NEM: ICMA), as amended by NEM: ICMA Act 36 of 2014).

Hydrocarbons – Oils used in machinery as lubricants, including diesel and petrol used as fuel.

Impact - A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

Interested and Affected Party (I&AP) – Any individual, group, organization, or associations which are interested in or affected by an activity as well as any organ of state that may have jurisdiction over any aspect of the activity.

Municipality –

(a) Means a metropolitan, district or local municipality established in terms of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998); or

(b) In relation to the implementation of a provision of this Act in an area which falls within both a local municipality and a district municipality, means

  (i) The district municipality, or

  (ii) The local municipality, if the district municipality, by agreement with the local municipality, has assigned the implementation of that provision in that area to the local municipality.

NEMA EIA Regulations - The EIA Regulations means the regulations made under section 24(5) of the National Environmental Management Act (Act 107 of 1998) (Government Notice No. R 982, R 983, R984 and R 985 in the Government Gazette of 4 December 2014 refer as amended by GNR 324, 325, 326 and 327 of 7 April 2017.

No-Go Alternative – The option of not proceeding with the activity, implying a continuation of the current situation / status quo.

Prospecting – As defined in the MPRDA, prospecting means intentionally searching for any mineral by means of any method (a) which disturbs the surface or subsurface of the earth, including any portion of the earth that is under the sea or under the water; or (b) in or on any residue stockpile or residue deposit, in order to establish the existence of any mineral and to determine the extent and economic value thereof; or (c) in the sea or other water on land.

Public Participation Process (PPP) - A process in which potential Interested and Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

Registered Interested and Affected Party – All persons who, as a consequence of the Public Participation Process conducted in respect of an application, have submitted written comments, or attended meeting with the applicant or environmental assessment practitioner (EAP); all persons who have requested the applicant or the EAP in writing, for their names to be placed on the register and all organs of state which have jurisdiction in respect of the activity to which the application relates.

Scoping process - A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail.

Scoping Report – The report describing the issues identified during the scoping process.

Significant impact – Means an impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Spatial Development Framework (SDF) - A document required by legislation and essential in providing conservation and development guidelines for an urban area, which is situated in an environmentally sensitive area and for which major expansion is expected in the foreseeable future.

Specialist study - A study into a particular aspect of the environment, undertaken by an expert in that discipline.

Stakeholders - All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

Sustainable development - Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic, and environmental factors into planning, implementation, and decision-making so as to ensure that development serves present and future generations.

Tailings - Tailings are the materials left over after the process of separating the valuable fraction from the uneconomic fraction of an ore. Tailings are distinct from overburden, which is the waste rock or other material that overlies an ore or mineral body and is displaced during prospecting without being processed.

Visibility - The area from which the project components would actually be visible and depends upon topography, vegetation cover, built structures and distance.

Visual Character - The elements that make up the landscape including geology, vegetation, and land-use of the area.

Visual Quality - The experience of the environment with its particular natural and cultural attributes.

Visual Receptors - Individuals, groups or communities who are subject to the visual influence of a particular project.

ACRONYMS AND ABBREVIATIONS	
dB re 1 µPa	Underwater source level measurements
BGIS	Biodiversity Geographic Information Systems
DEA	Department of Environmental Affairs: National
DEIR	Draft Environmental Impact Report
D.W.S.	Department of Water & Sanitation
DMS	Dense Media Separation
DMR	Department of Mineral Resources
DSR	Draft Scoping Report
EA	Environmental Authorisation
EAPASA	Environmental Assessment Practitioners Association of South Africa
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme
FSR	Final Scoping Report
GNR	Government Notice Reference
Ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
kHz	kilohertz
km	Kilometres
km²	Square kilometres
LN	Listing Notice
L/s	Litres per second
m	Metres
m^2	Metres squared
m^3	Metres cubed
Ma	Megannum
MARPOL	International Convention for the Prevention of Pollution from Ships
MLRA	Marine Living Resources Act 18 of 1998
mm	Millimeters
MPA	Marine Protected Area
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
PWP	Prospecting Works Programme
NEMA	National Environmental Management Act 107 of 1998 as amended
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEM: ICMA	National Environmental Management: Integrated Coastal Management Act 24 of 2008 as amended by Act 36 of 2014
NEM: WA	National Environmental Management: Waste Act 59 of 1998
NHRA	National Heritage Resources Act 25 of 1999
SAHRA	South African National Heritage Resources Agency
SANBI	South African National Biodiversity Institute
t	tonnes
µPa	micropascal
WCDM	West Coast District Municipality

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 CONTACT PERSON & CORRESPONDENCE ADDRESS

1.1 Details of the EAP

Name of The Practitioner: Helene Botha
Company: GroenbergEnviro (Pty) Ltd
Tel No.: 076 509 0785
Fax No. : 086 476 7139
e-mail address: helene@groenbergenviro.co.za

1.2 Expertise of the EAP

1.2.1 The qualifications of the EAP

The qualifications and professional registrations of the Environmental Assessment Practioner (EAP)
(With evidence attached as **Appendix A: Attachments as per DMR Template Appendix 1&2: CV , page 75**).

NAME	Helene Botha	Pieter Badenhorst
QUALIFICATIONS	B. Sc. (Zoology & Genetics) B. SC. Hons. (Animal Behaviour) M. Env. Man (Masters' Degree in Environmental Management)	B. SC. B. Eng. (Civil) M. Eng. (Irrigation) B. Hons. (B&A) MBA
PROFESSIONAL REGISTRATION	Registration with Environmental Assessment Practitioners'' Association of South Africa (EAPASA): Reg. No.: 2019/558.- in progress	Professional Engineer, member of the Engineering Council of South Africa Member of the South African Institute of Civil Engineers Member of the International Association of Impact Assessment (South Africa) Registration with Environmental Assessment Practitioners' Association of South Africa (EAPASA): Reg. No.: 2019/1108

1.2.2 Summary of the EAP's past experience

Refer to **Appendix A: Attachments as per DMR Template Appendix 1&2: CV , page 75** for CV of EAP.

1.3 Description of the property.

Table 1: Location and Property Information

Farm Name:	Sea Concession 12B
Application area (Ha)	11166.9ha
Magisterial district:	Vanrhynsdorp
District Municipality	West Coast District Municipality
Local Municipality	Matzikama Local Municipality
Distance and direction from nearest town	Sea Concession 12(b) is situated approximately 300km north of Cape Town, with the inshore boundary located 1km seaward of the coast between Strandfontein to the south and Namakwa Sands Wet Separation Plant to the north. The offshore boundary is located approximately 4km offshore
21-digit Surveyor General Code for each farm portion	The concession area is located offshore and described as Sea Concession 12(b).
Locality map	Refer **Figure 1 & Figure 2**
Description of the overall activity. (Indicate Mining Right, Mining Permit, Prospecting right, Bulk Sampling, Production Right, Exploration Right, Reconnaissance permit, Technical co-operation permit, Additional listed activity)	**Prospecting right with Bulk Sampling** Nisarox (Pty) Ltd is proposing to prospect within Sea Concession area 12B for Diamonds (General & Alluvial), using both non-invasive and invasive sampling activities, none of which require infrastructure. For the purpose of this study, non-invasive means not physically destructive and invasive means physical sampling that is destructive. As the activity is located offshore and comprises

	prospecting only, no land-based infrastructure will be required. Prospecting will be vessel-based and will take place during spring and/or summer and when weather conditions are suitable, and seas are calm. It is anticipated to be completed within five (5) years. Sampling will be conducted in four phases and include a combination of non-invasive and invasive activities to detect the presence of paleo-beach deposits, which are known from other concessions to contain diamondiferous gravels. Prospecting operations are expected to occur sporadically within the concession area. The non-invasive activities will include geophysical exploration (acoustic survey), data acquisition and analysis, while the invasive activities will include physical sampling (collection of core, drill and grab samples). A possible phase of bulk sampling (remote pump and dredge mining) may also be implemented depending on the results of initial sampling. The principal objective of the proposed prospecting activities is to discover and estimate the potential mineral resources for possible future mining. Prospecting in shallow water up to 50m, that cover most of the concession area, will be conducted by a group owned custom fit survey vessel, normally with an overall length of 45.15m and a gross tonnage of 498t. This will be a multipurpose customised survey vessel capable of High-Resolution geophysical surveys (Phase 1) and small-scale boat sampling programs such as Coring and Van Veen Grab Sampling (Phase 2a) and Remote Pump Mining (Phase 3a). Prospecting in deeper water greater than 50m will be conducted by dedicated sampling vessels. For deeper water drill sampling activities (Phase 2b) a dedicated large diameter drilling sampling vessel, normally with an overall length of 114.4m, and gross tonnage of 4677t. Such a vessel is equipped with a subsea sampling tool, which can be operated in water depths up to 200m. The sampling tool comprises a 2.5m diameter drill bit operated from a drill frame structure. For bulk sampling in deeper areas (Phase 3b), trenching would be undertaken by a seabed crawler, deployed off a dedicated mining vessel, normally with an overall length of 150m and a gross tonnage of 9111t. Such a vessel is equipped with a track-mounted subsea crawler capable of working to depths up to 200m below sea level.

1.4 Location

(show nearest town, scale not smaller than 1:250000 attached as **Appendix 3: Locality Map, page 77**).

Sea Concession 12(b) is situated approximately 300km north of Cape Town, with the inshore boundary located 1km seaward of the coast between Strandfontein to the south and Namakwa Sands Wet Separation Plant to the north. The offshore boundary is located approximately 4km offshore.

Refer to the locality plan attached at **Figure 1**.

Figure 2 shows the properties and co-ordinates as detailed in **Table 1** above.

2 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY.

2.1 Listed and specified activities

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site and attach as **Appendix 4: Site Plan & Coordinates, page 78.**

NAME OF ACTIVITY (All activities including activities not listed) (E.g., Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**Aerial extent of the Activity Ha or m²**	**LISTED ACTIVITY Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE (*GNR 544, GNR 545 or GNR 546)/NOT LISTED***
The operation directly relates to prospecting of an offshore mineral resource (diamonds) and requires a prospecting right in terms of section 16 of the MPRDA. Prospecting is planned within Sea Concession area 12B using both non-invasive and invasive sampling activities, none of which require infrastructure. Sampling will be conducted in four phases to detect the presence of paleo-beach deposits, which are known from other concessions to contain diamondiferous gravels. Prospecting operations are expected to occur sporadically within the concession area. • Geophysical Surveys (Phase 1 Non-Invasive) including Swath bathymetry and sub-bottom profiling • Drill Sampling (Phase 2a Invasive) • Grab Sampling (Phase 2a Invasive) Large Diameter Drilling (Phase 2b Invasive)	Total Area 11166.9Ha Core samples footprint ±1.57m², & volume ±4.71m³. Grab samples footprint ±5m² & volume ±1.5m³ LDD footprint ± 2.4ha	X	GNR 983 Listing Notice 1 of 2014 (dated 8 December 2014), as amended by GN 517 GG 44701 (dated 11 June 2021): Activity 20: Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the MPRDA, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the prospecting right.”;
This operation requires permission in terms of Section 20 of the MPRDA for the removal and disposal of bulk samples of any minerals. The applicant requires maximum 360 000tons ROM for processing to obtain a representative sample for sufficient statistical analysis to complete a resource statement and to determine a grade (CPHT).	Bulk samples footprint ±3.6Ha & volume ±360 000 tons	X	GNR 984 Listing Notice 2 of 2014 (dated 8 December 2014), as amended by GN 517 GG 44701 (dated 11 June 2021): Activity 19: The removal and disposal of a mineral, which requires a permission in terms of section 20 of the MPRDA, as well as any other applicable activity as contained in Listing Notice 2, in Listing Notice 1 of 2014 or Listing Notice 3 of 2014, required to exercise the permission

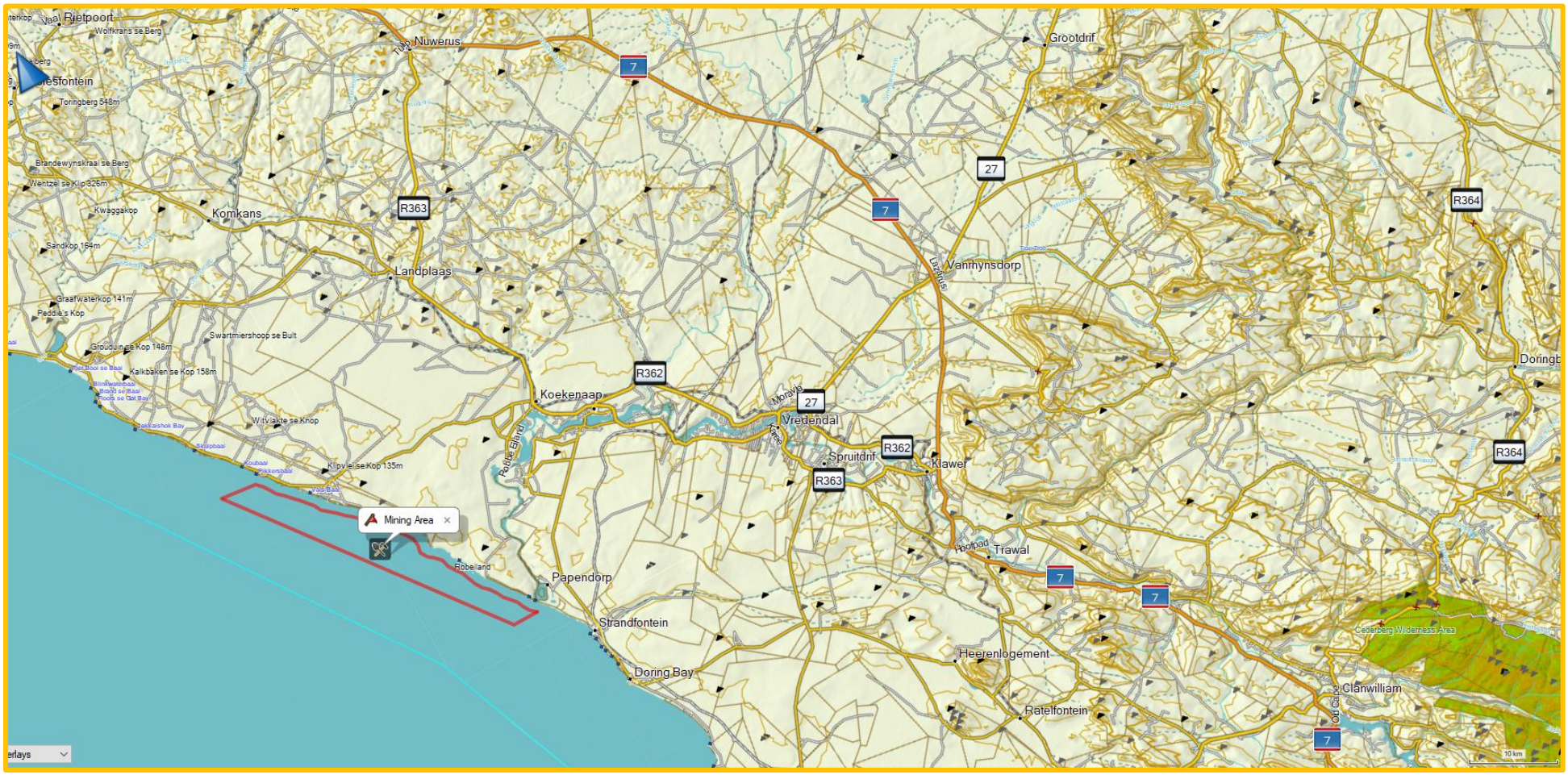


Figure 1: Locality Plan of Project Site Prospecting Right Area showing major routes and towns

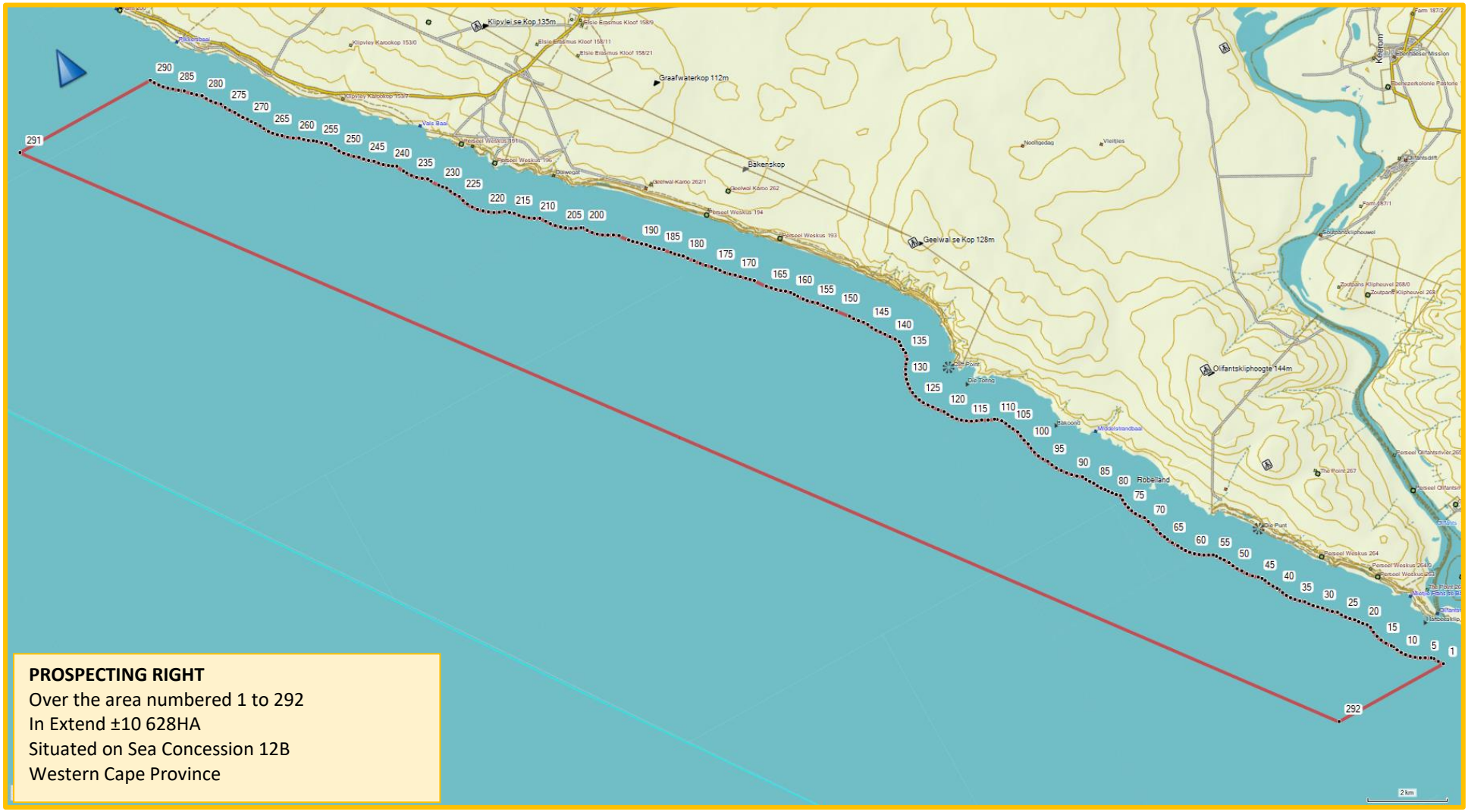


Figure 2: Layout plan, Sea Concession 12B

3 DESCRIPTION OF THE PROPOSED ACTIVITIES

3.1 Introduction and Background

Nisarox (Pty) Ltd is applying for a prospecting right with bulk sampling on Sea Concession 12 B to prospect for and remove and dispose of diamond (alluvial).

As per the Prospecting Works Programme (2022): Diamonds were introduced to the continental shelf via several river systems draining the interior of southern Africa. The Orange. Buffels and Olifants Rivers and their pre-cursors, have supplied the majority of diamonds to the west coast by eroding the kimberlite pipes from the interior.

The offshore deposits are the product of repeated reworking of material derived from the hinterland during a series of marine regressions and transgressions over the continental shelf.

The formation of the offshore deposits has been controlled by marine coastal and near shore processes (PWP, 2022).

The concession is situated off the Olifants River mouth and extends approximately 25 kilometres northward and two kilometres southward from the river mouth. The shoreward boundary of the concession is one kilometre from the shore, whereas the western boundary is defined by a straight line between two points situated 34.6 kilometres apart as 31 27' 18"S, 17 56' 37'' E and 31 42' 37"S,18 09' 20"E, and which lie approximately five kilometres from the South African coast. The concession varies in width between 4.3 kilometres and 2.5 kilometres (average 3.5 kilometres) and encompasses an area of approximately 116 square kilometres. The water depth in the concession ranges from 15 meters to 75 meters.

3.2 The Scope of the Proposed Activities

The information in Table 2 below is referenced from the Prospecting Works Programme (PWP) (2022).

Table 2: Details of the Mineral Resource (PWP; 2022)

ITEM	DETAIL
Type of mineral	Diamonds (General); Diamonds (Alluvial);
Locality (direction and distance from nearest town)	Sea Concession 12(b) is situated ap-proximately 300km north of Cape Town, with the inshore boundary located 1km seaward of the coast be-tween Strandfontein to the south and Namakwa Sands Wet Separation Plant to the north. The offshore boundary is located ap-proximately 4km offshore.
Extent of application	11166.9ha Refer to **Figure 2.**
Extent of the area required for infrastructure	Not applicable
Extent of the area required for prospecting	11166.9ha
Geological formation	The oldest basement rocks of the coastal plain are comprised of metamorphic formations (metasediments), gneisses and granites of the Namaqualand Metamorphic Province (1200Ma to 1000Ma old). These rocks are locally overlain by meta-sediments (quartz-ites, schists, phyllites and marbles) of the Gariep Supergroup, between 770Ma and 550Ma old. Sandstones and shales of the Nama Group and the Vanrhynsdorp Group occur inland below the escarpment. These sediments are generally well-pre-served and deposited during the Precambrian-Cambrian boundary of around 540Ma (PWP, 2022).

3.3 Project Description

Nisarox (Pty) Ltd is proposing to prospect within Sea Concession area 12B using both non-invasive and invasive sampling activities, none of which require infrastructure. For the purpose of this study, non-invasive means not physically destructive and invasive means physical sampling that is destructive. As the activity is located offshore and comprises prospecting only, no land-based infrastructure will be required.

Prospecting will be vessel-based and will take place during spring and/or summer and when weather conditions are suitable, and seas are calm. It is anticipated to be completed within five (5) years. Sampling will be conducted in four phases and include a combination of non-invasive and invasive activities to detect the presence of paleo-beach deposits, which are known from other concessions to contain diamondiferous gravels. Prospecting operations are expected to occur sporadically within the concession area.

The non-invasive activities will include geophysical exploration (acoustic survey), data acquisition and analysis, while the invasive activities will include physical sampling (collection of core, drill and grab samples). A possible phase of bulk sampling (remote pump and dredge mining) may also be implemented depending on the results of initial sampling. The principal objective of the proposed prospecting activities is to discover and estimate the potential mineral resources for possible future mining.

Prospecting in shallow water up to 50m, that cover most of the concession area, will be conducted by a group owned custom fit survey vessel normally with an overall length of 45.15m and a gross tonnage of 498t. This will be a multipurpose customised survey vessel capable of High-Resolution geophysical surveys (Phase 1) and small-scale boat sampling programs such as Coring and Van Veen Grab Sampling (Phase 2a) and Remote Pump Mining (Phase 3a).

Refer **Figure 3** to **Figure 5** of the sampling techniques possible in shallow water with a single custom fit exploration and mining vessel, the vessel can even be modified to handle small scale Remote Dredge Pump Mining (**Figure 6**).

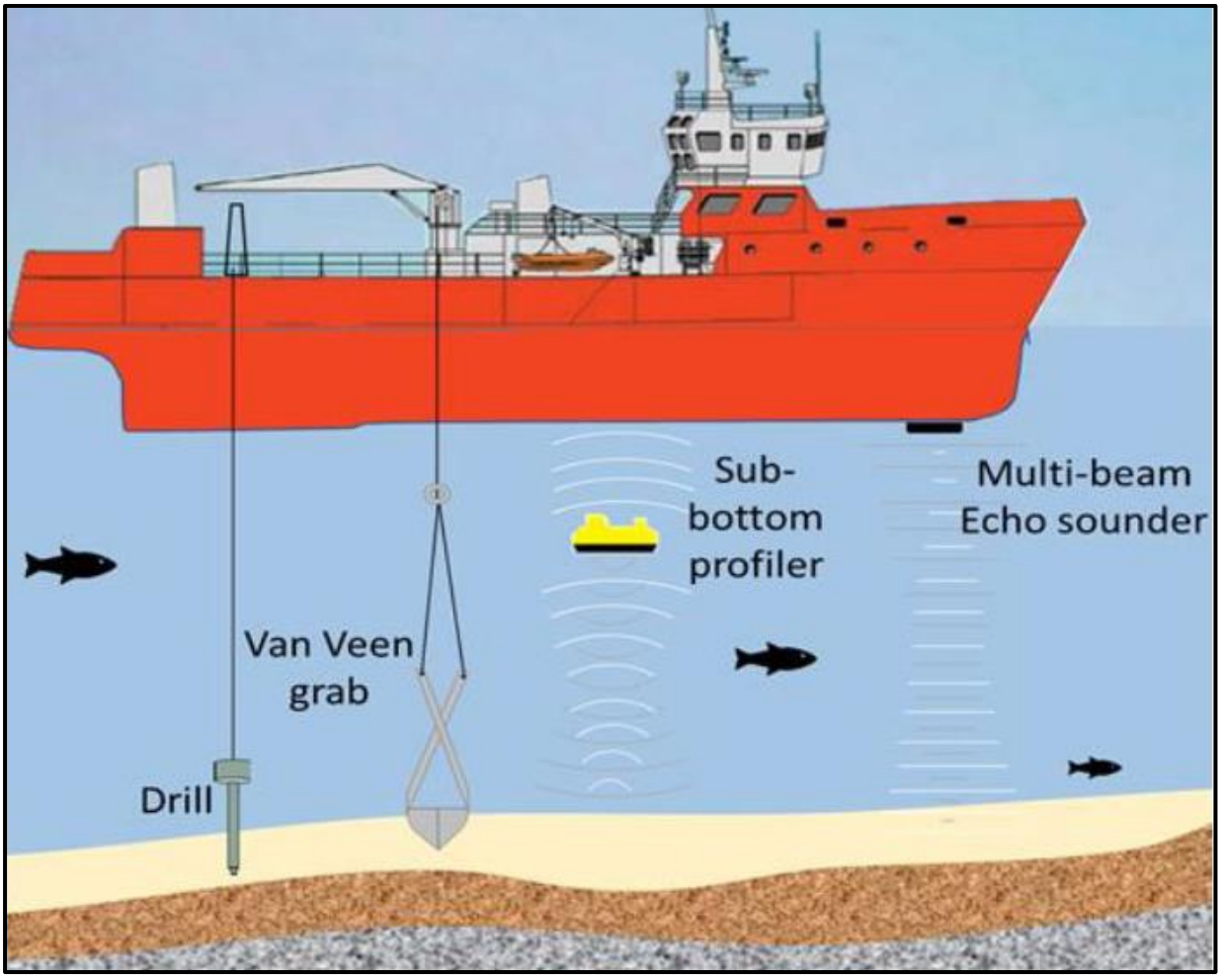


Figure 3: Illustration of sampling techniques possible in shallow water with a single custom fit exploration and mining vessel

Figure 4: An example of a sub-bottom profiler. Source: Seatronics

Figure 5: Left Example of a corer and right a Van Veen grab that works like a claw to grab sediment from the seafloor

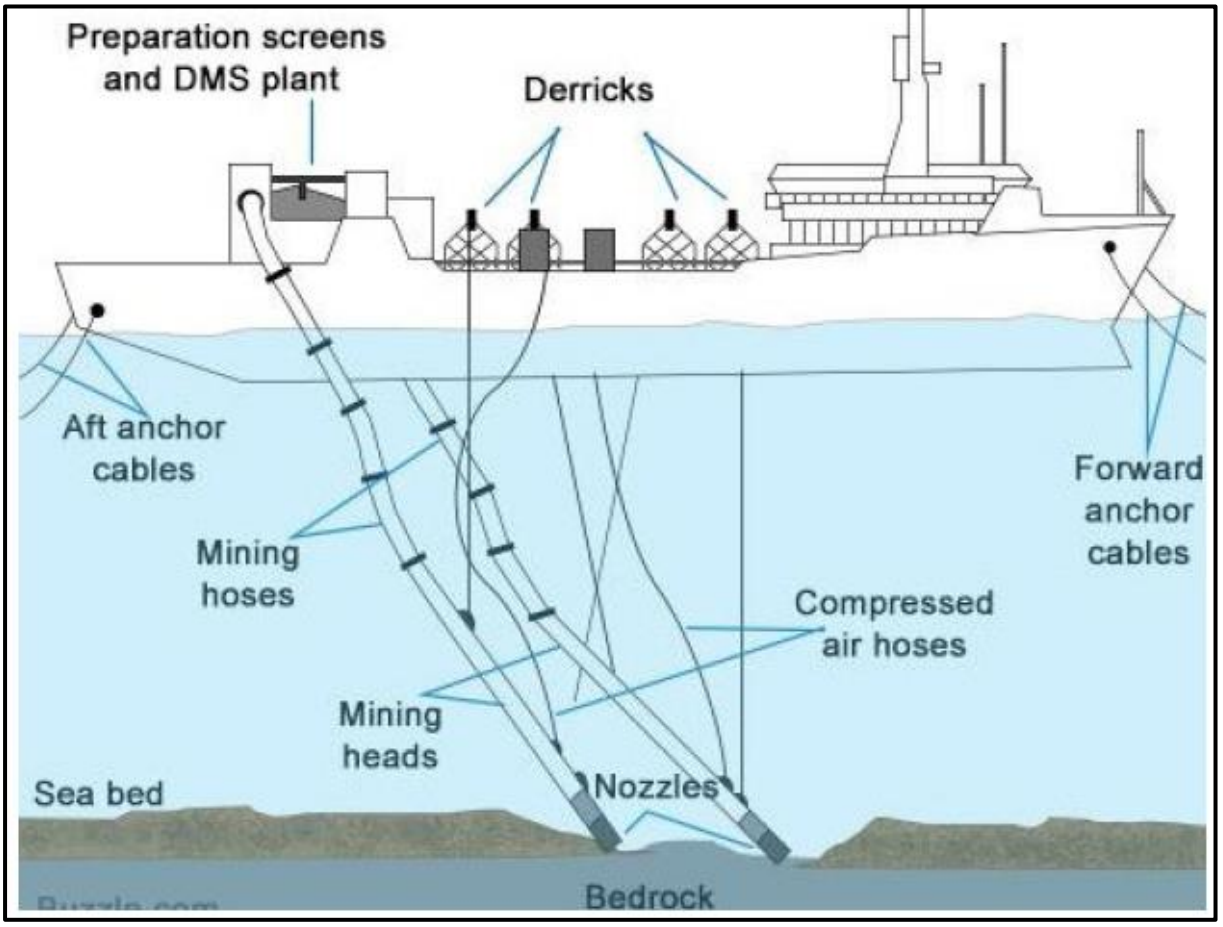


Figure 6: Illustration of remote pump mining (Source: http://globalextractionnetworks.com/about-diamonds/)

Prospecting in water deeper than 50m will be conducted by dedicated sampling vessels. For deeper water drill sampling activities (Phase 2b) a dedicated large diameter drilling sampling vessel, normally with an overall length of 114.4m, and gross tonnage of 4677t (**Figure 7**). Such a vessel is equipped with a subsea sampling tool, which can be operated in water depths up to 200m. The sampling tool comprises a 2.5m diameter drill bit operated from a drill frame structure (**Figure 8**).

For bulk sampling in deeper areas (Phase 3b) trenching would be undertaken by a seabed crawler, deployed off a dedicated mining vessel, normally with an overall length of 150m and a gross tonnage of 9111t (**Figure 9**). Such a vessel is equipped with a track-mounted subsea crawler (**Figure 10)** capable of working to depths up to 200m below sea level.

Figure 7: Example of a dedicated drill sampling vessel

Figure 8: Example of the 2.5 m diameter drill bit within the drill frame structure

Figure 9: Example of a dedicated sampling vessel

Figure 10: Example of a track-mounted sub-sea crawler

3.3.1 Geophysical Surveys Phase 1

Swath bathymetry and sub-bottom profiling will be the geophysical survey techniques employed during the proposed prospecting operations making use of:

- a multibeam echosounder designed to produce high resolution digital terrain models of the seafloor (**Figure 11**) by transmitting a 30kHz sounding in a wide swath below the vessel; and
- a parametric sub-bottom profiler (Topas system), which uses shallow (35 to 45kHz) and medium penetration (1 to 10kHz) "Chirp" seismic pulses to generate profiles up to 60m beneath the seafloor (**Figure 11**), thereby giving a cross section view of the sediment layers.

Sound levels from the acoustic equipment would range between 190 to 220dB re 1µPa at 1m. The proposed surveys would be undertaken in specific priority areas in the concessions, at water depths of between approximately 15 - 75m. The surveys would have a line spacing of between 100 to 1 000m apart. The total line kilometres to be surveyed is estimated at 600km. The planned duration for the proposed geo-physical surveys would be a total of 20 days per year over a four-year period.

In general terms, sound sources that have high sound pressure and low frequency will travel the greatest distances in the marine environment. Conversely, sources that have high frequency will tend to have greater attenuation over distance due to interference and scattering effects. It is for this reason that the acoustic footprint of the above-mentioned sonar survey tools is considered to be much lower than that of deeper penetration low frequency seismic surveys and in addition have lower sound pressure levels. It should be noted that a decibel is a logarithmic scale of pressure where each unit of increase represents a tenfold increase in the quantity being measured.

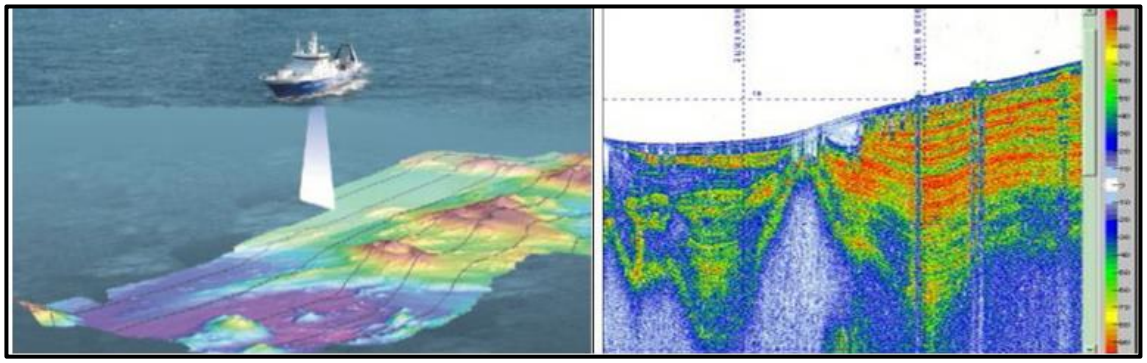


Figure 11: Swath bathymetry (left) and Sub-bottom profiling (right)

3.3.2 Drill Sampling Phase 2

For core samples in water depths less than 30m coring (e.g., vibrocoring) will be done

A vibrocorer consists of a core barrel in a landing frame with a vibrating motor on top.

The vibrocorer is landed on the seafloor, the motor turned on and the barrel penetrates the unconsolidated sediment. Once the core stops penetrating, the motor is turned off and the vibrocorer is raised back up to the deck. A PVC pipe is placed inside the core barrel prior to coring and the core sample is collected in this pipe. Cores can penetrate up to water depths of 50m and core samples up to 3m in length.

Core samples will be collected at 100-200 sites. A corer penetrates the seafloor to collect sediment samples used to determine the structure of the seafloor, sediment layers and types of sediment (i.e., sand, gravel and/ or rock and the hardness of the rock). This information is then used to engineer the drilling tool. Geotechnical sampling is also used to determine whether there are materials that can be mined in the area and whether it will be economically viable. The core samples will disturb a total surface area of 1.57m² and collect a total volume of 4.71m³.

Van Veen Grab sampling may also be used to supplement the vibrocoring: A Van Veen grab (clamshell bucket) collects sediment samples that are analysed to identify sediment types. Sampling will be done at 20-50 sites, disturb a total surface area of 5 square meters (m²) and a total volume of 1.5 cubic meters (m³).

For deeper water drill sampling activities would be undertaken using a dedicated drilling vessel to be sub-contracted. Such a vessel is equipped with a subsea sampling tool that comprises a 2.5m diameter drill bit operated from a drill frame structure, which is launched through the moon pool of the support vessel and positioned on the seabed.

The drill frame structure has a base of 6.5 x 6.5m, stands 23m high and weighs 147tons. The drill bit can penetrate sediments up to 12m depth above the bedrock. The sediments are fluidised with strong water jets and airlifted to the support vessel where they are treated in the onboard mineral recovery plant. All oversized and undersized tailings are discharged back to the sea on site.

A sample spacing of as little as 20m can be achieved by the dynamically positioned vessel. Depending on sea and the sub-seabed geotechnical conditions, up to 60 samples can be successfully taken per day. The samples would be undertaken at intervals of 50 to 500m. The total number of drill samples would be up to a maximum of 4 800. With the drill footprint of 5m², a total area of 2.4ha would be sampled.

3.3.3 Bulk Sampling Phase 3

Following analysis of the drill samples and establishment of a potential resource, bulk trench sampling may be conducted to confirm the economic viability of the resource for mining. It is proposed that up to ten trenches, each 180m long and 20m wide would be excavated within the concession area. Thus, the area to be disturbed would be 3.6 ha. The planned duration of the proposed bulk sampling would be a total of 14 days over a two-year period. It is noted that the trenches will not be contiguous but located in the prospective areas derived from the drill sampling results. The aim of the trench sampling is to determine the geotechnical characteristics of the footwall and overburden which is essential in establishing the optimal approach to mining in these areas.

For trenching in water depths less than 30m Remote Pump Mining may be used. The mining system typically comprises a suspended steel mining tool, suction hoses (10 - 18-inch diameter) and on-board dredge pumps. The mining tool consists of a steel pipe fitted with a mining head (or digging head), which has an opening fitted with grizzly/cross bars to allow sized gravel to pass through and prevent blockages of the suction hose system. The digging head that can also be fitted with high pressure water jetting nozzles to agitate the gravel on the seabed and improve mining efficiency. These jetting nozzles also serve to flush the digging head in the event of it becoming blocked.

The mining tool is suspended from an A-frame situated at the aft end or from davits along either side of the vessel. Some vessels may be fitted with dual mining systems, where mining tools are deployed from both the port and starboard sides. The mining tool suspension cable passes through a hydraulically controlled swell compensator system, which compensates for the vertical movements of the mining tool caused by the digging action. The vessel moves within a four-point anchor mooring system in order to cover the targeted seabed. Once the dredged material is pumped onboard it undergoes processing.

For trenching in deeper water activities would be undertaken using a dedicated sampling vessel to be sub-contracted. Such a vessel is equipped with a track-mounted subsea crawler capable of working to depths up to 200m below sea level. The crawler, which is fitted with highly accurate acoustic seabed navigation and imaging systems, and equipped with an anterior suction system, is lowered to the seabed and is con-trolled remotely from the surface support vessel through power and signal umbilical cables. Water jets in the crawler's suction loosen seabed sediments, and sorting bars filter out oversize boulders. The sampled sediments are pumped to the surface for shipboard processing. The area of the seabed to be sampled by the crawler can only be determined following analysis of drill samples and development of a resource model.

Shipboard processing consists of Primary Screening, Dense Media Separation (DMS) and Recovery Treatment (**Figure 12**).

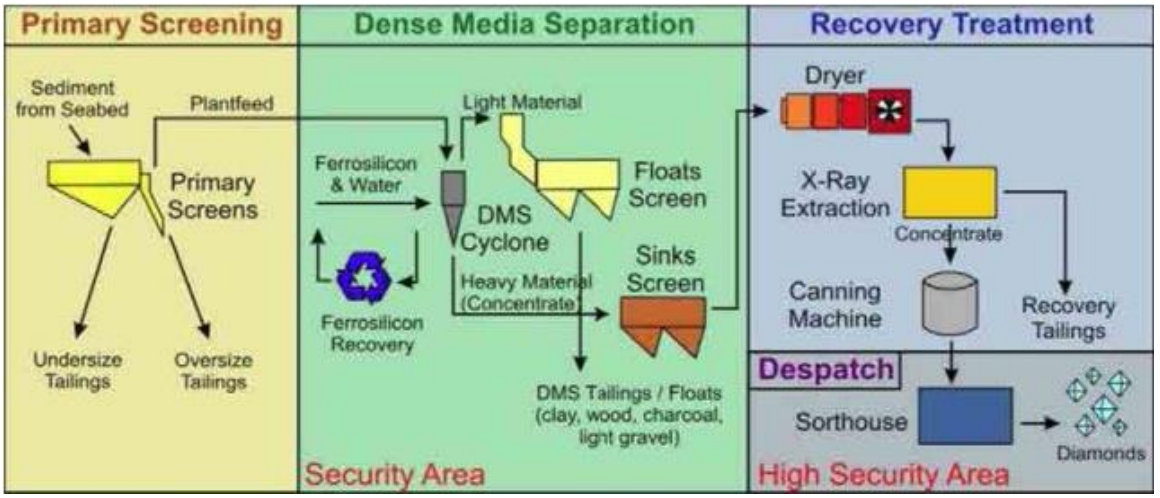


Figure 12: Flowchart of marine diamond gravel processing operations

The incoming slurry from the subsea tool via the slurry hose spooler will end up in the receiving box of the plant, here the velocity and the pressures are reduced, it also starts reducing the water content out of the slurry mass. The slurry mass will then proceed on a primary selection vibrating screen, where the undersize smaller than 1.25mm and particles larger than 19mm is separated.

The under size is transferred directly to the tailings moon-pool, the over size is transferred via a belt feeder which can establish the mass of the oversize if there is no water present in the oversize flow.

The plant feed material is pumped to the storage bins, as from where it can be selectively handled via a belt feeder system to the following treatment options, but depending on the soil conditions:

• Option 1 Transfer direct to the DMS unit.

• Option 2 Transfer to the Barmac crushing system and from there to the DMS unit.

All material from the feed preparation is transferred in the DMS feed hopper, from where it is introduced in the mixing box with the ferrosilicon, passing through the hydro cyclone VC 1220 spigot size 64mm, and the split between the floats and sinks (both over a common wash screen which is treated as restricted area), the floats are routed via a belt feeder to the tailings moon-pool, the sinks are routed to the final recovery section unit.

This final recovery section is a restricted access-controlled area, and only special authorized personnel have access to this area under supervision of security. The material introduced to the recovery module in one batch and passed as a single batch through to the flow sort double pass x-ray machine. Following the x-ray machine treatment, the final high concentrate is guided over a dryer system to the storage container in the glove box container. From here every individual sample is hand sorted, weighed, counted, first appraisal and packed in the drop save. The QA procedure will be followed that for each sample drilled, tracers larger than 4 mm are introduced in the crusher sump and the samples are not classed as clean and acceptable until 90% tracers been recovered in the glove box.

All tailings from the total mineral separation processes are re-introduced to the sea via the tailings moon- pool or conveyors.

Table 3: Bulk Sampling Activities

ACTIVITY		DETAILS		
Number of pits/trenches planned		10		
Dimensions of excavations	Number of excavations	Length	Breadth	Depth
	10	180m	20m	5m
Locality		Can only be determined following analysis of drill samples and development of a resource model		
Volume Overburden (Waste) per bulk sample area		18 000m³		
Volume Ore per bulk sample area		Estimated 10 carats per 100 tons		
Density Overburden		18 000m³ X SG of 2 = 36 000 tons		
Density Ore		NA for Diamonds		
Phase(s) when bulk sampling will be required		Phase 3 Following analysis of drill samples		
Timeframe(s)		Year 3 and 4		

3.3.4 Pre-/feasibility studies Phase 4

The project manager monitors the programme, consolidates and processes the data and amends the programme depending on the results. This is a continuous process throughout the programme and continues even when no prospecting is done on the ground.

Each physical phase of prospecting is followed by desktop studies involving interpretation and modelling of all data gathered. These studies will determine the manner in which the work programme is to proceed in terms of activity, quantity, resources, expenditure and duration.

3.4 Prospecting Works Programme

The different phases that will be exercised during the prospecting works are indicated above in 3.3.1 to 3.3.4. Refer to Table 4 below, which provides an indication of the typical programme followed in prospecting.

3.5 Vessel Emissions and Discharges

This section provides a brief description of the types of emissions and discharges that are expected from the proposed prospecting operations during normal operations. These would include:

- Discharges such as deck drainage, machinery space wastewater, sewage, etc.;
- Disposal of solid waste such as food waste; and
- Vessel machinery emissions.

These are discussed in more detail below.

3.5.1 Discharges to Sea

3.5.1.1 Vessel machinery spaces (bilges), ballast water and deck drainage

The concentration of oil in discharge water from any vessel (bilge and ballast) would comply with the MARPOL Regulation 21 standard of less than 15ppm oil in water. Any oily water would be processed through a suitable separation and treatment system to meet the MARPOL Annex I standard before discharge overboard. Drainage from marine (weather) deck spaces would wash directly overboard.

3.5.1.2 Sewage

South Africa is a signatory to MARPOL Annex IV Regulations for the Prevention of Pollution by Sewage from Ships and contracted vessels would be required to comply with the legislated requirements of this Annex.

3.5.1.3 Food (galley) wastes

The disposal into the sea of food waste is permitted in terms of MARPOL Annex V when it has been comminuted or ground and the vessel is located more than 3 nautical miles (approximately 5.5km) from land. Such comminuted or ground food wastes shall be capable of passing through a screen with openings no greater than 25mm. Disposal overboard without macerating can occur greater than 12 nautical miles (approximately 22km) from the coast. The daily discharge from a vessel is typically about 0.15 m3.

3.5.1.4 Detergents

Detergents used for washing exposed marine deck spaces would be discharged overboard. The toxicity of detergents varies greatly depending on their composition. Water-based detergents are low in toxicity and are preferred for use. Preferentially biodegradable detergents would be used. Detergents used on work deck space would be collected with the deck drainage and treated as described under deck drainage (see **Section 3.5.1.1** above).

3.5.1.5 Other

Vessels used during prospecting activities would have a certified antifouling coating system that is tin free.

3.5.2 Waste disposal to land

A number of other types of waste generated during the bulk sampling activities would not be discharged at sea but would be transported onshore for ultimate disposal. Waste transported to land would be disposed at a licensed municipal landfill facility or at an alternative approved site. Operators would co-operate with local authorities to ensure that waste disposal is carried out in an environmentally acceptable manner. A summary of these waste types generated by a vessel used during typical prospecting operations is given below.

3.5.2.1 General waste

This includes waste, paper, plastics, wood, glass, etc. Waste would be disposed of at an onshore landfill site in accordance with legal requirements.

3.5.2.2 Scrap Metal

Scrap metal would be stored and recycled / disposed of on land in accordance with legal requirements.

3.5.2.3 Drums and Containers

Empty drums containing residues, which may have adverse environmental effects (solvents, lubricating/gear oil, etc.), would be recycled / disposed of in a licensed landfill site in accordance with legal requirements.

3.5.2.4 Used Oil

This includes used lubricating and gear oil, solvents, hydrocarbon-based detergents and machine oil. Toxicity varies depending on oil type. All non-recycled waste oils would be securely stored, transported to shore and disposed of at a licensed landfill site, acceptable to the relevant authorities.

3.5.2.5 Chemicals and hazardous wastes

Disposal of any unexpected chemical and hazardous substance (e.g., fluorescent tubes, toner cartridges, batteries, etc.) would be undertaken on a case-by-case basis and in a manner acceptable to appropriate regulatory authorities.

3.5.2.6 Infectious wastes

Infectious wastes include bandages, dressings, surgical waste, tissues, medical laboratory wastes, needles, and food wastes from persons with infectious diseases. Only minor quantities of medical waste are expected.

Prevention of exposure to contaminated materials is essential, requiring co-operation with local medical facilities to ensure proper disposal. All such waste will be incinerated onboard or stored and brought onshore for disposal via a registered medical waste company.

3.5.2.7 Filters and filter media

This includes air, oil and water filters from machinery. Oily residue and used media in oil filters that may contain metal (e.g., copper) fragments, etc. are possibly toxic. Filters and media would be transported onshore and disposed of at a licensed landfill facility.

3.5.3 Discharges to air

Compliance with the requirements of Marpol Annex VI - Prevention of Air Pollution from Ships will be required for all vessel engines and where vessels are fitted with rubbish incinerators.

Table 4: Prospecting Program as per PWP (2022)

Phase	Activity	Skill(s) required	Timeframe	Outcome	Timeframe for out-come	What technical expert will sign off on the out-come?
1 Non – invasive	Regional scale, High-Resolu-tion geophysical surveys	Geologist Project Manager	20 days per year for 4 years	Maps, plan & report on previous work. Delineation of potential gravel resource.	Year 4	Geologist
2a Invasive	Shallow water Collection of core and grab samples	Geologist Project Manager	8 days per year for 4 years	Diamond Ore Characterization (DOC) study for metallurgical purposes	Year 4	Geologist
2b Invasive	Deep water Large diameter drill sam-pling					
3a Bulk Sampling	Shallow water Remote Pump Mining	Geologist Project Manager	1 month over a two-year period	Diamond Ore Characterization (DOC) study for metallurgical purposes and to allow the suffi-cient recovery of diamonds for evaluation and foot printing pur-poses.	Year 4	Geologist
3b Bulk Sampling	Deep water Remote Dredge (crawler) Mining					
4 Feasibility study	Final analysis, quality con-trol, database update and resource statement Application for mining right or final decommissioning and closure	Geologist Economist	Month 49-60	Feasibility study and decision making if results prove negative then decommissioning and final closure if results prove positive then continue with mining Mining right or Closure certifi-cate	Year 5	Project Manager

4 POLICY AND LEGISLATIVE CONTEXT

4.1 Table of Applicable Legislation and Guidelines

Table 5: Applicable Legislation and Guidelines

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT
Constitution of South Africa, specifically everyone has a right; a. to an environment that is not harmful to their health or wellbeing; and b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: i. prevents pollution and ecological degradation; ii. promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.	Prospecting Right activities	The prospecting right activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together be avoided, it will be minimised and mitigated in order to protect the environmental right of South Africans.
Minerals and Petroleum Resources Development Act (No 28 of 2002) [MPRDA] Section 24 (as amended) **MPRDA Regulations as amended by GNR349 of 18 April 2011.**	Application to the DMR for a prospecting right in terms of Sections 16 & 22.	The conditions and requirements attached to the granting of the Prospecting Right will apply to the prospecting activities. DMR is the Competent Authority (CA) for this NEMA application.
National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]	Application to the DMR for Environmental Authorisation in terms of the 2014 EIA Regulations as amended by the 2021 EIA Regulations. Refer to **Table 6** for list of activities.	An Application for Environmental Authorisation must be submitted to DMR for an Environmental Authorisation (EA). The listed activities in **Table 6** that are triggered determine the Environmental Authorisation (EA) application process to be followed, which is an EIA for this Prospecting Right. The appropriate EA must be obtained before proceeding with any prospecting activities in terms of the prospecting right application. The compilation of this Scoping Report and the Public Participation Process is required in terms of NEMA.
National Environmental Management Act, 1998 (Act No. 107 of 1998): Financial Provisions Regulations in GNR 1147 (dated 20/11/2015), as amended by GNR 991 (dated 21/09/2018)	The Final Rehabilitation, Decommissioning and Mine Closure Plan will be included in the DEIR	The purpose of these Regulations is to regulate the determination and making of financial provision as contemplated in the Act for the costs associated with the undertaking of management, rehabilitation, and remediation of environmental impacts from prospecting, exploration, mining, or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future. The Final Rehabilitation, Decommissioning and Mine Closure Plan will be included in the DEIR.
"Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Section 24(5) (a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation" ("the Protocols"), in GG 43110 (dated 20 March 2020 came into effect on 15 May 2020), and GN 320. Themes included in this GN are	Screening Tool Report, and Site Sensitivity Verification Report is attached at **Appendix C: Screening Tool Reports And Site Sensitivity Verification Report, Page 106.**	Refer to Section 9.1. **Appendix C: Screening Tool Reports And Site Sensitivity Verification Report, Page 106.** Section 11.3 details the specialist compliance statements required to inform the EIA Phase, as per the requirements of the Protocols.

agriculture; avifauna; terrestrial biodiversity; aquatic biodiversity; noise; defense; and civil aviation. **Protocols in GG 43855 of GN No. 1150 dated 30 October 2020 provide for Terrestrial and Animal Plant Species.**		
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] **National list of ecosystems that are threatened and in need of protection, 2011 (in GN 1002 dated 2 December 2011)**	Section 9 and 9.2.6.2	There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site as per the screening tool report in **Appendix C: Screening Tool Reports And Site Sensitivity Verification Report, Page 106.** This will be confirmed by the marine ecologist during the EIA phase.
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	Section 9.2.8	In terms of Section 36 of the Act, the metropolitan and district municipalities are charged with implementing the AEL system. However, as the offshore area of activity and the Exclusive Economic Zone (EEZ) do not fall within the borders of any municipality or province of South Africa as set out in the Constitution, there is no formal means in terms of NEM: AQA by which application can be made for incineration from vessels in the offshore. Furthermore, the on-board incineration of waste is permitted in terms of the International Convention for the Prevention of Pollution from Ships, 1973/1978 (MARPOL), to which South Africa is a signatory. Thus, there is uncertainty of the applicability of NEM: AQA to offshore operations, given that MARPOL, an international convention, allows for the on-board incineration of waste and there is no formal implementing authority for AEL applications associated with offshore operations.
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 9.2.7.11 & 10.1.7	A Marine Heritage Impact Assessment and a Palaeontological Report will be prepared for inclusion in the EIA Phase. These will be submitted to SAHRA and HWC for comment
International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)	Section 10.1	MARPOL, an international convention, allows for the on-board incineration of waste and offshore waste management activities, such as those related to sewage.
Hazardous Substances Act (Act No. 15 of 1973)	Storage and control of hazardous substances to be included in EMPr.	The objective of the Act is to provide for the control of substances which may cause injury or ill health to or death of human beings due to their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure. In terms of the Act, substances are divided into schedules, based on their relative degree of toxicity and the Act provides for the control of importation, manufacture, sale, use, operation, application, modification, disposal and dumping of substances in each schedule. The reagent chemicals to be used in the mineral processing plant, as well as chemicals typically found in petroleum products (for example) benzene, are regulated in terms of this Act. The processing plant, chemical storage area, fuel storage facility and refueling bay, with all appropriate controls in place, will not conflict with the Act. The EMPr will provide details in this regard.

Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA)	Safety precautions to be taken into account by the Project Team in the prospecting planning.	The objective of the Act is to cover all aspects relating to health and safety of employees and other persons on the mine property. The Act places the responsibility on the mine owner for ensuring that the mine is designed, constructed and equipped in a manner which allows for a safe and healthy working environment.
Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) [PAJA]	Decision by the Competent Authority	Gives effect to section 33 of the Constitution that requires that "*Everyone has the right to administrative action that is lawful, reasonable and procedurally fair*". All administrative actions must be based on the relevant considerations.
Marine Living Resources Act 18 of 1998 (MLRA)	Section 9	Although there are a number of declared MPAs off the West Coast, the Applicant does not intend prospecting in these areas and consequently there will be no impact on these MPAs.
National Environmental Management: Integrated Coastal Management Act 24 of 2008	Section 9	NEM: ICMA provides for the integrated management of the coastal zone, including the promotion of social equity and best economic use, while protecting the coastal environment. Chapter 8 of the Act establishes an integrated system for regulating the disposal of effluent and waste into the sea. Section 70 prohibits incineration at sea and restricts dumping at sea unless done so in terms of a permit and in accordance with South Africa's obligations under international law. As the Applicant does not intend on disposing effluent and waste into the sea, no authorisations are required in terms of NEM: ICMA.
Municipal Plans and Policies		
The sea concession area does not fall within the jurisdiction of any municipality.		
Standards, Guidelines and Spatial Tools		
Specialist Studies, Integrated Environmental Management, Information Series 4 (2002)	Section 11	This guideline was consulted to ensure adequate development of terms of reference for specialist studies.
Criteria for determining Alternatives in EIA, Integrated Environmental Management, Information Series 11 (2004)	Section 7	This guideline was consulted to inform the consideration of alternatives.
Environmental Management Plans, Integrated Environmental Management, Information Series 12 (2004)		To be included in the EIR phase.
Environmental Impact Reporting, Integrated Environmental Management, Information Series 15 (2004)		To be included in the EIR phase.
Mining and Biodiversity Guideline: 2013 Mainstreaming biodiversity into the mining sector. Pretoria.	Section 9	The mitigation measures to address and mitigate the potential impacts of the prospecting will be included in the EMPr.
DEA Guideline on Need & Desirability (2017)	Section 5	Refer to Section 5
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs (undated)	Sections 8, 11.7 & **Appendix B: , Page 82**	Sections 8, 11.7 & **Appendix B: , Page 82**
DEAT Integrated Environmental Management Information Series 5: Impact Significance (2002)	Section 10	To be included in the EIR phase.
DEAT Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)	Section 10	To be included in the EIR phase.
SANBI BGIS databases (www.bgis.sanbi.org)	Baseline environmental descriptions in Section 9.2	Used during desktop research to identify sensitive environments within the prospecting right area.

In addition to the foregoing, the Applicant must also comply with the provisions of other relevant conventions and legislation, which includes, amongst others, the following:

4.2 INTERNATIONAL MARINE POLLUTION CONVENTIONS

- International Convention for the Prevention of Pollution from Ships, 1973/1978 (MARPOL);
- Amendment of the International Convention for the Prevention of Pollution from Ships, 1973/1978
- (MARPOL) (Bulletin 567 – 2/08);
- International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC
- Convention);
- United Nations Convention on Law of the Sea, 1982 (UNCLOS);
- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (the London Convention) and the 1996 Protocol (the Protocol);
- International Convention relating to Intervention on the High Seas in case of Oil Pollution Casualties (1969)
- and Protocol on the Intervention on the High Seas in Cases of Marine Pollution by substances other than oil (1973);
- Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (1989); and
- Convention on Biological Diversity (1992).

4.3 OTHER SOUTH AFRICAN LEGISLATION

- Carriage of Goods by Sea Act, 1986 (No. 1 of 1986);
- Dumping at Sea Control Act, 1980 (No. 73 of 1980);
- Hazardous Substances Act, 1983 and Regulations (No. 85 of 1983);
- Marine Living Resources Act, 1998 (No. 18 of 1998);
- Marine Traffic Act, 1981 (No. 2 of 1981);
- Marine Pollution (Control and Civil Liability) Act, 1981 (No. 6 of 1981);
- Marine Pollution (Prevention of Pollution from Ships) Act, 1986 (No. 2 of 1986);
- Marine Pollution (Intervention) Act, 1987 (No. 65 of 1987);
- Maritime Safety Authority Act, 1998 (No. 5 of 1998);
- Maritime Safety Authority Levies Act, 1998 (No. 6 of 1998);
- Maritime Zones Act 1994 (No. 15 of 1994);
- Merchant Shipping Act, 1951 (No. 57 of 1951);
- Mine Health and Safety Act, 1996 (No. 29 of 1996);
- National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004);
- National Environmental Management: Integrated Coastal Management Act, 2008 (No. 24 of 2008);
- National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003)
- National Heritage Resources Act, 1999 (No. 25 of 1999);
- National Ports Act, 2005 (No. 12 of 2005);
- National Water Act, 1998 (No. 36 of 1998);
- Occupational Health and Safety Act, 1993 (No. 85 of 1993) and Major Hazard Installation Regulations;
- Sea-Shore Act, 1935 (No. 21 of 1935);
- Sea Birds and Seals Protection Act, 1973 (No. 46 of 1973);
- Ship Registration Act, 1998 (No. 58 of 1998);
- South African Maritime Safety Authority Act, 1998 (No. 5 of 1998);
- South African Maritime Safety Authority Levies Act, 1998 (No. 6 of 1998); and
- Wreck and Salvage Act, 1995 (No. 94 of 1995).

4.4 Listed Activities

Table 6: Listed and Specified Activities

NAME OF ACTIVITY	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
The operation directly relates to prospecting of an offshore mineral resource (diamonds) and requires a prospecting right in terms of section 16 of the MPRDA. Prospecting is planned within Sea Concession area 12B using both non-invasive and invasive sampling activities, none of which require infrastructure. Sampling will be conducted in four phases to detect the presence of paleo-beach deposits, which are known from other concessions to contain diamondiferous gravels. Prospecting operations are expected to occur sporadically within the concession area. • Geophysical Surveys (Phase 1 Non-Invasive) including Swath bathymetry and sub-bottom profiling • Drill Sampling (Phase 2a Invasive) • Grab Sampling (Phase 2a Invasive) • Large Diameter Drilling (Phase 2b Invasive)	Total Area 11166.9Ha Core samples footprint ±1.57m², & volume ±4.71m³. Grab samples footprint ±5m² & volume ±1.5m³ LDD footprint ± 2.4ha	X	GNR 983 Listing Notice 1 of 2014 (dated 8 December 2014), as amended by GN 517 GG 44701 (dated 11 June 2021): Activity 20: Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the MPRDA, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the prospecting right.	NA
This operation requires permission in terms of Section 20 of the MPRDA for the removal and disposal of bulk samples of any minerals. The applicant requires maximum 360 000tons ROM for processing to obtain a representative sample for sufficient statistical analysis to complete a resource statement and to determine a grade (CPHT).	Bulk samples footprint ±3.6Ha & volume ±360 000 tons	X	GNR 984 Listing Notice 2 of 2014 (dated 8 December 2014), as amended by GN 517 GG 44701 (dated 11 June 2021): Activity 19: The removal and disposal of a mineral, which requires a permission in terms of section 20 of the MPRDA, as well as any other applicable activity as contained in Listing Notice 2, in Listing Notice 1 of 2014 or Listing Notice 3 of 2014, required to exercise the permission	NA
OTHER ACTIVITIES (Associated infrastructure and activities not considered to be listed activities)				
N/A				

5 NEED & DESIRABILITY OF THE PROPOSED ACTIVITIES

5.1 Mining and Biodiversity Guidelines (2013)

The Mining and Biodiversity Guidelines (2013)[1] state that: "*Sustainable development is enshrined in South Africa's Constitution and laws. The need to sustain biodiversity is directly or indirectly referred to in a number of Acts, not least the National Environmental Management: Biodiversity Act (No. 10 of 2004) (hereafter referred to as the Biodiversity Act) and is fundamental to the notion of sustainable development. International guidelines and commitments as well as national policies and strategies are important in creating a shared vision for sustainable development in South Africa*."

The Department of Mineral Resources (DMR), as custodian of South Africa's mineral resources, is tasked with enabling the sustainable development of these resources. This includes giving effect to the constitutional requirement to "*prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*"[2].

The primary environmental objective of the MPRDA is to give effect to the "*environmental right*"[3] contained in the South African Constitution. The MPRDA further requires the Minister to ensure the sustainable development of South Africa's mineral resources, within the framework of national environmental policies, norms, and standards, while promoting economic and social development.

The Mining and Biodiversity Guidelines (2013) document identifies four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining & prospecting. The categories are: Category A: Biodiversity priority area which are legally protected and mining is prohibited; Category B: Highest Biodiversity importance – highest risk for mining; Category C: High Biodiversity Importance – high risk to mining; and "Category D: Moderate Biodiversity Importance" – moderate risk for mining. Category B and Category C require an environmental impact assessment process to address the issues of sustainability.

Refer to **Figure 13**, which shows the prospecting right area in relation the Mining and Biodiversity Guidelines database (SANBI BGIS). A section of the Sea Concession 12B is situated in an area classified as highly sensitive for mining.

5.2 Diamond Resources Supply and Employment Benefits

The full labour force is unknown at present but will include unskilled, semi-skilled, and skilled. Some services that will be outsourced and that will provide job security, will be environmental monitoring services and compliance officer, training, mining engineer, surveyor, consultant geologist, and main workshop.

[1] Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.
[2] Constitution of the Republic of South Africa (No. 108 of 1996).
[3] Section 24 of the Constitution states that "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: prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

Figure 13: Sea Concession 12B in relation to the 2013 Mining & Biodiversity Guideline areas

5.3 DEA Guideline on Need and Desirability (2017)

As referenced in the DEA Guideline on Need and Desirability (2017), NEMA defines "*evaluation*" as "*the process of ascertaining the relative importance or significance of information, in the light of people's values, preferences and judgements, in order to make a decision.*" In evaluating each impact (negative and positive) in terms of each of the aspects of the environment, "*need and desirability*" must specifically be considered in the analysis of each impact of the proposed activity. However, to determine if the proposed activity is the best option when considering "*need and desirability*," it must also be informed by the sum of all the impacts considered holistically. In this regard "*need and desirability*" also becomes the impact summary with regard to the proposed activity. The impact summary will be included in the EIR.

These Guidelines state that: "*In considering the impact summary it must be remembered that ultimately the aim of EIA is to identify, predict and evaluate the actual and potential risks for and impacts on the geographical, physical, biological, social, economic and cultural aspects of the environment, in order to find the alternatives and options that best avoid negative impacts altogether, or where negative impacts cannot be avoided, to minimise and manage negative impacts to acceptable levels, while optimising positive impacts, to ensure that ecological sustainable development and justifiable social and economic development outcomes are achieved*".

The principles of *Integrated Environmental Management* (IEM) as set out in Section 23 of NEMA have been considered in this scoping environmental assessment and will be applied in the EIR, EMPr and Closure Report, as explained below.

- **Environmental management placing people and their needs at forefront of its concern, and serve their physical, physiological, developmental, cultural and social interests equitably** – This process will be undertaken in a transparent manner and all effort will be made to involve all the relevant stakeholders and Interested and Affected Parties. I.e., Public participation will be undertaken to obtain the issues / concerns / comments of the affected people for input into the process.
- **Socially, environmentally, and economically sustainable development** – All aspects of the receiving environment and how this will be impacted has been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures were proposed to ensure that the impact is mitigated. i.e., this report along with the EMPr (to be included in the EIA Phase) proposes mitigation measures which will minimise the negative impacts of the proposal on the environment.
- **Consideration for ecosystem disturbance and loss of biodiversity** – the prospecting site is located in a marine area, in close proximity to the Olifants River in an area earmarked for mining. Ecosystem disturbance and loss of biodiversity will be considered in the impact assessment. Rehabilitation, where applicable back to the natural state is a key component and will be undertaken in a phased manner as the prospecting activities progress. This report together with the EMPr and Closure Plan proposes mitigation measures which will minimise the impacts of the proposal on the environment.
- **Pollution and environmental degradation** – The implementation of recommendations made and proposed mitigations to be detailed in the EIR and Environmental Management Programme Report (EMPr), and Closure Plan will ensure minimum environmental degradation. Erosion and dust have been identified and detailed mitigation measures will be included in the EMPr in the EIA phase to minimise the impacts.
- **Landscape disturbance** – All aspects of the receiving environment and how this will be impacted has been considered and investigated at a scoping level to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be detailed in the EIR, EMPr and Closure Plan to ensure that the impact is mitigated.
- **Waste avoidance, minimisation, and recycling** – These aspects were considered and incorporated into the operational component of the project, and mitigation measures included in the EMPr.
- **Responsible and equitable use of non-renewable resources** – These aspects have been considered and there is not much scope to reduce the use of non-renewable resources, such as transport or the use of diesel and fuel for marine vessels.
- **Avoidance, minimisation and remedying of environmental impacts** - All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be proposed to ensure that the impact is mitigated. A number of mitigation measures will be detailed to minimise the impact of the proposal on the environment.
- **Interests, needs and values of Interested and Affected Parties** – This process has been undertaken in a transparent manner and all effort has been made to involve all the relevant stakeholders and Interested and Affected Parties (I&APs). The DSR was made available to all identified I&APs to obtain comments on the proposed development. No comments were received.
- **Access of information** – Potential Interested and Affected Parties were notified of the proposal and the availability of the Draft Scoping Report (DSR). They were also notified of having the opportunity to register as an I&AP. Organs of state will be kept informed during the course of the EIA process.

- **Promotion of community well-being and empowerment** – This process is being undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and I&APs.

Potential impacts on the biophysical environment and socio-economic conditions have been assessed, and steps have been taken to mitigate negative impacts, and enhance positive impacts. Any mitigation measures from SAHRA will be included in the FEIR. Adequate and appropriate opportunity will be provided for public participation. Environmental attributes have been considered based on the available information, and environmental management practices have been identified and established to ensure that the proposed activities will proceed in accordance with the principles of IEM.

5.4 Minerals and Mining Policies and Plans in South Africa

In order for mining to continue to be a core contributor to the South African economy and in the pursuance of the sustainable development of the nation's mineral resources, it is necessary to identify new resources through prospecting activities, such as bulk sampling in the case of this application. A key intent of the Minerals and Mining Policy of South Africa states that Government will: "*promote exploration and investment leading to increased mining output and employment*" (Minerals and Mining Policy of South Africa, 1998). The Policy states further that:

- "*The South African mining industry, one of the country's few world-class industries, has the capacity to continue to generate wealth and employment opportunities on a large scale;*
- *Mining is an international business and South Africa has to compete against developed and developing countries to attract both foreign and local investment. Many mining projects in South Africa have tended to be unusually large and long term, requiring massive capital and entailing a high degree of risk; and*
- *South Africa has an exceptional minerals endowment, and in several major commodities has the potential to supply far more than the world markets can consume."*

In the more recently published Department of Minerals Resources and Energy (then Department of Mineral Resources) Strategic Plan 2014 – 2019, the foreword by the Minister of Mineral Resources and Energy notes that the Department "*will continue to promote mineral value addition to strengthen the interface between extractive industries and national socio-economic developmental objectives*" and "*contribute towards decent employment, inclusive growth and industrialisation of South Africa*".

The West Coast District Municipality's (WCDM) Integrated Development Plan 2017 – 2022 (2019) notes that it has "*a vast number of mineral resources, of which some are currently not being exploited*" and deems that "*mining could potentially make an increased economic contribution to the WCDM economy when these unexploited resources are utilised in future*".

In terms of the above, it is evident that the proposed prospecting activities are deemed to be important to the current national and provincial economies as future mining projects are a means to assist Government in meeting broader societal needs.

6 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The prospecting right has been applied for a period of five (5) years. The Environmental Authorisation should therefore allow for 5 years of prospecting.

7 DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PREFERRED SITE, ACTIVITY & ALTERNATIVE

7.1 Details of all alternatives considered

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

(a) Property on which or location where it is proposed to undertake the activity;
(b) Type of activity to be undertaken;
(c) Design or layout of the activity;
(d) Technology to be used in the activity;
(e) Operational aspects of the activity; and
(f) Option of not implementing the activity.

Appendix 2 Section 2 (h)(i) of the EIA Regulations, 2014, requires that all S&EIR processes must identify and describe feasible and reasonable alternatives. Alternatives considered during the screening phases of the project are described below.

Alternatives, in relation to a proposed activity, are different ways of meeting the general purposes and requirements of the proposed activity, which may include alternatives to:

- the location where it is proposed to undertake the activity; and
- the technology to be used in the activity or operations alternative.
- No-Go alternative

7.2 Location or Site Alternatives

As the intention of the proposed prospecting operations is to determine the presence of economically viable diamond deposits that occur within Sea Concessions 12B, no further location alternatives are considered in the Scoping and EIA process.

The different prospecting activities being considered in the Scoping and EIA process are described in detail in Section 7.3 below.

7.3 Type of Activity

The Applicant is not the landowner, and therefore it would not be realistic for this company to propose another type of activity as their core business is prospecting or mining. This area has been earmarked as a sea concession area for prospecting/mining. Although the proposed prospecting activity takes place over an extended time period, the best post-mining land use alternative is to return the site to its natural state, where possible. The holder of a prospecting right is required to rehabilitate the environment affected by prospecting to its natural state or to another predetermined land use. Other activity alternatives have therefore not been considered as the purpose of the proposed project is to prospect for diamonds within the Sea Concession 12B application area as shown in **Figure 2**.

The application is for prospecting rights and no alternatives were considered.

7.4 Technology & Operations Alternatives

Nisarox (Pty) Ltd is proposing to prospect within Sea Concession area 12B using both non-invasive and invasive sampling activities, none of which require infrastructure. For the purpose of this study, non-invasive means not physically destructive and invasive means physical sampling that is destructive. As the activity is located offshore and comprises prospecting only, no land-based infrastructure will be required.

Prospecting will be vessel-based and will take place during spring and/or summer and when weather conditions are suitable, and seas are calm. It is anticipated to be completed within five (5) years. Sampling will be conducted in four phases and include a combination of non-invasive and invasive activities to detect the presence of paleo-beach deposits, which are known from other concessions to contain diamondiferous gravels. Prospecting operations are expected to occur sporadically within the concession area.

The non-invasive activities will include geophysical exploration (acoustic survey), data acquisition and analysis, while the invasive activities will include physical sampling (collection of core, drill and grab samples). A possible phase of bulk sampling (remote pump and dredge mining) may also be implemented depending on the results of initial sampling. The principal objective of the proposed prospecting activities is to discover and estimate the potential mineral resources for possible future mining.

Prospecting in shallow water up to 50m, that cover most of the concession area, will be conducted by a group owned custom fit survey vessel normally with an overall length of 45.15m and a gross tonnage of 498t. This will be a multipurpose customised survey vessel capable of High-Resolution geophysical surveys (Phase 1) and small-scale boat sampling programs such as Coring and Van Veen Grab Sampling (Phase 2a) and Remote Pump Mining (Phase 3a).

Refer to Figure 14 of the sampling techniques possible in shallow water with a single custom fit exploration and mining vessel, the vessel can even be modified to handle small scale Remote Dredge Pump Mining (**Figure 14** to **Figure 16**).

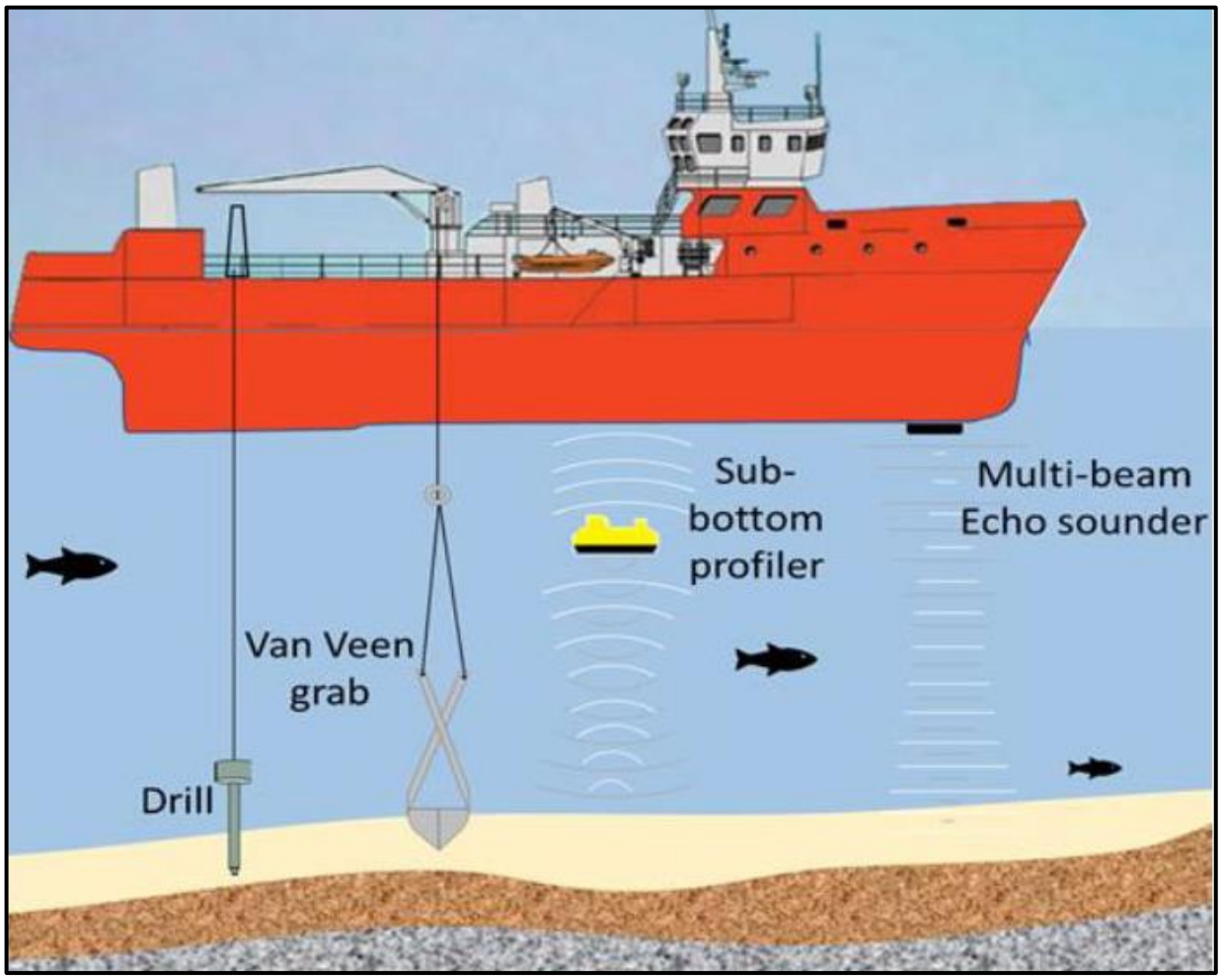


Figure 14: Illustration of sampling techniques possible in shallow water with a single custom fit exploration and mining vessel

Figure 15: An example of a sub-bottom profiler. Source: Seatronics

Figure 16: Left Example of a corer and right a Van Veen grab that works like a claw to grab sediment from the seafloor

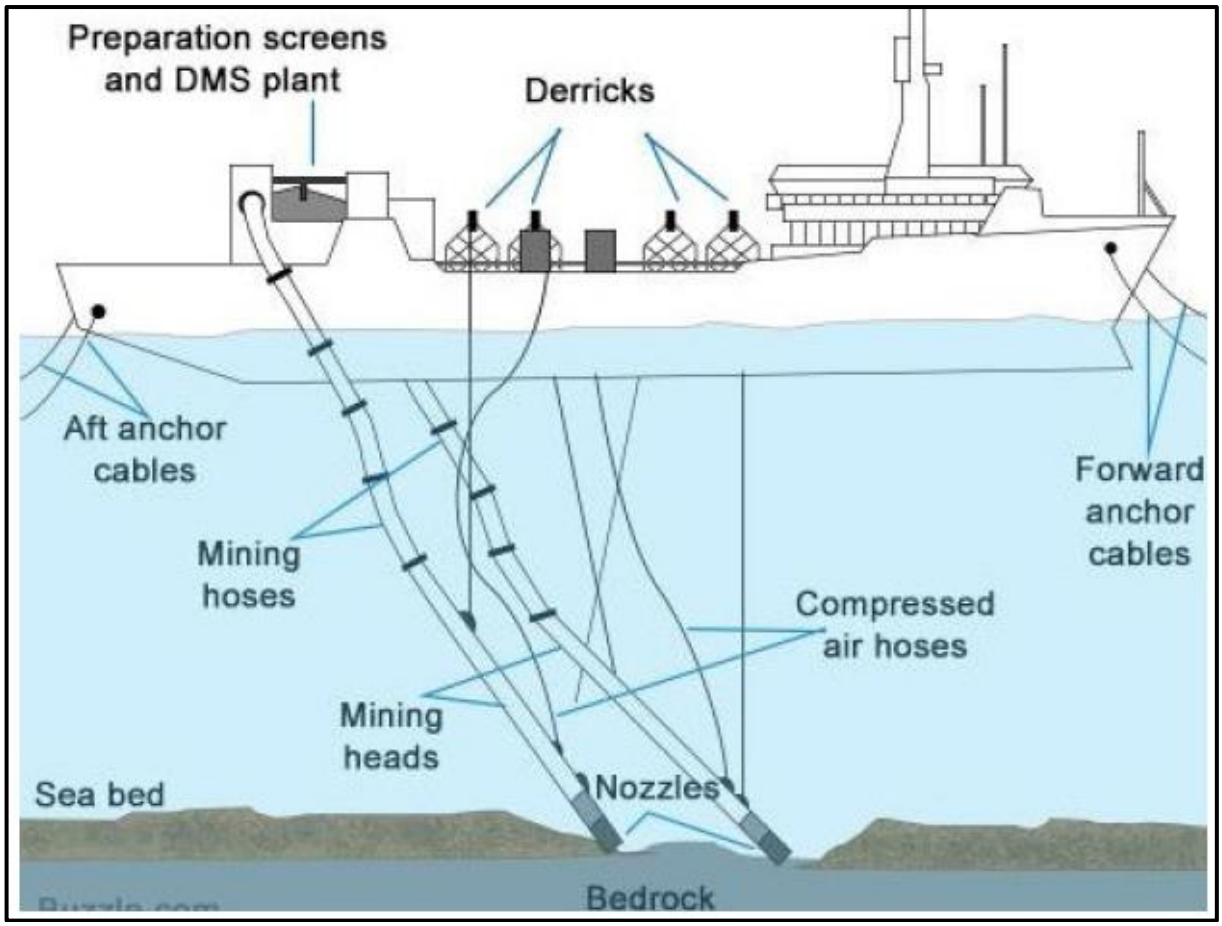


Figure 17: Illustration of remote pump mining (Source: http://globalextractionnetworks.com/about-diamonds/)

Prospecting in water deeper than 50m, will be conducted by dedicated sampling vessels. For deeper water drill sampling activities (Phase 2b) a dedicated large diameter drilling sampling vessel, normally with an overall length of 114.4m, and gross tonnage of 4677t (Figure 17). Such a vessel is equipped with a subsea sampling tool, which can be operated in water depths up to 200m. The sampling tool comprises a 2.5m diameter drill bit operated from a drill frame structure (**Figure 18**).

For bulk sampling in deeper areas (Phase 3b) trenching would be undertaken by a seabed crawler, deployed off a dedicated mining vessel, normally with an overall length of 150m and a gross tonnage of 9111t (**Figure 20**). Such a vessel is equipped with a track-mounted subsea crawler (**Figure 21**) capable of working to depths up to 200m below sea level.

Figure 18: Example of a dedicated drill sampling vessel

Figure 19: Example of the 2.5 m diameter drill bit within the drill frame structure

Figure 20: Example of a dedicated sampling vessel

Figure 21: Example of a track-mounted sub-sea crawler

7.4.1 Geophysical Surveys Phase 1

Swath bathymetry and sub-bottom profiling will be the geophysical survey techniques employed during the proposed prospecting operations making use of:

- a multibeam echosounder designed to produce high resolution digital terrain models of the seafloor (**Figure 22**) by transmitting a 30kHz sounding in a wide swath below the vessel; and
- a parametric sub-bottom profiler (Topas system), which uses shallow (35 to 45kHz) and medium penetration (1 to 10kHz) "Chirp" seismic pulses to generate profiles up to 60m beneath the seafloor (**Figure 22**), thereby giving a cross section view of the sediment layers.

Sound levels from the acoustic equipment would range between 190 to 220dB re 1µPa at 1m. The proposed surveys would be undertaken in specific priority areas in the concessions, at water depths of between approximately 15 - 75m. The surveys would have a line spacing of between 100 to 1 000m apart. The total line kilometres to be surveyed is estimated at 600km. The planned duration for the proposed geo-physical surveys would be a total of 20 days per year over a four-year period.

In general terms, sound sources that have high sound pressure and low frequency will travel the greatest distances in the marine environment. Conversely, sources that have high frequency will tend to have greater attenuation over distance due to interference and scattering effects. It is for this reason that the acoustic footprint of the above-mentioned sonar survey tools is considered to be much lower than that of deeper penetration low frequency seismic surveys and in addition have lower sound pressure levels. It should be noted that a decibel is a logarithmic scale of pressure where each unit of increase represents a tenfold increase in the quantity being measured.

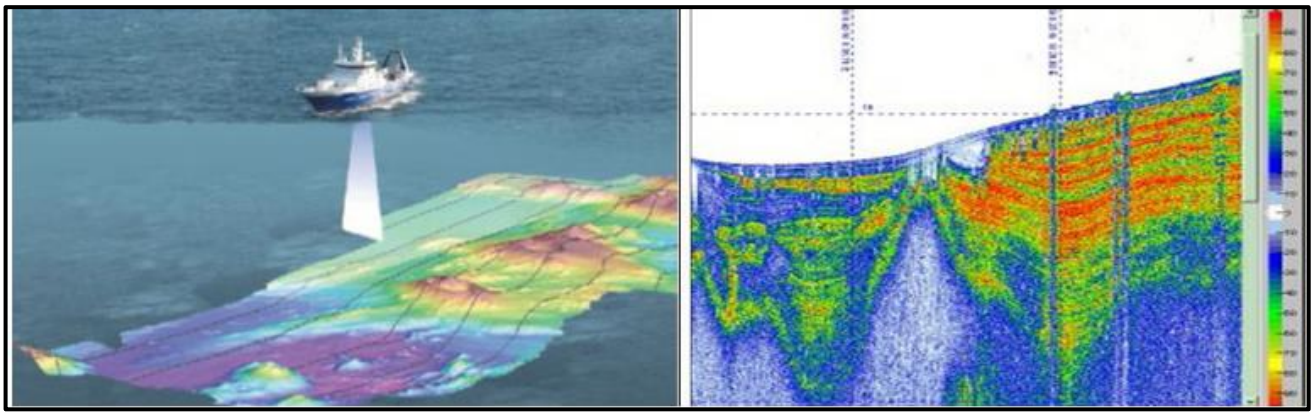


Figure 22: Swath bathymetry (left) and Sub-bottom profiling (right)

7.4.2 Drill Sampling Phase 2

For core samples in water depths less than 30m coring (e.g., vibrocoring) will be done

A vibrocorer consists of a core barrel in a landing frame with a vibrating motor on top.

The vibrocorer is landed on the seafloor, the motor turned on and the barrel penetrates the unconsolidated sediment. Once the core stops penetrating, the motor is turned off and the vibrocorer is raised back up to the deck. A PVC pipe is placed inside the core barrel prior to coring and the core sample is collected in this pipe. Cores can penetrate up to water depths of 50m and core samples up to 3m in length.

Core samples will be collected at 100-200 sites. A corer penetrates the seafloor to collect sediment samples used to determine the structure of the seafloor, sediment layers and types of sediment (i.e., sand, gravel and/ or rock and the hardness of the rock). This information is then used to engineer the drilling tool. Geotechnical sampling is also used to determine whether there are materials that can be mined in the area and whether it will be economically viable. The core samples will disturb a total surface area of 1.57m² and collect a total volume of 4.71m³.

Van Veen Grab sampling may also be used to supplement the vibrocoring: A Van Veen grab (clamshell bucket) collects sediment samples that are analysed to identify sediment types. Sampling will be done at 20-50 sites, disturb a total surface area of 5 square meters (m²) and a total volume of 1.5 cubic meters (m³).

For deeper water drill sampling activities would be undertaken using a dedicated drilling vessel to be sub-contracted. Such a vessel is equipped with a subsea sampling tool that comprises a 2.5m diameter drill bit operated from a drill frame structure, which is launched through the moon pool of the support vessel and positioned on the seabed.

The drill frame structure has a base of 6.5 x 6.5m, stands 23m high and weighs 147tons. The drill bit can penetrate sediments up to 12m depth above the bedrock. The sediments are fluidised with strong water jets and airlifted to the support vessel where they are treated in the onboard mineral recovery plant. All oversized and undersized tailings are discharged back to the sea on site.

A sample spacing of as little as 20m can be achieved by the dynamically positioned vessel. Depending on sea and the sub-seabed geotechnical conditions, up to 60 samples can be successfully taken per day. The samples would be undertaken at intervals of 50 to 500m. The total number of drill samples would be up to a maximum of 4 800. With the drill footprint of 5m², a total area of 2.4ha would be sampled.

7.4.3 Bulk Sampling Phase 3

Following analysis of the drill samples and establishment of a potential resource, bulk trench sampling may be conducted to confirm the economic viability of the resource for mining. It is proposed that up to ten trenches, each 180m long and 20m wide would be excavated within the concession area. Thus, the area to be disturbed would be 3.6ha. The planned duration of the proposed bulk sampling would be a total of 14 days over a two-year period. It is noted that the trenches will not be contiguous but located in the prospective areas derived from the drill sampling results. The aim of the trench sampling is to determine the geotechnical characteristics of the footwall and overburden which is essential in establishing the optimal approach to mining in these areas.

For trenching in water depths less than 30m Remote Pump Mining may be used. The mining system typically comprises a suspended steel mining tool, suction hoses (10 - 18-inch diameter) and on-board dredge pumps. The mining tool consists of a steel pipe fitted with a mining head (or digging head), which has an opening fitted with grizzly/cross bars to allow sized gravel to pass through and prevent blockages of the suction hose system. The digging head can also be fitted with high pressure water jetting nozzles to agitate the gravel on the seabed and improve mining efficiency. These jetting nozzles also serve to flush the digging head in the event of it becoming blocked.

The mining tool is suspended from an A-frame situated at the aft end or from davits along either side of the vessel. Some vessels may be fitted with dual mining systems, where mining tools are deployed from both the port and starboard sides. The mining tool suspension cable passes through a hydraulically controlled swell compensator system, which compensates for the vertical movements of the mining tool caused by the digging action. The vessel moves within a four-point anchor mooring system in order to cover the targeted seabed. Once the dredged material is pumped onboard it undergoes processing.

For trenching in deeper water activities would be undertaken using a dedicated sampling vessel to be sub-contracted. Such a vessel is equipped with a track-mounted subsea crawler capable of working to depths up to 200m below sea level. The crawler, which is fitted with highly accurate acoustic seabed navigation and imaging systems, and equipped with an anterior suction system, is lowered to the seabed and is controlled remotely from the surface support vessel through power and signal umbilical cables. Water jets in the crawler's suction loosen seabed sediments, and sorting bars filter out oversize boulders. The sampled sediments are pumped to the surface for shipboard processing. The area of the seabed to be sampled by the crawler can only be determined following analysis of drill samples and development of a resource model.

Shipboard processing consists of Primary Screening, Dense Media Separation (DMS) and Recovery Treatment (**Figure 23**)

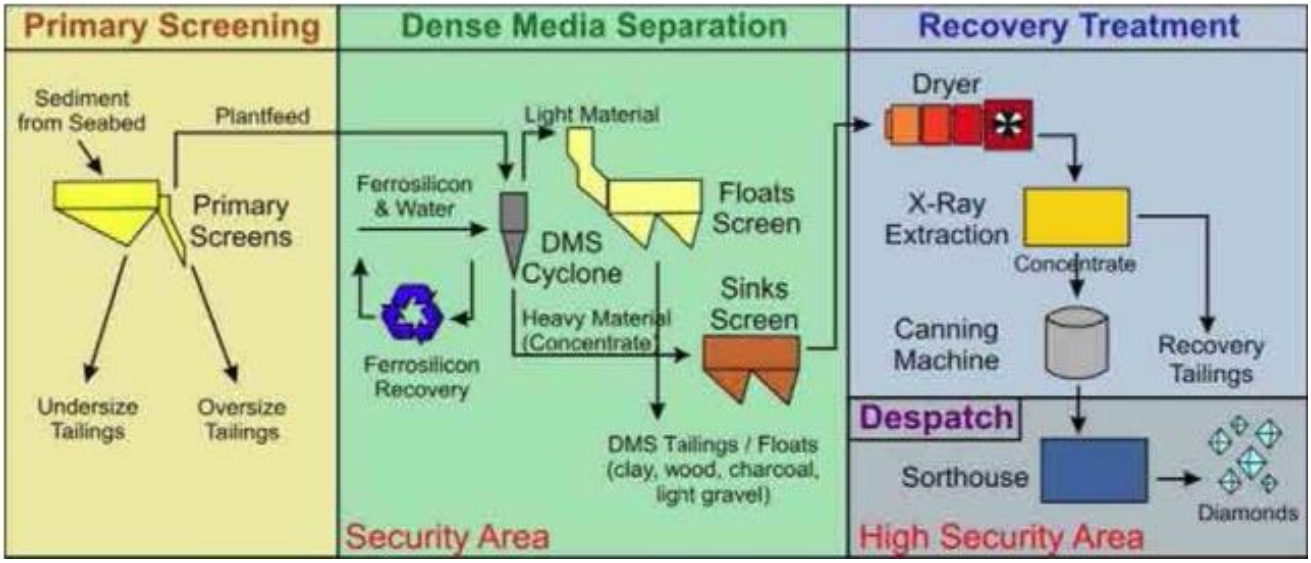


Figure 23: Flowchart of marine diamond gravel processing operations

The incoming slurry from the subsea tool via the slurry hose spooler will end up in the receiving box of the plant, here the velocity and the pressures are reduced, it also starts reducing the water content out of the slurry mass. The slurry mass will then proceed on a primary selection vibrating screen, where the undersize smaller than 1.25mm and particles larger than 19mm is separated.

The under-size particles are transferred directly to the tailings moon-pool, the oversize particles are transferred via a belt feeder which can establish the mass of the oversize if there is no water present in the oversize flow.

The plant feed material is pumped to the storage bins, as from where it can be selectively handled via a belt feeder system to the following treatment options, depending on the soil conditions:

- Option 1 Transfer direct to the DMS unit.
- Option 2 Transfer to the Barmac crushing system and from there to the DMS unit.

All material from the feed preparation is transferred in the DMS feed hopper, from where it is introduced in the mixing box with the ferrosilicon, passing through the hydro cyclone VC 1220 spigot size 64mm, and the split between the floats and sinks (both over a common wash screen which is treated as a restricted area), the floats are routed via a belt feeder to the tailings moonpool, the sinks are routed to the final recovery section unit.

This final recovery section is a restricted access-controlled area, and only authorized personnel have access to this area, under supervision of security. The material introduced to the recovery module in one batch and passed as a single batch through to the flow sort double pass x-ray machine. Following the x-ray machine treatment, the final high concentrate is guided over a dryer system to the storage container in the glove box container. From here every individual sample is hand sorted, weighed, counted, first appraisal and packed in the drop save. The QA procedure will be followed that for each sample drilled, tracers larger than 4mm are introduced in the crusher sump and the samples are not classed as clean and acceptable until 90% tracers have been recovered in the glove box.

All tailings from the total mineral separation processes are re-introduced to the sea via the tailings moonpool or conveyors.

The technology described above is currently used and the most practical option available with good results. There are therefore no other technology or operational alternatives for consideration.

7.5 The No-go Alternative

The No-Go Alternative will mean that the potential for increasing the supply of diamonds will not be realised. There will be no supply of diamonds to the local and international market, and no generation of much needed employment opportunities. South Africa and the Western Cape has a high unemployment rate, with the decline in mining a decade ago. The ongoing flow of revenue and employment security will continue to have a very positive spin-off locally and regionally.

7.6 Summary of Alternatives

The assessment of alternatives must at all times include the "no-go" option as a baseline against which all other alternatives must be measured. The "no go" alternative will therefore be further assessed together with the preferred and only alternative in the impact rating component of the EIA Phase.

The project site has been selected based on the fact that the site has been earmarked for prospecting/mining. The technology or operations of the mining and the associated existing infrastructure comprising the logistics, infrastructure and processing plants has been determined by the position of the mineral resource, and will continue to be applicable for Sea Concession 12B, as shown in **Figure 2**. The operational approach is practical and based on best practice to ensure a phased prospecting approach.

In summary therefore:

- **The Preferred Alternative is the Prospecting of Diamonds, as per the area depicted by Sea Concession 12B shown in Figure 2.**
- The preferred and only **location** alternative of the prospecting activity is as per **Figure 2**, which indicates the prospecting areas. No electricity powerline connections are required.
- The preferred **technology and operational** alternative are the use of geophysical surveys, drill sampling, bulk sampling.

The preferred alternatives described above will be rated in the impact assessment component in the EIA phase, together with the mandatory "no-go" alternative that must be assessed against as the environmental baseline, for comparison purposes in terms of significance through the life of the project. The public participation process initiated in this scoping phase will serve to inform the selection of alternatives for detailed impact assessment in the EIA Phase.

8 PUBLIC PARTICIPATION PROCESS

8.1 Introduction

The public participation process will be conducted according to the requirements as prescribed in Regulations 40 to 44 of the EIA Regulations, 2014 (as amended). Full details of the public participation process conducted including copies of all supporting documents (e.g., the information provided to Interested & Affected Parties (I&APs) and the comments received) will be included in **Appendix B: , Page 82** in the Final Scoping Report.

8.2 Comment Period on the Draft Scoping Report

The project notification and availability of the Draft Scoping Report will be distributed via email to relevant Government Departments, and other Interested and/or Affected Parties (I&APs). Included in the Project Notification Letter will be a Registration and Comment form and POPIA consent form, a copy of which is included in **Appendix B: , Page 82.** Hard copies may be requested where the EAP will then furnish one to the nearest local public library. A link to download the reports will be included with the email notification dated 13 September 2022.

The commenting period of 30 days on this Draft Scoping Report will be from 14 September 2022 to 14 October 2022.

All public consultation documents, such as a copy of the advertisement placed in the local newspaper (Ons Kontrei); site notices placed in near towns; project notification; and proof of project notification, will be included in **Appendix B: , Page 82** of the Final Scoping Report. Registered I&APs will be notified of the commencement of the EIA Phase.

Refer to "**Table 13: I&AP engagement activities planned during the Impact Assessment Phase**" included in the Plan of Study for EIA (**Sections 11.6 and 11.7**).

8.3 Summary of Issues Raised by I&APs

Table 7: Summary of Issues Raised by I&APs

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES					
Landowner	**X**				
Republic of South Africa	X				
Lawful occupier/s of the land					
N/A					
Landowners or lawful occupiers on adjacent properties	**X**				
N/A					
Municipal Councillor	**X**				
Municipal Manager: Matzikama Local Municipality	**x**				
Municipal Manager: West Coast District Municipality	**x**				
Municipality	**X**				
Matzikama Local Municipality	X				
West Coast District Municipality	X				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA)	**X**				
	x				
Communities					
N/A					
Dept. Land Affairs	X				
Department of Rural Development and Land Reform					
Traditional Leaders					
N/A					

Dept. Environmental Affairs & Development Planning	**X**				
Dept. Environmental Affairs & Development Planning: Directorate: Development Facilitation	x				
Other Competent Authorities affected	**X**				
Department of Water and Sanitation (DHSW&S)					
SAHRA	X				
Cape Nature					
Department of Environment, Forestry and Fisheries					
SAHRA					
Department Oceans and Coast					
OTHER AFFECTED PARTIES					
INTERESTED PARTIES					

9 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROJECT SITE

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 information provided here is based on available baseline information for the area.

9.1 Screening Tool and Site Sensitivity Verification Report

Refer to **Appendix C: Screening Tool Reports And Site Sensitivity Verification Report, page 106**, which details the findings of the Screening Tool (**Table 8**), and the Site Sensitivity Verification Report.
The sensitivities listed below were identified in the Screening Report for Sea Concession 12B:

Table 8: Summary of Screening Tool Report Sensitivities

THEME	SCREENING TOOL SENSITIVITY RATING
None	None

The "Protocols" require that the EAP or a specialist verify the screening tool report findings. Sea Concession 12B does not overlap with any themes in the screening tool report and thus no results are indicated in the report. The following specialist impact assessment have been identified by the Screening Tool Report and **Table 9** below, provides a summary of the EAP's recommendations.

Table 9: Summary of Recommendations based on Site Sensitivity Verification

SENSITIVITY THEME	FINDINGS OF SITE SENSITIVITY VERIFICATION REPORT & COMMENT ON SPECIALIST INPUT
Agricultural Impact Assessment	Rated as NOT APPLICABLE by the EAP: • The proposed activity is not related to agriculture No further agricultural assessment required.
Terrestrial Biodiversity	Rated as NOT APPLICABLE by the EAP: • The activity is not based terrestrially. • No terrestrial biodiversity assessments are deemed required by the EAP.
Aquatic Biodiversity	Rated as NOT APPLICABLE by the EAP: • The activity is not based in freshwater but in the ocean. • No aquatic biodiversity assessments are deemed required by the EAP, BUT a marine ecology impact assessment will be undertaken as part of the EIA phase.
Noise Impact Assessment	Rated as NOT APPLICABLE by the EAP: • The activity will take place in the ocean. No impact assessment is deemed necessary by the EAP.
Radio Activity Impact Assessment	Rated as NOT APPLICABLE by the EAP: • No radioactive materials will be used. • No impact assessment is deemed necessary by the EAP
Archaeological cultural, and Palaeontology	The following will be conducted during the EIA phase - • Offshore Palaeontological Impact Assessment & a Maritime Archaeology Impact Assessment. • Heritage Impact Assessment (HIA), required in terms of National Heritage Act (Act 25 of 1999), to include palaeontological assessment.
Marine Ecology Impact Assessment.	Although not included by the Screening Tool Report, the EAP has identified this as a required impact assessment

9.2 Type of Environment Affected by the Proposed Activity

This section provides a general overview of the physical and biological oceanography and human utilisation (socio-economic environment) of South African West Coast and, where applicable, detailed descriptions of the marine environment that may be directly affected by the proposed prospecting activities.

9.2.1 Geographical

Sea Concession 12(b) is situated ap-proximately 300km north of Cape Town, with the inshore boundary located 1km seaward of the coast between Strandfontein to the south and Namakwa Sands Wet Separation Plant to the north.

The offshore boundary is located approximately 4km offshore.

9.2.2 Marine Environment

The study area is located in the central subregion of the Benguela region dominated by the cold Benguela Current, but also influenced by intrusions of warm-water eddies of the Agulhas Current (**Figure 24**). The Benguela region extends the length of the Benguela Current from approximately Cape Point in the south, to the position of the Angola-Benguela front in the north. The Benguela Region can be divided into three subregions, namely the Southern Benguela (Cape Point to Cape Columbine), Central Benguela (Cape Columbine to Lüderitz) and Northern Benguela (Lüderitz to the Angola-Benguela front).

The continental shelf along the West Coast maintains a general north-northwest trend. It is narrowest between Cape Columbine and Cape Point (40km), widening to the north of Cape Columbine reaching its widest off the Orange River (180km), and widening south of Cape Point due to the presence of the Agulhas Bank.

The inner shelf along the West Coast is underlain by Precambrian bedrock (Pre-Mesozoic basement), whilst the middle and outer shelf areas are composed of Cretaceous and Tertiary sediments (Dingle 1973; Dingle et al. 1987; Birch et al. 1976; Rogers 1977; Rogers & Bremner 1991). As a result of erosion on the continental shelf along the West Coast, the unconsolidated sediment cover is generally thin, often less than 1m. Sediments are finer seawards, changing from sand on the inner and outer shelves to muddy sand and sandy mud in deeper water. Further offshore, benthic habitats are dominated by lower bathyal and abyssal unconsolidated muds and sandy muds (**Figure 25**). The continental slope, seaward of the shelf break, has a smooth seafloor, underlain by calcareous ooze.

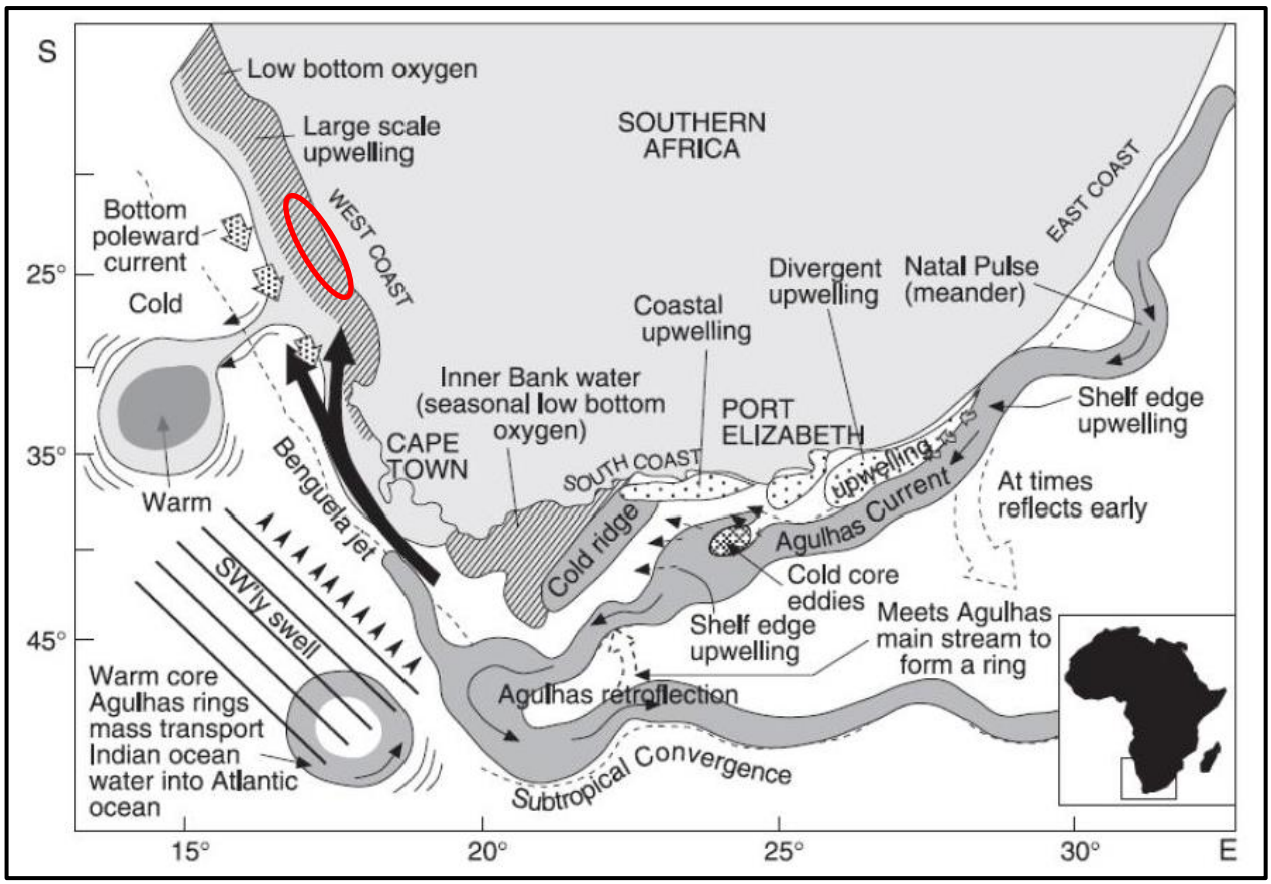


Figure 24: Oceanographic features along the South African Coast.

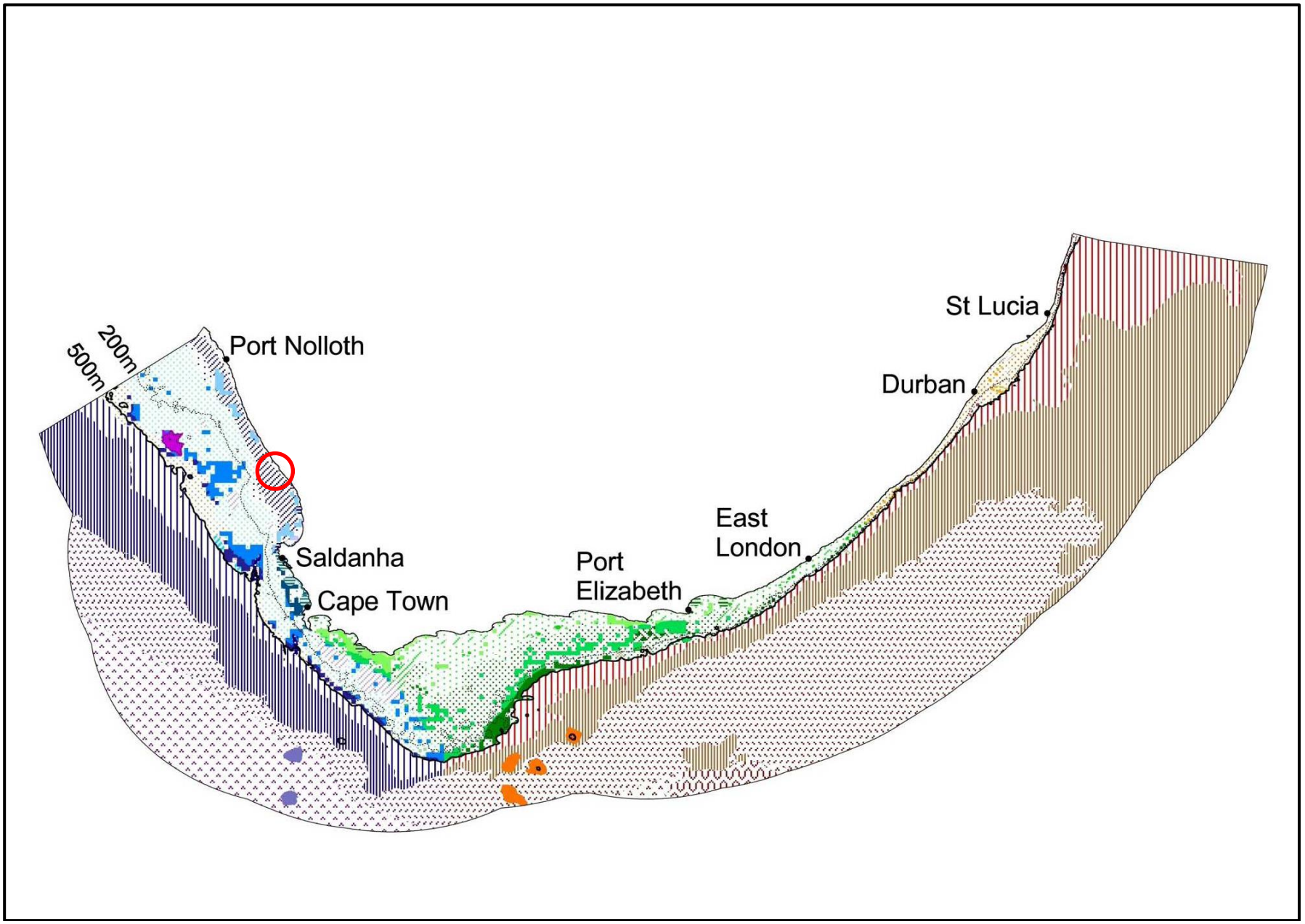


Figure 25: Coastal and offshore benthic habitat types in South Africa with the approximate location of Sea Concession 12B indicated by red circle

Figure 26: Legend list - Coastal and offshore benthic habitat types in South Africa

9.2.3 Geophysical Characteristics

9.2.3.1 Bathymetry

The continental shelf along the West Coast is generally wide and deep, although large variations in both depth and width occur. The shelf maintains a general north-north-west trend, widening north of Cape Columbine and reaching its widest off the Orange River (180km). The shelf widens again south of Cape Point due to the presence of the Agulhas Bank.

Banks on the continental shelf include the Orange River pro-delta, a shallow (160 - 190m) zone that reaches maximal widths (180km) offshore of the Orange River, and Child's Bank, situated approximately 150km offshore at about 31°S. These features are located well to the east of Sea Concession 12B.

9.2.3.2 Geological formation

The geological history of these deposits is complex and involves the interaction of fluvial and marine systems.

Diamonds were introduced to the continental shelf via several river systems draining the interior of southern Africa. The Orange. Buffels and Olifants Rivers and their pre-cursors, have supplied the majority of diamonds to the west coast by eroding the kimberlite pipes from the interior.

Wilson estimated that about 3 billion carats have been eroded out of these kimberlite pipes since early Tertiary. Gurney has estimate that about 532 million tons of kimberlitic, equivalent to more than 500 million carats of diamonds have been eroded from the main kimberlitic pipe in Kimberley alone. During the Cretaceous lo early Paleogene a southern Karoo River introduced diamonds to the west coo.st via the Olifants River exit. This river is believed to have included the Kimberley region in its catchment area. This system was subsequently captured by a northern Kalahari River, which resulted in diamonds being introduced to the continental margin at the modern Orange River exit. (De Witt 1993).

The offshore deposits are the product of repeated reworking of material derived from the hinterland during a series of marine regressions and transgressions over the continental shelf.

The formation of the offshore deposits has been controlled by marine coastal and near shore processes (PWP, 2021).

The Namaqualand coastline is a wave delineated, microtidal region with a mean tidal range of only 1,6m. The general observation is that sediment transport is predominantly northwards from a combination of both incomplete refraction of the south-westerly swells along the generally north-south orientated coastline (Birch 1986) and these are enhanced during summer by southerly winds.

According to De Decker (1987), as per SRK 2021, average wave conditions (i.e., occurring 95% of the time) are capable of transporting very coarse sand (1-2mm) at a depth of 30m. Furthering storm waves (i.e., occurring 5% of the time) can move medium-sized pebbles (± 10.5mm) and small cobbles (± 100mm) at -15m. Clearly, diamond size distribution should follow this same trend and diamondiferous deposits on the shelf platform (0-40m) are continually being reworked and redistributed northwards.

The concession is situated off the Olifants River mouth and extends about 25 kilometres northward and two kilometres southward from the river mouth. The shoreward boundary of the concession is one kilometre from the shore, whereas the western boundary is defined by a straight line between two points situated 34.6 kilometres apart as 31 27' 18"S, 17 56' 37'' E and 31 42' 37"S,18 09' 20"E, and which lie approximately five kilometres from the South African coast. The concession varies in width between 4.3 kilometres and 2.5 kilometres (average 3.5 kilometres) and encompasses an area of approximately 116 square kilometres. The water depth in the concession ranges from 15 meters to 75 meters.

The inner shelf is underlain by Precambrian bedrock (Pre-Mesozoic basement), whilst the middle and outer shelf areas are composed of Cretaceous and Tertiary sediments (Dingle 1973; Dingle et al. 1987; Birch et al. 1976; Rogers 1977; Rogers & Bremner 1991). As a result of erosion on the continental shelf, the unconsolidated sediment cover is generally thin, often less than 1 m. Sediments are finer seawards, changing from sand on the inner and outer shelves to muddy sand and sandy mud in deeper water. However, this general pattern has been modified considerably by biological deposition (large areas of shelf sediments contain high levels of calcium carbonate) and localised river input (see Figure 27).

An approximately 500km long mud belt (up to 40km wide, and of 15m average thickness) is situated at water depths of between -30m and -100m over the inner shelf slope between the Orange River and St Helena Bay (Birch et al. 1976). Further offshore, sediment is dominated by muddy sands, sandy muds, mud and some sand (**Figure 28**).

The continental slope, seaward of the shelf break, has a smooth seafloor, underlain by calcareous ooze. Present day sedimentation is limited to input from the Orange River. This sediment is generally transported northward. Most of the sediment in the area is therefore considered to be relict deposits by now ephemeral rivers active during wetter climates in the past. The Orange River, when in flood, still contributes largely to the mud belt as suspended sediment is carried southward by poleward flow. In this context, the absence of large sediment bodies on the inner shelf reflects on the

paucity of terrigenous sediment being introduced by the few rivers that presently drain the South African West Coast coastal plain.

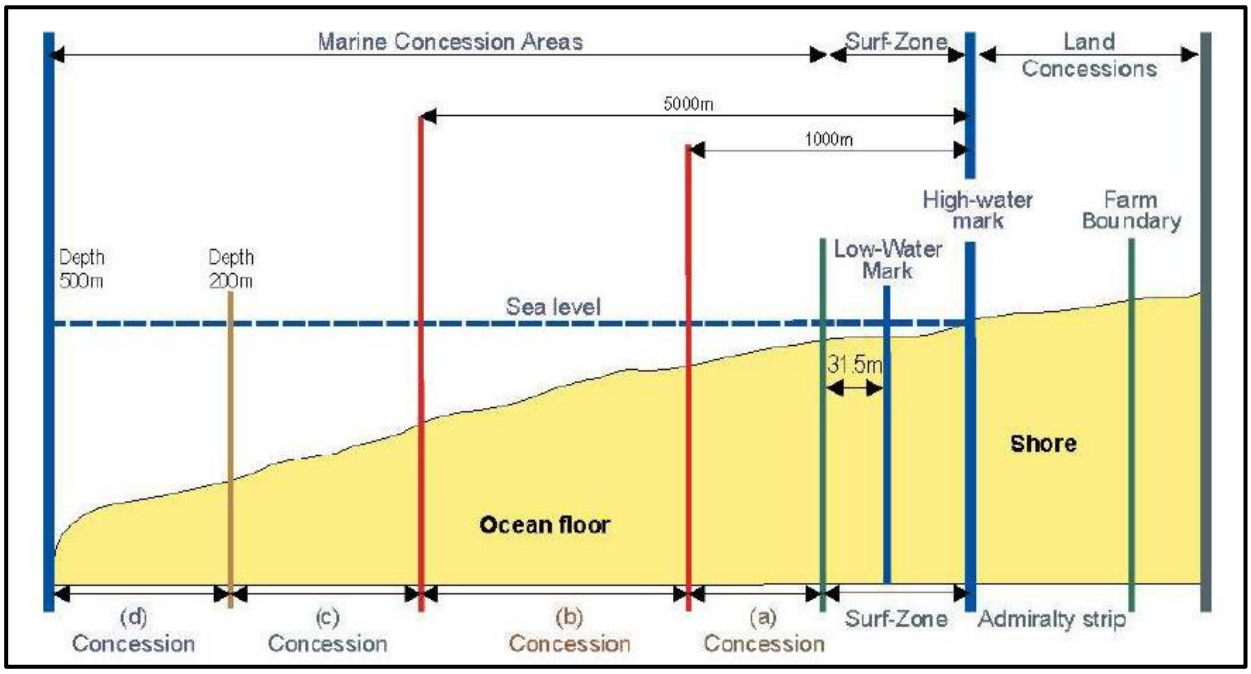


Figure 27: Onshore and Offshore Boundaries of The South African (A) To (D). Marine Diamond Mining Concession Areas (SLR Consulting, 2018)

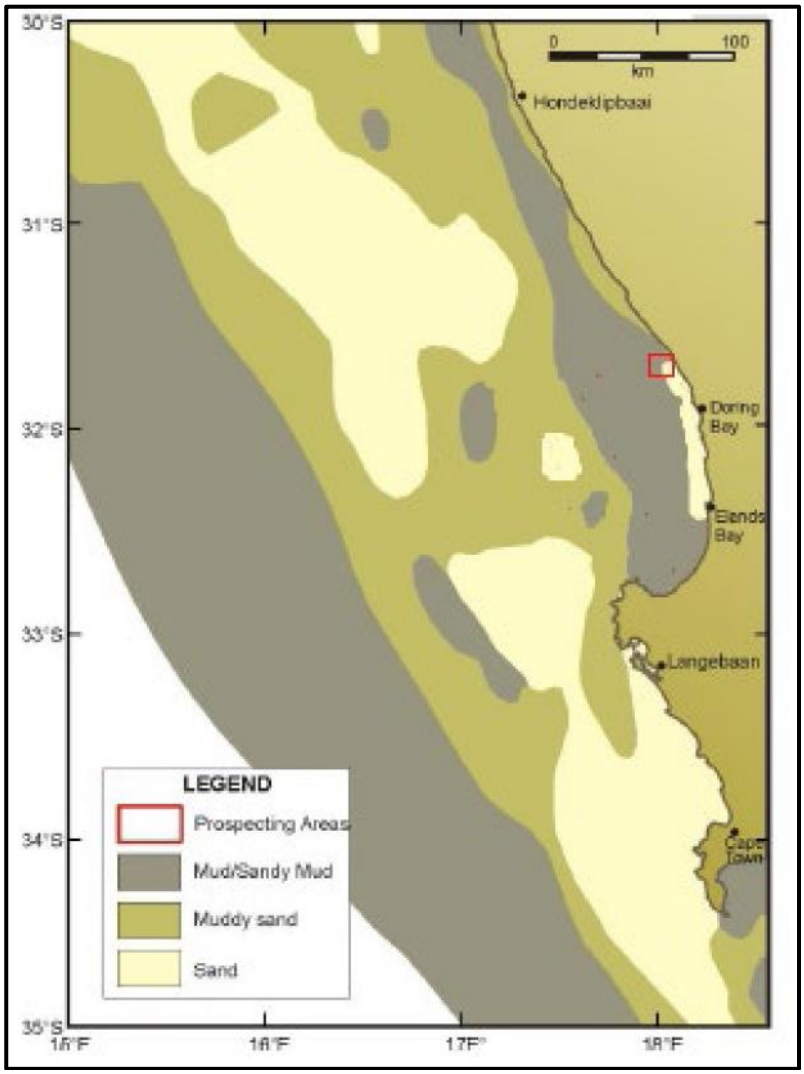


Figure 28: Sea concessions 12B in relation to the regional bathymetry and showing proximity of prominent seabed features

9.2.4 Characteristics

9.2.4.1 Meteorology

The terrestrial climate along the West Coast of South Africa is considered moderate. Weather patterns along the West Coast are influenced largely by the mid-latitude cyclones that are generated to the southwest of the country, and the South Atlantic and Indian Ocean high pressure systems (SRK 2021). The key weather patterns around southern Africa are illustrated in **Figure 29**.

Winds are one of the main physical drivers of the nearshore Benguela region, both on an oceanic scale, generating the heavy and consistent south-westerly swells that impact this coast, and locally, contributing to the northward-flowing longshore currents, and being the prime mover of sediments in the terrestrial environment. Consequently, physical processes are characterised by the average seasonal wind patterns, and substantial episodic changes in these wind patterns have strong effects on the entire Benguela region.

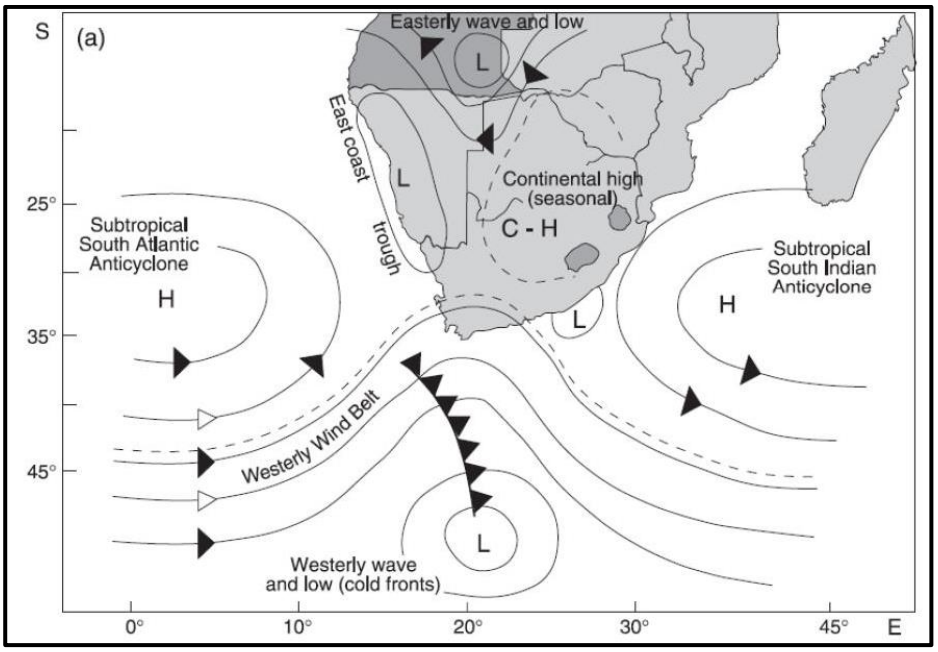


Figure 29: Key weather systems of Southern Africa

These seasonal changes result in substantial differences between the typical summer and winter wind patterns in the region, as the southern hemisphere anti-cyclonic high-pressure system, and the associated series of cold fronts, moves northward in winter, and southward in summer. The strongest winds occur in summer (October to March), during which winds blow 98% of the time, and gales (winds exceeding 18 m/s or 35 kts) are frequent (SRK 2021). Virtually all winds in summer come from the south to south-southeast, averaging 20 - 30kts and reaching speeds in excess of 100 km/h (60 kts) (Figure 29). The combination of these southerly/south-easterly winds drives the massive offshore movements of surface water, and the resultant strong upwelling of nutrient rich bottom waters, which characterise this region in summer.

Winter remains dominated by southerly to south-easterly winds, but the closer proximity of the winter cold-front systems results in a significant south-westerly to north-westerly component (Figure 4-2). This 'reversal' from the summer condition results in cessation of upwelling, movement of warmer mid-Atlantic water shorewards and breakdown of the strong thermoclines which typically develop in summer. There are also more calms in winter, occurring about 4% of the time, and wind speeds generally do not reach the maximum speeds of summer.

However, the westerly winds blow in synchrony with the prevailing south-westerly swell direction, resulting in heavier swell conditions in winter.

9.2.4.2 Large-Scale Circulation and Coastal Currents

The southern African West Coast is strongly influenced by the Benguela Current. Current velocities in continental shelf areas generally range between 10 – 30 cm/s (SRK 2021), although localised flows in excess of 50 cm/s occur associated with eddies. On its western side, flow is more transient and characterised by large eddies shed from the retroflection of the Agulhas Current, resulting in considerable variation in current speed and direction over the domain. In the south, the Benguela current has a width of 200km, widening rapidly northwards to 750km.

The surface flows are predominantly wind-forced, barotropic and fluctuate between poleward and equatorward flow (Shillington et al. 1990; SRK 2021). Current speeds decrease with depth, while directions rotate from predominantly north-

westerly at the surface to south-easterly near the seabed. Near bottom shelf flow is mainly poleward with low velocities of typically <5 cm/s (SRK 2021).

The major feature of the Benguela Current is coastal upwelling (see **Section 9.2.4.5**). As a consequence, the high nutrient supply to surface waters leads to high primary phytoplankton production, which in turn, serves as the basis for a rich food chain. The prevailing longshore, equatorward winds move nearshore surface water northwards and offshore. To balance the displaced water, cold, nutrient-rich water wells up inshore. Although the rate and intensity of upwelling fluctuates with seasonal variations in wind patterns, the most intense upwelling tends to occur where the shelf is narrowest and the wind strongest (**Figure 30**).

There are three upwelling centres in the southern Benguela, namely the Namaqua (30°S), Cape Columbine (33°S) and Cape Point (34°S) upwelling cells (SRK 2021). Upwelling in these cells is seasonal, with maximum upwelling occurring between September and March. The Sea Concession areas all fall within the Namaqua upwelling cell. Upwelling in these cells is seasonal, with maximum upwelling occurring between September and March.

Where the Agulhas Current passes the southern tip of the Agulhas Bank (Agulhas Retroflection area), it may shed a filament of warm surface water that moves north-westward along the shelf edge towards Cape Point, and Agulhas Rings, which similarly move north-westwards into the South Atlantic Ocean. These rings may extend to the seafloor and west of Cape Town may split, disperse or join with other rings. The surface water of the Agulhas Current is generally >21°C, and its influence west of Cape Agulhas results in average sea surface temperatures in the southern Benguela of 16 - 20°C (Shannon 1985). During the process of ring formation, intrusions of cold sub-Antarctic water move into the South Atlantic. The contrast in warm (nutrient-poor) and cold (nutrient-rich) water is thought to be reflected in the presence of cetaceans and large migratory pelagic fish species (Best 2007).

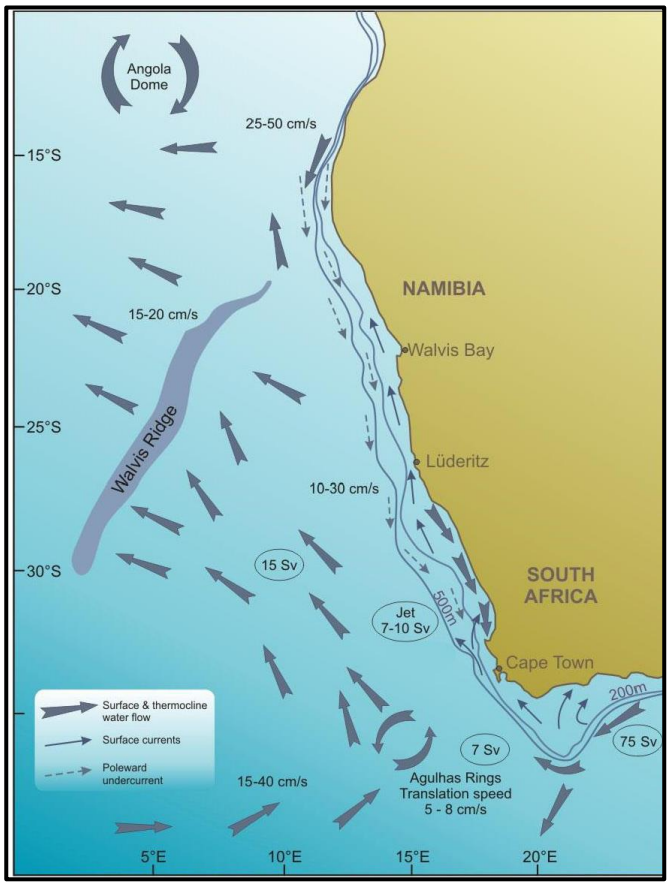


Figure 30: Major circulation features in the Benguela region

9.2.4.3 Waves and Tides

Most of the west coast of southern Africa is classified as exposed and experiences strong wave action, rated between 13-17 on the 20-point exposure scale (SRK 2021). Much of the coastline is therefore impacted by heavy south-westerly swells generated in the roaring forties, as well as significant sea waves generated locally by the prevailing moderate to strong southerly winds characteristic of the region. The Roaring Forties are strong westerly winds generally occurring between 40°S and 50°S degrees. The strong west-to-east air currents are caused by the combination of air being displaced from the Equator towards the South Pole and the Earth's rotation, and there are few landmasses to serve as windbreaks. The peak wave energy periods fall in the range 9.7 – 15.5 seconds.

The wave regime along the southern African West Coast shows only moderate seasonal variation in direction, with virtually all swells throughout the year coming from the south and south-southwest direction (see Figure 30). Winter swells are strongly dominated by those from south and south-southwest, which occur almost 80% of the time, and typically exceed 2m in height, averaging approximately 3m, and often attaining over 5m. With wind speeds capable of reaching 100 km/h during heavy winter south-westerly storms, winter swell heights can exceed 10m.

In comparison, summer swells tend to be smaller on average, typically around 2m, not reaching the maximum swell heights of winter. There is also a slightly more pronounced southerly swell component in summer. These southerly swells tend to be wind-induced, with shorter wave periods (approximately 8 seconds), and are generally steeper than swell waves (SRK 2021). These wind-induced southerly waves are relatively local and, although less powerful, tend to work together with the strong southerly winds of summer to cause the northward-flowing. In common with the rest of the southern African coast, tides are semi-diurnal, with a total range of some 1.5m at spring tide, but only 0.6m during neap tide periods.

9.2.4.4 Water

South Atlantic Central Water (SACW) comprises the bulk of the seawater in the study area, either in its pure form in the deeper regions, or mixed with previously upwelled water of the same origin on the continental shelf (SRK 2021). Salinities range between 34.5 ppt and 35.5ppt (Shannon 1985).

Seawater temperatures on the continental shelf of the southern Benguela typically vary between 6°C and 16°C.

The continental shelf waters of the Benguela system are characterised by low oxygen concentrations, especially on the bottom. SACW itself has depressed oxygen concentrations (~80% saturation value), but lower oxygen concentrations (<40% saturation) frequently occur (Bailey et al. 1985; Chapman & Shannon 1985).

9.2.4.5 Upwelling & Plankton Production

During upwelling the comparatively nutrient-poor surface waters are displaced by enriched deep water, supporting substantial seasonal primary phytoplankton production. The cold, upwelled water is rich in inorganic nutrients, the major contributors being various forms of nitrates, phosphates and silicates (Chapman & Shannon 1985). High phytoplankton productivity in the upper layers again depletes the nutrients in these surface waters.

This results in a wind-related cycle of plankton production, mortality, sinking of plankton detritus and eventual nutrient re-enrichment occurring below the thermocline as the phytoplankton decays. Biological decay of plankton blooms can in turn lead to “black tide” events, as the available dissolved oxygen is stripped from the water during the decomposition process. Subsequent anoxic decomposition by sulphur reducing bacteria can result in the formation and release of hydrogen sulphide (SRK 2021).

9.2.4.6 Organic Inputs

The Benguela upwelling region is an area of particularly high natural productivity, with extremely high seasonal production of phytoplankton and zooplankton. These plankton blooms in turn serve as the basis for a rich food chain up through pelagic baitfish (anchovy, pilchard, round-herring and others), to predatory fish (snoek), mammals (primarily seals and dolphins) and seabirds (African penguins, cormorants, pelicans, terns and others).

All of these species are subject to natural mortality, and a proportion of the annual production of all these trophic levels, particularly the plankton communities, die naturally and sink to the seabed.

Balanced multispecies ecosystem models have estimated that the Benguela region supported biomasses of 76.9 tons/km² of phytoplankton and 31.5 tons/km² of zooplankton alone (Shannon et al. 2003). Thirty-six percent of the phytoplankton and 5% of the zooplankton are estimated to be lost to the seabed annually. This natural annual input of millions of tons of organic material onto the seabed has a substantial effect on the ecosystems of the Benguela region. It provides most of the food requirements of the particulate and filter-feeding benthic communities that inhabit the sandy-muds of this area, and results in the high organic content of the muds in the region. As most of the organic detritus is not directly consumed, it enters the seabed decomposition cycle, resulting in subsequent depletion of oxygen in deeper waters.

An associated phenomenon ubiquitous to the Benguela system are red tides (dinoflagellate and/or ciliate blooms) (see Shannon & Pillar 1985; Pitcher 1998). Also referred to as Harmful Algal Blooms (HABs), these red tides can reach very large proportions, extending over several square kilometres of ocean. Toxic dinoflagellate species can cause extensive mortalities of fish and shellfish through direct poisoning, while degradation of organic-rich material derived from both toxic and non-toxic blooms results in oxygen depletion of subsurface water.

9.2.4.7 Low Oxygen Events

The continental shelf waters of the Benguela system are characterised by low oxygen concentrations with less than 40% saturation occurring frequently (e.g., Visser 1969; Bailey et al. 1985). The low oxygen concentrations are attributed to nutrient remineralisation in the bottom waters of the system (Chapman & Shannon 1985). The absolute rate of this is

dependent upon the net organic material build-up in the sediments, with the carbon rich mud deposits playing an important role. As the mud on the shelf is distributed in discrete patches there are corresponding preferential areas for the formation of oxygen-poor water. The two main areas of low-oxygen water formation in the southern Benguela region are in the Orange River Bight and St Helena Bay (Chapman & Shannon 1985; Bailey 1991; Shannon & O'Toole 1998; Bailey 1999; Fossing et al. 2000).

The spatial distribution of oxygen-poor water in each of the areas is subject to short- and medium-term variability in the volume of hypoxic water that develops. De Decker (1970) showed that the occurrence of low oxygen water off Lambert's Bay is seasonal, with highest development in summer/autumn. Bailey & Chapman (1991), on the other hand, demonstrated that in the St Helena Bay area daily variability exists as a result of downward flux of oxygen through thermoclines and short-term variations in upwelling intensity. Subsequent upwelling processes can move this low-oxygen water up onto the inner shelf, and into nearshore waters, often with devastating effects on marine communities (SRK, 2021).

Periodic low oxygen events in the nearshore region can have catastrophic effects on the marine communities leading to large-scale stranding of rock lobsters, and mass mortalities of marine biota and fish (SRK 2021; Matthews & Pitcher 1996; Pitcher 1998; Cockcroft et al. 2000). The development of anoxic conditions as a result of the decomposition of huge amounts of organic matter generated by algal blooms is the main cause for these mortalities and walkouts. The blooms develop over a period of unusually calm wind conditions when sea surface temperatures were high. Algal blooms usually occur during summer-autumn (February to April) but can also develop in winter during the 'berg' wind periods, when similar warm windless conditions occur for extended periods.

9.2.4.8 Turbidity

Turbidity is a measure of the degree to which water loses its transparency due to the presence of suspended particulate matter. Total Suspended Particulate Matter (TSPM) can be divided into Particulate Organic Matter (POM) and Particulate Inorganic Matter (PIM), the ratios between them varying considerably. The POM usually consists of detritus, bacteria, phytoplankton and zooplankton, and serves as a source of food for filter-feeders.

Seasonal microphyte production associated with upwelling events will play an important role in determining the concentrations of POM in coastal waters. PIM, on the other hand, is primarily of geological origin consisting of fine sands, silts and clays. Off Namaqualand, the PIM loading in nearshore waters is strongly related to natural inputs from the Orange River or from 'berg' wind events. 'Berg' wind events can potentially contribute the same order of magnitude of sediment input as the annual estimated input of total sediment by the Orange River (Shannon & Anderson 1982; Zoutendyk 1992, 1995; Shannon & O'Toole 1998; Lane & Carter 1999).

Concentrations of suspended particulate matter in shallow coastal waters can vary both spatially and temporally, typically ranging from a few mg/l to several tens of mg/l (Bricelj & Malouf 1984; Berg & Newell 1986; SRK 2021). Field measurements of TSPM and PIM concentrations in the Benguela current system have indicated that outside of major flood events, background concentrations of coastal and continental shelf suspended sediments are generally < 12 mg/l, showing significant long-shore variation (Zoutendyk 1995). Considerably higher concentrations of PIM have, however, been reported from southern African West Coast waters under stronger wave conditions associated with high tides and storms, or under flood conditions. During storm events, concentrations near the seabed may even reach up to 10 000mg/l (Miller & Sternberg 1988). In the vicinity of the Orange River mouth, where river outflow strongly influences the turbidity of coastal waters, measured concentrations ranged from 14.3mg/l at Alexander Bay just south of the mouth (Zoutendyk 1995) to peak values of 7 400mg/l immediately upstream of the river mouth during the 1988 Orange River flood (Bremner et al. 1990).

The major source of turbidity in the swell-influenced nearshore areas off the West Coast is the redistribution of fine inner shelf sediments by long-period Southern Ocean swells. The current velocities typical of the Benguela (10-30cm/s) are capable of re-suspending and transporting considerable quantities of sediment equator wards.

Under relatively calm wind conditions, however, much of the suspended fraction (silt and clay) that remains in suspension for longer periods becomes entrained in the slow poleward undercurrent (Shillington et al. 1990; Rogers & Bremner 1991).

Superimposed on the suspended fine fraction, is the northward littoral drift of coarser bedload sediments, parallel to the coastline. This northward, nearshore transport is generated by the predominantly south-westerly swell and wind-induced waves. Longshore sediment transport varies considerably in the shore-perpendicular dimension, being substantially higher in the surf-zone than at depth, due to high turbulence and convective flows associated with breaking waves, which suspend and mobilise sediment (Smith & Mocke 2002).

On the inner and middle continental shelf, the ambient currents are insufficient to transport coarse sediments typical of those depths, and re-suspension and shoreward movement of these by wave-induced currents occur primarily under storm conditions (see also Drake et al. 1985; Ward 1985; SRK 2021). Data from a Waverider buoy at Port Nolloth have indicated that 2m waves are capable of re-suspending medium sands (200µm diameter) at approximately 10m depth,

whilst 6m waves achieve this at approximately 42m depth. Low amplitude, long-period waves will, however, penetrate even deeper. Most of the sediment shallower than 90m can therefore be subject to re-suspension and transport by heavy swells (Lane & Carter 1999).

Mean sediment deposition is naturally higher near the seafloor due to constant re-suspension of coarse and fine PIM by tides and wind-induced waves. Aggregation or flocculation of small particles into larger aggregates occurs as a result of cohesive properties of some fine sediments in saline waters. The combination of re-suspension of seabed sediments by heavy swells, and the faster settling rates of larger inorganic particles, typically causes higher sediment concentrations near the seabed. Significant re-suspension of sediments can also occur up into the water column under stronger wave conditions associated with high tides and storms. Re-suspension can result in dramatic increases in PIM concentrations within a few hours (Sheng et al. 1994). Wind speed and direction have also been found to influence the amount of material re-suspended (Ward 1985).

Although natural turbidity of seawater is a global phenomenon, there has been a worldwide increase of water turbidity and sediment load in coastal areas as a consequence of anthropogenic activities. These include dredging associated with the construction of harbours and coastal installations, beach replenishment, accelerated runoff of eroded soils as a result of deforestation or poor agricultural practices, discharges from terrestrial, coastal and marine mining operations (Airoldi 2003), and sediment plumes as a result of bottom trawling fishery activities.

Such increase of sediment loads has been recognised as a major threat to marine biodiversity at a global scale (UNEP 1995).

9.2.5 Biological Oceanography

Biogeographically, the Sea Concession areas falls into the cold temperate Namaqua Bioregion, which extends from Sylvia Hill, north of Lüderitz in Namibia to Cape Columbine (Emanuel et al. 1992; Lombard et al. 2004) (see **Figure 31**). The coastal, wind-induced upwelling characterising the Western Cape coastline, is the principle physical process which shapes the marine ecology of the southern Benguela region. The Benguela system is characterised by the presence of cold surface water, high biological productivity, and highly variable physical, chemical and biological conditions. The West Coast is, however, characterized by low marine species richness and low endemicity (Awad et al. 2002).

Communities within marine habitats are largely ubiquitous throughout the Southern African West Coast region, being particular only to substrate type or depth zone. These biological communities consist of many hundreds of species, often displaying considerable temporal and spatial variability (even at small scales). The majority of the proposed prospecting right area is located beyond the 50m depth contour. The near- and offshore marine ecosystems comprise a limited range of habitats, namely unconsolidated seabed sediments, deep water reefs and the water column. The biological communities 'typical' of these habitats are described briefly below, focussing both on dominant, commercially important and conspicuous species, as well as potentially threatened or sensitive species, which may be affected by the proposed prospecting activities.

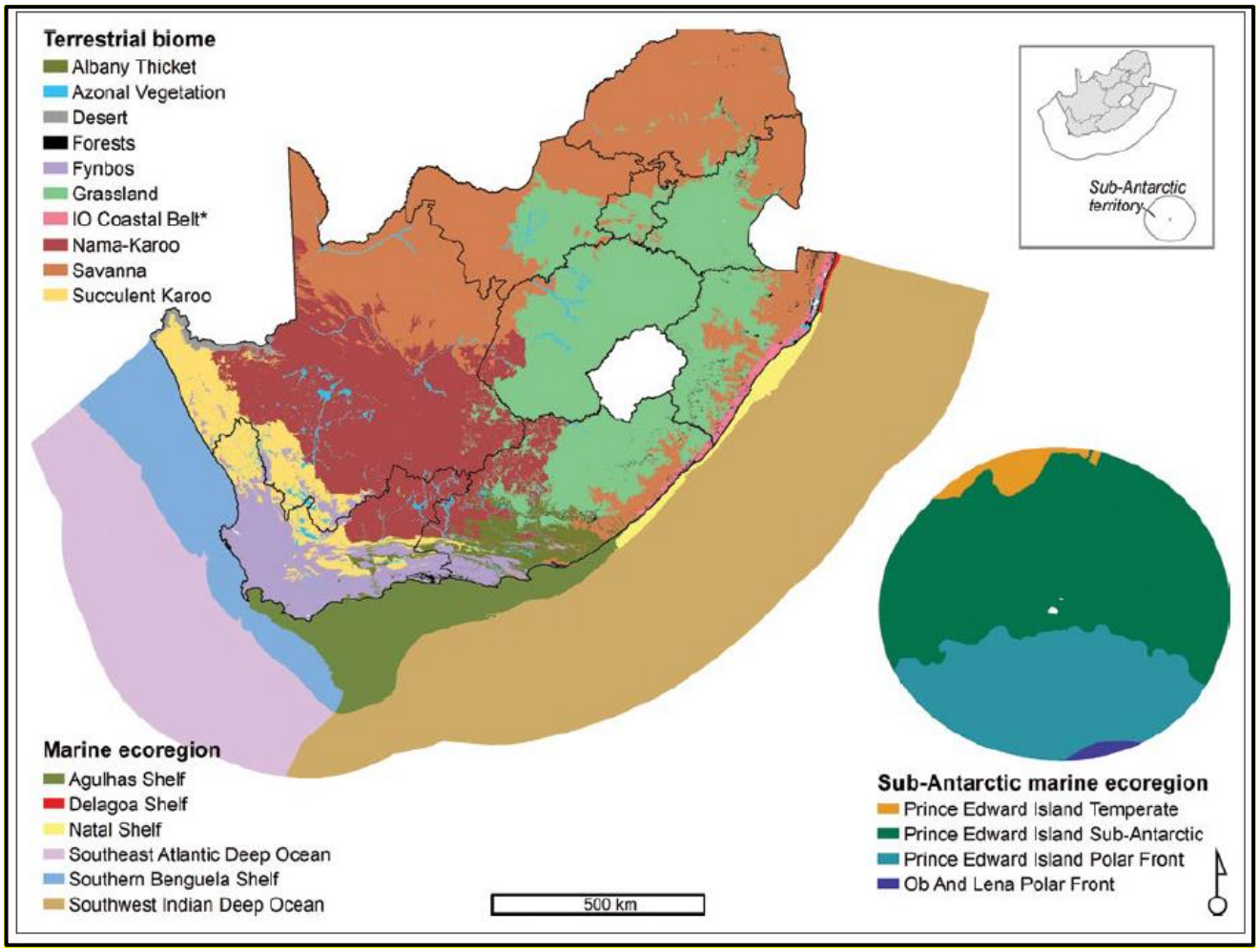


Figure 31: South Africa's nine marine bioregions, as defined by Lombard

9.2.5.1 Habitats & Communities

Nearshore and Offshore Unconsolidated Habits

The benthic biota of unconsolidated marine sediments constitutes invertebrates that live on (epifauna) or burrow within (infauna) the sediments and are generally divided into macrofauna (animals >1mm) and meiofauna (<1mm).

Rocky Subtidal Habitat and Kelp Beds

Biological communities of the rocky sublittoral can be broadly grouped into an inshore zone from the sublittoral fringe to a depth of about 10m dominated by flora and an offshore zone below 10m depth dominated by fauna.

From the sublittoral fringe to a depth of between 5 and 10m, the benthos is largely dominated by algae, in particular two species of kelp. The canopy forming kelp *Ecklonia maxima* extends seawards to a depth of about 10m. The smaller *Laminaria pallida* forms a sub-canopy to a height of about 2m underneath *Ecklonia* but continues its seaward extent to approximately 30m depth, although further north up the west coast increasing turbidity limits growth to shallower waters (10-20m) (SRK 2021). *Ecklonia maxima* is the dominant species in the south forming extensive beds from west of Cape Agulhas to north of Cape Columbine but decreasing in abundance northwards. *Laminaria* becomes the dominant kelp north of Cape Columbine and thus in the project area, extending from Danger Point east of Cape Agulhas to Rocky Point in northern Namibia (SRK 2021).

Kelp beds absorb and dissipate much of the typically high wave energy reaching the shore, thereby providing important partially-sheltered habitats for a high diversity of marine flora and fauna, resulting in diverse and typical kelp-forest communities being established. Through a combination of shelter and provision of food, kelp beds support recruitment and complex trophic food webs of numerous species, including commercially important rock lobster stocks (SRK 2021).

Growing beneath the kelp canopy, and epiphytically on the kelps themselves, are a diversity of understorey algae, which provide both food and shelter for predators, grazers and filter-feeders associated with the kelp bed ecosystem. Representative under-storey algae include *Botryocarpa prolifera, Neuroglossum binderianum, Botryoglossum platycarpum, Hymenena venosa* and Rhodymenia (=Epymenia) obtusa, various coralline algae, as well as subtidal extensions of some algae occurring primarily in the intertidal zones (Bolton 1986). Epiphytic species include *Polysiphonia virgata, Gelidium vittatum (=Suhria vittata)* and *Carpoblepharis flaccida*. In particular, encrusting coralline algae are

important in the under-storey flora as they are known as settlement attractors for a diversity of invertebrate species. The presence of coralline crusts is thought to be a key factor in supporting a rich shallow-water community by providing substrate, refuge, and food to a wide variety of infaunal and epifaunal invertebrates (SRK 2021).

The sublittoral invertebrate fauna is dominated by suspension and filter-feeders, such as the mussels *Aulacomya ater* and *Choromytilus meriodonalis*, and the Cape reef worm *Gunnarea capensis*, and a variety of sponges and sea cucumbers. Grazers are less common, with most herbivory being restricted to grazing of juvenile algae or debris-feeding on detached macrophytes. The dominant herbivore is the sea urchin *Parechinus angulosus*, with lesser grazing pressure from limpets, the isopod *Paridotea reticulata* and the amphipod *Ampithoe humeralis*. The abalone *Haliotis midae*, an important commercial species present in kelp beds south of Cape Columbine is naturally absent north of Cape Columbine.

Deep-water coral communities

There has been increasing interest in deep-water corals in recent years because of their likely sensitivity to disturbance and their long generation times. These benthic filter-feeders generally occur deeper than 150m with some species being recorded from as deep as 3 000m. Some species form reefs while others are smaller and remain solitary. Corals add structural complexity to otherwise uniform seabed habitats thereby creating areas of high biological diversity (Breeze et al. 1997; MacIssac et al. 2001). Deep water corals establish themselves below the thermocline where there is a continuous and regular supply of concentrated particulate organic matter, caused by the flow of a relatively strong current over special topographical formations which cause eddies to form. Nutrient seepage from the substratum might also promote a location for settlement (Hovland et al. 2002).

In the productive Benguela region, substantial areas on the shelf should thus potentially be capable of supporting rich, cold water, benthic, filter-feeding communities.

Demersal Fish Species

Demersal fish are those species that live and feed on or near the seabed. As many as 110 species of bony and cartilaginous fish have been identified in the demersal communities on the continental shelf of the West Coast (Roel 1987).

Pelagic Communities

In contrast to demersal and benthic biota that are associated with the seabed, pelagic species live and feed in the open water column. The pelagic communities are typically divided into plankton and fish, and their main predators, marine mammals (seals, dolphins and whales), seabirds and turtles. It is pointed out that the marine component of the 2011 National Biodiversity Assessment (Sink et al. 2012), rated the majority of the offshore pelagic habitat types as 'least threatened' (refer to Figure 32), with only a narrow band along the shelf break of the West Coast being rated as 'vulnerable', primarily due to its importance as a migration pathway for various resource species (e.g. whales, tuna, billfish, turtles).

- **Plankton**

Plankton is particularly abundant in the shelf waters off the West Coast, being associated with the upwelling characteristic of the area. Plankton range from single-celled bacteria to jellyfish of 2m diameter, and include bacterio-plankton, phytoplankton, zooplankton, and ichthyoplankton.

- **Cephalopods**

Fourteen species of cephalopds have been recorded in the southern Benguela, the majority of which are sepiods/cuttlefish (Lipinski 1992; Augustyn et al. 1995). Most of the cephalopod resource is distributed on the mid-shelf with *Sepia australis* being most abundant at depths between 60-190 m, whereas *S. Hieronis* densities were higher at depths between 110-250m. *Rossia enigmatica* occurs more commonly on the edge of the shelf to depths of 500m. Biomass of these species was generally higher in the summer than in winter. Cuttlefish are largely epi-benthic and occur on mud and fine sediments in association with their major prey item; mantis shrimps (Augustyn et al. 1995). They form an important food item for demersal fish.

- **Pelagic Fish**

The structure of the nearshore and surf zone fish community varies greatly with the degree of wave exposure. Species richness and abundance is generally high in sheltered and semi-exposed areas but typically very low off the more exposed beaches (SRK 2021). The surf-zone and outer turbulent zone habitats of sandy beaches are considered to be important nursery habitats for marine fish; however, composition and abundance of individual assemblages appears heavily dependent on wave exposure (SRK 2021). Surf-zone fish communities off the South African West Coast have relatively high biomass, but low species diversity.

Two species that migrate along the West Coast following the shoals of anchovy and pilchards are snoek *Thyrsites atun* and chub mackerel *Scomber japonicas*. Their appearance along the West and South-West coasts are highly seasonal. Snoek migrating along the southern African West Coast reach the area between St Helena Bay and the Cape Peninsula

between May and August. They spawn in these waters between July and October before moving offshore and commencing their return northward migration (Payne & Crawford 1989). They are voracious predators occurring throughout the water column, feeding on both demersal and pelagic invertebrates and fish. Chub mackerel similarly migrate along the southern African West Coast reaching South-Western Cape waters between April and August. They move inshore in June and July to spawn before starting the return northwards offshore migration later in the year. Their abundance and seasonal migrations are thought to be related to the availability of their shoaling prey species (Payne & Crawford 1989).

- **Turtles**

Three species of turtle occur along the West Coast, namely the Leatherback (*Dermochelys coriacea*), and occasionally the Loggerhead *(Caretta caretta*) and the Green (*Chelonia mydas*) turtle. Loggerhead and Green turtles are expected to occur only as occasional visitors along the West Coast. The Leatherback is the only turtle likely to be encountered in the offshore waters of west South Africa.

The Benguela ecosystem, especially the northern Benguela where jelly fish numbers are high, is increasingly being recognized as a potentially important feeding area for leatherback turtles from several globally significant nesting populations in the south Atlantic (Gabon, Brazil) and south east Indian Ocean (South Africa) (Lambardi et al. 2008, Elwen & Leeney 2011; SRK 2021).

- **Seabirds**

Large numbers of pelagic seabirds exploit the pelagic fish stocks of the Benguela system. Of the 49 species of seabirds that occur in the Benguela region, 14 are defined as resident, 10 are visitors from the northern hemisphere and 25 are migrants from the southern Ocean. The 18 species classified as being common in the southern Benguela are listed in Table 4-2. The area between Cape Point and the Orange River supports 38% and 33% of the overall population of pelagic seabirds in winter and summer, respectively. Most of the species in the region reach highest densities offshore of the shelf break (200 – 500m depth) with highest population levels during their non-breeding season (winter).

- **Marine Mammals**

The marine mammal fauna occurring off the southern African coast includes several species of whales and dolphins and one resident seal species. Thirty-five species of whales and dolphins are known (based on historic sightings or strandings records) or likely (based on habitat projections of known species parameters) to occur in these waters (see Table 4-4). The offshore areas have been particularly poorly studied with almost all available information from deeper waters (>200m) arising from historic whaling records prior to 1970. Current information on the distribution, population sizes and trends of most cetacean species occurring on the west coast of southern Africa is lacking. Information on smaller cetaceans in deeper waters is particularly poor and the precautionary principal must be used when considering possible encounters with cetaceans in this area.

Records from stranded specimens show that the area between St Helena Bay (~32°S) and Cape Agulhas (~34°S, 20°E) is an area of transition between Atlantic and Indian Ocean species, as well as those more commonly associated with colder waters of the west coast (e.g. dusky dolphins and long finned pilot whales) and those of the warmer east coast (e.g. striped and Risso's dolphins) (Findlay et al. 1992). The location of the sea concessions lies north of this transition zone and can be considered to be truly on the 'west coast'.

9.2.6 Conservation Areas

9.2.6.1 Marine Protected Areas

Using biodiversity data mapped for the 2004 and 2011 National Biodiversity Assessments, a systematic biodiversity plan has been developed for the West Coast (Majiedt et al. 2013) with the objective of identifying both coastal and offshore priority areas for MPA expansion. To this end, various focus areas were identified for protection on the West Coast between Cape Agulhas and the South African – Namibian border, and these were carried forward through Operation Phakisa for the proposed development of offshore MPAs. A network of 20 MPAs was gazetted on 23 May 2019, thereby increasing the ocean protection within the South African EEZ to 5%.

No MPA overlaps the Sea Concession 12B area. The Namaqua Fossil Forest (nr 3 on **Figure 32**) is situated 65km north-north-west of the concession area. The Childs Bank MPA (nr 4 on **Figure 32**) is situated 195km North-West and the Cape Canyon (nr 5 on **Figure 32**) and Benguela Muds (nr 6 on **Figure 32**) are situated more than 120km South West.

Figure 32: Locality of the South African Marine Protected Areas in relation to the prospecting area (red oval).

9.2.6.2 Threat Status and Vulnerable Marine Ecosystems

Rocky shore and sandy beach habitats are generally not particularly sensitive to disturbance and natural recovery occurs within 2-5 years. However, much of the Namaqualand coastline has been subjected to decades of disturbance by shore-based diamond mining operations (Penney et al. 2007). These cumulative impacts and the lack of biodiversity protection has resulted in most of the coastal habitat types in Namaqualand being assigned a threat status of 'critically endangered' (Lombard et al. 2004; Sink et al. 2012). Using the SANBI benthic and coastal habitat type GIS database, the threat status of the benthic habitats in the general area, and those potentially affected by proposed prospecting activities in Sea Concessions 12B, were identified asNamaqua Muddy Inner Shelf and Southern Bengual Outer Shelf.

As part of a regional Marine Spatial Management and Governance Programme (MARISMA; 2014-2020) the Benguela Current Commission (BCC) and its member states have identified a number of Ecologically or Biologically Significant Areas (EBSAs) both spanning the border between Namibia and South Africa and along the South African West and South Coasts, with the intention of implementing improved conservation and protection measures within these sites. Those areas identified as being of high priority for place-based conservation measures within the broad project area are shown in **Figure 33**. These EBSAs have been proposed and inscribed under the Convention of Biological Diversity (CBD). Concession area 12B fall within the transboundary Benguela Upwelling System EBSA. The principal objective of these EBSAs is identification of features of higher ecological value that may require enhanced conservation and management measures. No specific management actions have been formulated for the various areas at this stage.

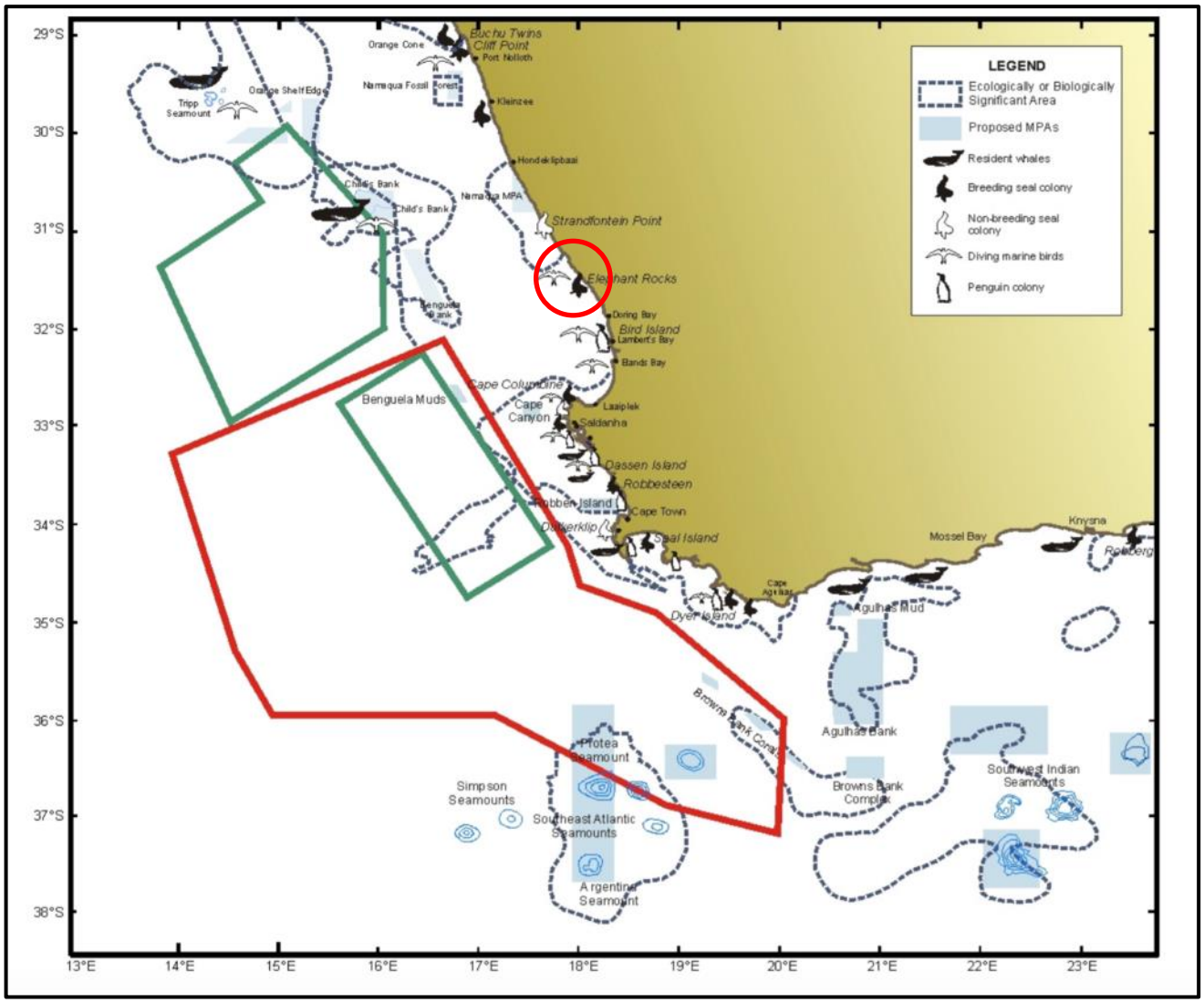


Figure 33: Environment interaction points on the west coast, illustrating the location of Seabird and seal colonies and resident whale populations in relation to the 12b sea concession area (red circle), offshore marine protected areas and EBSAS (as of 30 august 2019) are also shown.

9.2.7 Socio-economic Environment

9.2.7.1 Fisheries and Other Harvesting

The South African fishing industry consists of approximately 14 commercial sectors operating within the 200 nautical mile Exclusive Economic Zone (EEZ). The western coastal shelf is a highly productive upwelling ecosystem (Benguela current) and supports a number of fisheries.

Primary fisheries in terms of economic value and overall tonnage of landings are the demersal (bottom) trawl and long-line fisheries targeting the cape hakes *Merluccius paradoxus* and *M. capensis*, and the pelagic purse-seine fishery targeting pilchard (*Sardinops sagax*), anchovy (*Engraulis encrasicolus*) and red-eye round herring (*Etrumeus whitheadii*). Secondary commercial species in the hake-directed fisheries include an assemblage of demersal (bottom-dwelling) fish of which monk fish (*Lophius vomerinus*) and snoek (*Thyrsites atun*) are the most important commercial species. Other fisheries active on the West Coast are the pelagic long-line fishery for tunas and swordfish and the tuna pole and traditional line-fish sectors. West Coast rock lobster (*Jasus lalandi*) is an important trap fishery exploited close to the shoreline (waters shallower than 100m) including the intertidal zone and kelp beds off the West Coast.

On the West Coast of South Africa, major fishing grounds tend to be centred along the shelf break which is located approximately along the 500m isobath. Historically and currently the bulk of the main commercial fish stocks caught on the northern West Coast of South Africa have been landed and processed at the Western Cape ports of Cape Town and Saldanha (less than 1% of the South African commercial allowable catch is landed in the Northern Cape Province). The main reasons for this include lack of local infrastructure, distance to market and relatively low volumes of fish landings. The main commercial sectors operating in the vicinity of the study area are discussed below:

9.2.7.2 West Coast Rock Lobster

The West Coast rock lobster occurs inside the 200m depth contour along the West Coast from Namibia to East London on the East Coast of South Africa. In South Africa, the fishery is divided into the offshore fishery and the near-shore fishery, both directed inshore of the 100m bathymetric contour. The offshore sector operates in a water depth range of 30m to 100m whilst the inshore fishery is restricted by the type of gear used to waters shallower than 30m in depth.

Fishing grounds are divided into Zones stretching from the Orange River mouth to east of Cape Hangklip in the South-Eastern Cape. Effort is seasonal with boats operating from the shore and coastal harbours. Catch is managed using a TAC set annually for different management areas. The fishery operates seasonally, with closed seasons applicable to different management zones. There is a direct overlap with the proposed prospecting activities and the offshore sector in Zone B, Areas 3 & 4 (**Figure 34**).

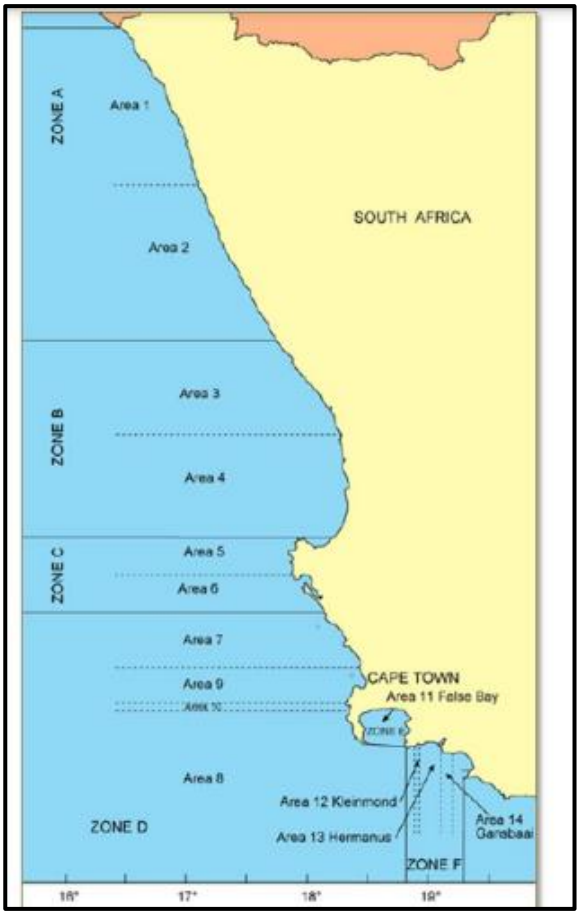


Figure 34: West Coast rock lobster fishing zones and areas. The five super-areas are A1-2 corresponding to Zone A, A 3-4 to Zone B, A5- 6 to Zone C, A7 being the northern-most Area within Zone D, and A8+ comprising Area 8 of Zone D in conjunction with Zone F. Source (DAFF).

9.2.7.3 Abalone Ranching

The Abalone *(Haliotus midae*) is endemic to South Africa with the natural population extending east from St Helena Bay in the Western Cape to Port St Johns on the east coast (Branch et al. 2010; SRK 2021).

Seeding of abalone in designated areas (ranching) has led to the establishment of abalone outside this natural range, including sites along approximately 50km of the Namaqualand coast in the Northern Cape. The potential to increase this seeded area to 175km has been made possible through the issuing of "Abalone Ranching Rights" (Government Gazette No. 729 of 20 August 2010) in four concession zones between Alexander Bay and Hondeklipbaai.

Kelp forests are a key habitat for abalone, as they provide a key food source for abalone as well as an ideal ecosystem for abalone's life cycle (Branch et al., 2010). Light is a limiting factor for kelp beds, which are therefore limited to depths of 10m on the Namaqualand coast (Anchor Environmental, 2012). In the wild, abalone may take 30 years to reach full size of 200mm, but farmed abalone attain 100mm in only 5 years, which is the maximum harvest size (SRK 2021).

Abalone ranching was pioneered by Port Nolloth Sea Farms who were experimentally seeding kelp beds in Port Nolloth by 2000. Abalone ranching expanded in the area in 2013 when DEFF (then, the Department of Agriculture, Forestry and Fisheries - DAFF) issued rights for each of four Concession Area Zones. Two hatcheries exist in Port Nolloth producing up

to 250 000 spat. To date, there has been no seeding in Zones 1 or 2. However, seeding has taken place in Zones 3 and 4, both of which are situated to the north of the sea concession areas.

9.2.7.4 Beach-Seine and Gillnet Fisheries

There are a number of active beach-seine and gillnet operators throughout South Africa (collectively referred to as the "netfish" sector). Initial estimates indicate that there are at least 7 000 fishers active in fisheries using beach-seine and gillnets, mostly (86%) along the West and South coasts. These fishers utilise 1 373 registered nets and report an average catch of about 1 600 tons annually, constituting 60% harders (also known as mullet, *Liza richardsonii*), 10% St Joseph shark (*Callorhinchus capensis*) and 30% "bycatch" species such as galjoen (*Dichistius capensis*), yellowtail (*Seriola lalandii*) and white steenbras (*Lithognathus lithognathus*).

The fishery is managed on a Total Allowable Effort (TAE) basis with a fixed number of operators in each of 15 defined areas. The number of Rights Holders for 2014 was listed as 28 for beach-seine and 162 for gill-net (DAFF, 2014a). Permits are issued solely for the capture of Harders, St Joseph and species that appear on the 'bait list.'

The exception is False Bay, where Right Holders are allowed to target line-fish species that they traditionally exploited. The beach-seine fishery operates primarily on the West Coast of South Africa between False Bay and Port Nolloth (Lamberth 2006) with a few permit holders in KwaZulu-Natal targeting mixed shoaling fish during the annual winter migration of sardine (SRK 2021).

Due to the range of beach-seine activities (20m), there would be no overlap with the sea concession areas, however, it is expected that the concession areas do overlap with gillnet fishing areas.

9.2.7.5 Fisheries Research

Surveys of demersal fish resources are carried out in January (West Coast survey encompassing the area between the Namibian border and Cape Agulhas) and April/May (South Coast survey encompassing the area between Cape Agulhas and Port Alfred) each year by DAFF in order to set the annual TACs for demersal fisheries. Stratified, bottom trawls are conducted to assess the biomass, abundance and distribution of hake, horse mackerel, squid and other demersal trawl species on the shelf and upper slope of the South African coast. The gear configuration is similar to that of commercial demersal trawlers; however, nets are towed for a shorter duration of generally 30 minutes per tow. Trawl positions are randomly selected to cover specific depth strata that range from the coast to the 1 000m bathymetric contour. Approximately 120 trawls are conducted during each survey over a period of approximately one month.

The biomass of small pelagic species is also assessed bi-annually by an acoustic survey. During these surveys, the survey vessel travels pre-determined transects (perpendicular to bathymetric contours) running offshore from the coastline to approximately the 200m bathymetric contour. The survey is designed to cover an extensive area from the Orange River on the West Coast to Port Alfred on the East Coast.

9.2.7.6 Shipping Transport

The majority of shipping traffic is located on the outer edge of the continental shelf with traffic inshore of the continental shelf along the West Coast largely comprising fishing and mining vessels, especially between Kleinsee and Oranjemund. The main shipping lanes are located further offshore of Sea Concession areas 12B.

9.2.7.7 Oil and Gas Exploration and Production

Oil and gas exploration and production is currently undertaken in a number of licences blocks off the South and East coasts of South Africa (see **Figure 35**).

9.2.7.8 Exploration

The South African continental shelf and economic exclusion zone (EEZ) have similarly been partitioned into Licence blocks for petroleum exploration and production activities. Oil and gas exploration in the South African offshore commenced with seismic surveys in 1967. Since then, numerous 2D and 3D seismic surveys have been undertaken in the West Coast offshore.

Approximately 40 exploration wells have been drilled since the 1960's. Prior to 1983, reliable technology was not available for removing wellheads from the seafloor. Since then, however, on completion of drilling operations, the well casing has been severed 3 m below the sea floor and removed from the seafloor together with the permanent and temporary guide bases. Of the approximately 40 wells drilled, 35 wellheads remain on the seafloor. Location and wellhead details are available from the Hydrographic office of the South African Navy (which issues the details to the public in a notice to mariners) or directly from PASA.

PETROLEUM EXPLORATION AND PRODUCTION ACTIVITIES IN SOUTH AFRICA

Restriction Notice on Applications

As of the 28 of June 2018, no new applications for Technical Cooperation Permits, Exploration Rights and Production Rights will be received until a notice of invitation for application is published. This affects all acreage offshore
It does not affect:
- Reconnaissance permits - i.e. spec surveys/multi-client surveys
- Applications made before the 28th June 2018
- Current permit and right holders' exclusive rights to apply for exploration rights (from a TCP) or production rights (from an ER)

The above-mentioned restriction does not apply to onshore areas under restriction notice dated 3rd February 2014.

Mineral and Petroleum Resources Development Act, No.28 of 2002.

Role of Petroleum Agency SA

Under section 71 of the above Act, Petroleum Agency SA has been appointed the designated Agency, with the following responsibilities:
- Promotion and regulation of exploration and production on and offshore
- Receive applications, evaluate and recommend the award of permits and rights
- Review, evaluate and recommend approval of EMPs
- Monitor compliance of licence conditions
- Maintain and add value to the national petroleum exploration and production database
- Acquire reconnaissance data
- Collect all prescribed fees

Permits and rights

The above Act defines the following permits and rights:
- Reconnaissance Permit - 12 months, non-exclusive
- Technical Cooperation Permit - 12 months, exclusive desk-top study, exclusive right to apply for Exploration Right
- Exploration Right - exclusive, transferable, 3 years, renewable for a maximum of 3 periods of 2 years each.
- Production Right - exclusive, transferable, 30 years, renewable.

KUDU GAS FIELD
BW Kudu (56%) Namcor (44%)
Discovered in 1974 by a Chevron / Regent /Soekor consortium. The reservoir comprises Barremian (Early Cretaceous) aeolian sandstones with average porosities up to 22 % at 4400m.

TOSACO 362ER
Prospects/leads mapped in the drift sequence

THOMBO / MAIN STREET PANORO / AZINAM 105ER
Preparing to drill the Gazania Prospect

SUNBIRD (Operator) (76%) PETROSA (24%) 003PR

PETROSA (100%) 248ER

SHELL (90%) OK ENERGY (10%) 274ER

IBHUBESI GAS FIELD
Ibhubesi gas field comprises fluvial type channels and lobes of Albian to early Cretaceous age. Currently, this production right is under a Gas Market Development Plan with an Integrated Field Development Plan (IFP) ongoing.

SUNGU-SUNGU Petroleum (100%) 223ER
Reprocessed 2D seismic data.
Currently evaluating prospectivity in the drift sequence

TotalEnergies (Operator) (40%) Shell (40%) PetroSA (20%)
Interpretation of the recently acquired 3D seismic data is ongoing. Several prospective areas have been identified in the drift sequences 224ER

E-CE GAS FIELD (PetroSA 100%)
Originally the Sable oil field, gas is now being produced from this Aptian age deep marine channel sandstone reservoir to supplement the feed to the Mossel Bay plant.

ORIBI/ORYX OIL FIELD (PetroSA 100%)
Submarine fan deposits of Albian (Early Cretaceous) age.
Currently not in production.

PETROSA BLOCK 9 061ER
Ongoing exploration and appraisal of oil and gas discoveries.

F-A GAS FIELD & SATELLITES (PetroSA 100%)
Currently producing from Early Cretaceous shallow marine sandstone reservoirs.
Separate 91km pipelines convey gas and condensate to the PetroSA GTL synfuels refinery at Mossel Bay where petrol, diesel, kerosene, etc are produced.
F-O Field, 4 wells drilled and currently 2 producing.

PETROSA - BLOCK 11a 061ER
Early Cretaceous shallow marine gas fields currently under appraisal.

TOTALENERGIES (45%) MAIN STREET (10%) QATAR PETROLEUM (25%) CNR (20%)
Two deep water, gas and condensate Apt-Albian discoveries, commercialisation is currently under discussion 067ER

NEW AGE ALGOA (50%) RIFT Petroleum (50%) 207ER
Prospectivity evaluation of the synrift and post rift sequences ongoing

BG INTERNATIONAL (50%) IMPACT AFRICA (50%) 252ER

SASOL (100%)
Purchased 2D multi-client seismic data. Interpretation of this data and legacy data ongoing. 235ER

PANDE & TEMANE GAS FIELDS
Combined reserves in excess of 5.5 Tcf.
Now operated by Sasol/ENH partnership.

Eskom - Majuba Underground Coal Gasification Project
Trial production started Jan. 2007
Planned full production by 2013 is 313 million sl/day (natural gas equivalent)

BOTSWANA COALBED METHANE (CBM) EXPLORATION
Large Potential Resource

Soutpansberg
Resource type: CBM
Operator: BlackGold
Current status: Early exploration stages for CBM.

Waterberg
Resource type: CBM (Coalbed Methane)
Main Operator: Anglo Operations (Pty) Ltd
Current status: Feasibility studies for commercialisation of the resource

Springbok Flats
Resource type: CBM
Operator: Re:Sinna
Current status: Desktop exploration studies

Highveld/Ermelo
Resource type: CBM & Coal Sandstone
Operator: Afro Energy (Pty) Ltd
Current status: Production feasibility studies including pilot production wells.

Karoo Basin
Resource type: Shale gas
Applicants: Falcon & Bundu
Current status: Under application
Deep tight gas shale play?
Dry gas in fractured carbonaceous Ecca Group shales (Fort Brown Formation) on the flank of a dolerite sill.
Tested flow rate of 1.84 million scf/day at 2072 psi, (2563m to 2612) but showed depletion.

Silver Wave Energy 275ER

Impact Africa (90%) Silver Wave Energy (10%) 276ER

BG International Impact Africa 252ER

Silver Wave Energy 277ER

TotalEnergies 231ER

TotalEnergies (48.61% Impact Africa (22.22%) Qatar Petroleum (29.17%) 335ER

TotalEnergies (40%) Shell (40%) PetroSA (20%) 224ER

TotalEnergies (50%) Sezigyn (20%) Qatar Petroleum (30%) 339ER

Ricocure (60%) Azinam (20%) Africa Oil (20%) 343ER

PetroSA 283ER

Engen 105 000 bbl/d

Sapref 165 000 bbl/d

Chevron 100 000 bbl/d

PetroSA synfuel refinery 36 000 bbl/d (Crude source/feed)

Coega Industrial Development Zone

SFF Bulk oil storage 42 million bbl

Steel mill

Coal export terminal

Cape Gas pipeline - Exports about 350 million scf/day

Oil pipeline

Free State gas field

Wits Basin
Resource type: Biogenic Gas
Main Operator: Tetra4 (Pty)Ltd
Current status: Gas Production drilling and market finalisation

Limit of Great Karoo Basin

Limit of SA exclusive economic zone 200 nautical miles (370km)

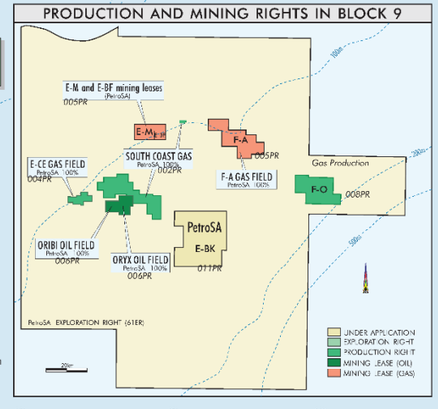
ONSHORE RIGHTS

REF NUM	TYPE	CLIENT NAME
12/2/202	TCP	Gondwana Petroleum
12/2/206	TCP	Imbokodo
12/2/207	TCP	Imbokodo
12/2/208	TCP	Bosi Brothers
12/2/218	TCP	Pasanc28
12/3/002/1B	ER	Anglo Operations
12/3/214	ER	Gold One Africa
12/3/262/1B	ER	Bosi Brothers
12/3/270	ER	Afro Energy (Pty) Ltd
12/3/272	ER	Afro Energy (Pty) Ltd
12/3/288	ER	Twala Mnyamanda
12/3/315/1A	ER	Motuoane Energy
12/4/007	PR	Tetra4 (Pty) Ltd

ONSHORE APPLICATIONS

REF NUM	TYPE	CLIENT NAME
12/2/209	TCP	Bulwark Oil and Gas
12/2/210	TCP	Bulwark Oil and Gas
12/2/211	TCP	Bulwark Oil and Gas
12/2/213	TCP	Bulwark Oil and Gas
12/2/214	TCP	Bulwark Oil and Gas
12/2/215	TCP	Bulwark Oil and Gas
12/2/217	TCP	Bulwark Oil and Gas
12/2/220	TCP	Rhino Oil and Gas
12/2/221	TCP	Rhino Oil and Gas
12/2/222	TCP	Tetra4 (Pty) Ltd
12/2/223	TCP	Tetra4 (Pty) Ltd
12/2/224	TCP	Tetra4 (Pty) Ltd
12/2/225	TCP	BlackGold
12/2/226	TCP	BlackGold
12/2/227	TCP	Rhino Oil and Gas
12/2/228	TCP	Bushe Kgalaka
12/2/231	TCP	Plateau Helium SA
12/2/232	TCP	Plateau Helium SA
12/3/009/C	ER	Organza Gas
12/3/031/A	ER	Tetra4 (Pty) Ltd
12/3/032/C	ER	Tetra4
12/3/068/A	ER	Badimo Gas
12/3/069/A	ER	Badimo Gas
12/3/094/C	ER	Tetra4 (Pty) Ltd
12/3/202	ER	Bundu Gas and Oil
12/3/208	ER	Falcon Oil and Gas
12/3/271	ER	Afro Energy (Pty) Ltd
12/3/294/A	ER	Rhino Oil
12/3/316	ER	Netwonns Energy
12/3/318/A	ER	Rhino Oil
12/3/320	ER	Afro Energy
12/3/341	ER	Netwonns Energy
12/3/350	ER	Rhino Oil
12/3/364	ER	Gondwana Energy
12/3/365	ER	Gondwana Energy
12/3/367	ER	Bastion
12/3/368	ER	Bastion
12/3/369	ER	Bastion

PRODUCTION AND MINING RIGHTS IN BLOCK 9



ONSHORE / OFFSHORE KEY
- PETROLEUM EXPLORATION WELL
- OIL SHOWS
- COAL FIRED POWER STATION
- GAS TURBINE POWER STATION
- POSSIBLE FUTURE GAS PIPELINE
- SEISMIC LINES
- KOEBERG NUCLEAR POWER PLANT
- COAL FIELD
- ONSHORE OPEN ACREAGE
- OFFSHORE OPEN ACREAGE
- AREAS UNDER APPLICATION
- TCP TECHNICAL COOPERATION PERMIT
- ER EXPLORATION RIGHT
- PR PRODUCTION RIGHT
- MINING LEASE (OIL) - Block 9
- MINING LEASE (GAS) - Block 9

200km
200 Isobaths in metres

Visit our website at www.petroleumagencysa.com for more information

This map does not constitute a final authority.
Requests for further details should be addressed to the Chief Executive, Petroleum Agency SA.

September 2022

Figure 35: Petroleum licence blocks off the west, south and east coasts of South Africa (After Pasa, 2019).

9.2.7.9 Undersea Cables

There are a number of submarine telecommunications cable systems across the Atlantic and the Indian Ocean as depicted in **Figure 36: African undersea cables**, including the WACS and ACE cables. The SAT3/SAFE cables (SAT-1 [abandoned], SAT-2 and SAT-3) are laid on the seafloor approximately on the 3 000m isobaths, running up the Cape Canyon to land at Melkbosstrand.

9.2.7.10 Diamond Prospecting and Mining

The concession areas lie adjacent to a number of marine diamond concession areas. The marine diamond concession areas are split into four or five zones (Surf zone and (a) to (c) or (d)-concessions), which together extend from the high-water mark out to approximately 500m depth.

9.2.7.11 Archaeological Sites

The majority of known wrecks along the West Coast are located in relatively shallow water close inshore (within the 100m isobath). According to the South African Heritage Resources Information System, there are at least 89 ship wrecks recorded between the Berg and Orange Rivers, many of which were vessels involved in coastal trade and fishing.

An Offshore Heritage and Paleontological Impact Assessment will be conducted to determine the impacts.

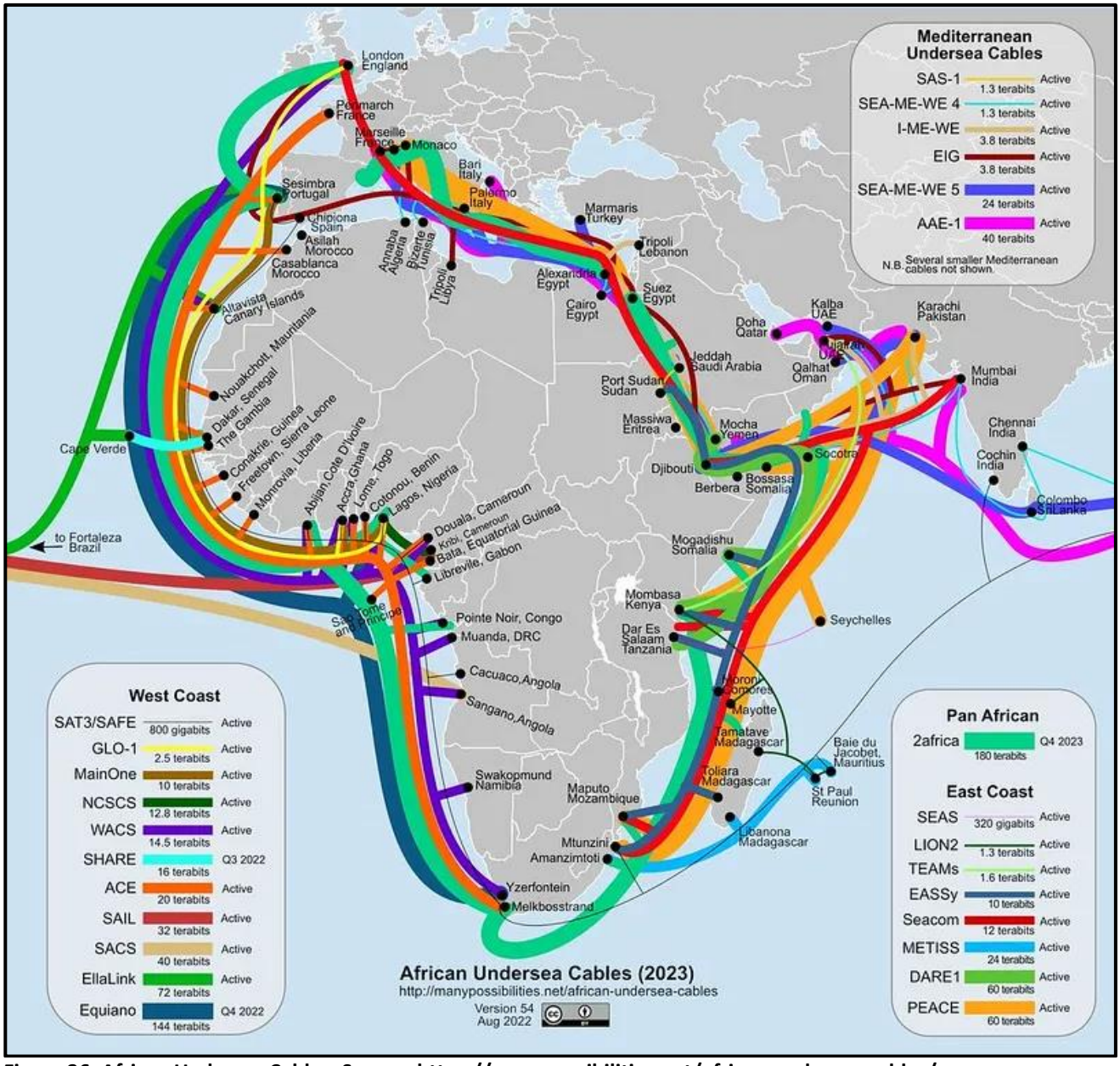


Figure 36: African Undersea Cables. Source: https://manypossibilities.net/african-undersea-cables/

9.2.8 Emissions

Air Quality

- Due to the onboard disposal of waste in some cases compliance with the requirements of Marpol Annex VI - Prevention of Air Pollution from Ships will be required for all vessel engines and where vessels are fitted with rubbish incinerators.

Noise and vibration

- The vessels will generate noise and vibration on the ocean.
- The prospecting activities will generate some noise.

Light Pollution

- The vessel will need to have lighting for security purposes.

9.3 Description of the current land uses

Data indicating the Land Cover 9-class (DEA, 2020) accessed through CapeFarmMapper indicates the area as a natural ocean or coastal area.

9.4 Description of specific environmental features and infrastructure on the site

Paragraphs in Section 9, provide a description of the environmental features of the biophysical and socio-economic characteristics of the prospecting right area.

9.5 Environmental and current land use map

Refer to Section 9.

10 IMPACTS IDENTIFIED

The potential risks arising from the prospecting operation discussed in Section 3 above are applicable to the proposed prospecting right application as listed below.

10.1 Potential Risks/Impacts

10.1.1 Potential risk of environmental impacts

The proposed prospecting operations could result in a number of impacts on marine fauna. Potential impacts include:

- Normal discharges to the marine environment from a variety of sources, including deck drainage, machinery space drainage, sewage and galley wastes from survey and support vessels;
- Potential impacts of multi-beam bathymetry and or sub-bottom profiler noise / pulses on marine fauna.
- Potential impacts could include physiological injury, behavioural avoidance of the survey area, masking of environmental sounds and communication, and indirect impacts due to effects on prey.
- Localised disturbance of marine fauna due to noise and lighting from the prospecting vessel(s), seabed crawler and support vessels;
- Physical damage to the seabed, alteration of sediment structure, alteration in benthic faunal community composition and potential reduction in benthic biodiversity due to drill and bulk sampling activities;
- Impacts on benthic fauna due to the discharge of processed sediments, including direct mortality, smothering of relatively immobile or sedentary species; and
- Accidental oil spills during normal operations (e.g., bunkering at sea). Oil spilled in the marine environment would have an immediate detrimental effect on water quality.
- Potential impacts on marine fauna will be addressed in the marine faunal assessment
- The marine faunal assessment has assessed the potential impacts relating to the proposed bulk prospecting activities on marine fauna (including cetaceans, seals, turtles, seabirds, fish, invertebrates and plankton species). The marine faunal assessment will be based on, inter alia, a review and collation of existing information and data from the international scientific literature, the Generic EMP prepared for marine diamond mining off the West Coast of South Africa and information sourced from the internet.

10.1.2 Potential risk associated with other marine prospecting, mining and exploration activities

The presence of the drill/bulk sampling vessel with the associated 500m safety zone could interfere with other prospecting, mining and exploration activities in the area.

The location of Sea Concession 12 in relation to existing exploration and marine mining and prospecting areas is presented in Section 9.2.7. This impact will be assessed using experience gained from the environmental assessment of similar operations elsewhere in the region and information from the Generic EMP prepared for marine diamond mining off the West Coast of South Africa.

10.1.3 Potential risk associated with marine transport routes

The presence of the drill/bulk sampling vessel with the associated 500m safety zone could interfere with shipping in the area.

The majority of shipping traffic is located on the outer edge of the continental shelf with traffic inshore of the continental shelf along the West Coast largely comprising fishing and prospecting / mining vessels, especially between Kleinzee and Oranjemund. The majority of the shipping traffic en route to and from Cape Town passes offshore of the project area.

This impact will be assessed using experience gained from the environmental assessment of similar operations elsewhere in the region and information from the Generic EMP prepared for marine diamond mining off the West Coast of South Africa. Additional input from a specialist is not deemed necessary. It may be necessary to discuss this issue with the South African Maritime Safety Authority (maritime co-ordination centre), as they monitor the movement of vessels around the South African coast.

10.1.4 Potential risks associated with shipwrecks

Drill and bulk sampling activities and the deposition of processed sediments could disturb cultural heritage material on the seabed, particularly historical shipwrecks.

The majority of known shipwrecks off the coast of South Africa occur in waters shallower than 100m within 50km of the coast. Thus, the likelihood of disturbing a shipwreck is expected to be very small considering the vast size of the South African offshore area. However, an Underwater Heritage Impact Assessment will be undertaken to confirm if there are any known shipwrecks in the area.

The terms of reference for the Underwater Heritage Impact Assessment are presented in Section 11.8.

10.1.5 Effect on socio-economic environment

- Disturbance of local communities in the West Coast fishing community caused by noise and vibrations and increase in vessels along fishing routes.
- An influx of people into the local communities looking for work, with an increase in demand for housing, schooling, and services. Such an influx of workers into a community often results in a change in social dynamics. Positive impacts include for example, the creation of both formal and informal businesses to supply additional needs, whilst negative social impacts include for example, an increase in substance abuse, HIV transmission and unwanted pregnancies.
- Staff losing their jobs at mine closure can have devastating effects on communities that are reliant on mine-based income. Job losses of secondary industries, businesses and contractors and contractual agreements with service providers surpassing mine closure date.
- Lack of compliance with the approved EMPr and a lack of auditing of the EMPr.
- Prospecting activities closure stalled due to non-compliance with relevant legislation (national, provincial, and local).
- Insufficient funds for complete rehabilitation.

10.1.6 Potential Risks associated with visual intrusion, noise, vibration, light pollution and air emissions

- Nuisance effects of air emissions due to a lack of implementation incinerator could impact on communities.
- The cumulative effect of a raise in the ambient noise levels or high noise levels in specific areas that exceed specified levels would impact on marine life in close proximity.
- Noise disturbance and light pollution would result from night-time activities (if applicable) in areas that are in close proximity to marine life.

10.1.7 Potential Risks associated with regard archaeological sites, cultural heritage sites or graves

- Disturbance of identified surface, or unknown sub-surface archaeological sites, if mitigation and monitoring is not implemented as per mitigating measures in a Heritage Impact Assessment (to be prepared in EIA Phase).

10.2 Potential Impacts and Risks associated with the Preferred Alternative

Refer to Section 7 above, which describes the location, type of activity, design or layout, technology and operational alternatives, and the preliminary result of having a preferred and only alternative, that of the Prospecting Right as per Figure 2. The potential impacts and risks associated with this preferred and only alternative are listed in Table 10 below.

Table 10: Preferred Alternative: Potential Impacts and Risks per Phase per Activity Prior to mitigation

Phase	**Activities**	**Potential Impacts & Risks**	**Significance (before mitigation)**	**Probability**	**Duration**	**Significance after mitigation**
Bulk sampling activities; and Geophysical sampling	Marine Ecology	Disturbance and/or impact on marine life as a result of normal discharges from survey and support vessels i.e., deck drainage, sewage and galley wastes.	To be determined			
		Accidental spillage of oils and other hazardous materials from the survey and support vessels disturbing and/or killing marine fauna.				
		Physical injury/mortality of marine life during as a result of survey and support vessel operation.				
		Potential impacts of multi-beam bathymetry and/or sub-bottom profiler pulses, noise and lightning resulting in marine fauna avoiding the area, masking environmental sounds/communication between animals. It may also lead to indirect impacts due to marine fauna being unaware of predators.				
		Physical damage to the seabed, sediment structure alteration, alteration/reduction in benthic faunal community composition as a result of bulk sampling activities.				
		Increased turbidity in the water during the re-deposition of tailings back to the seabed.				
	Fisheries	Disruption of fishing activities/loss of access to fishing areas/loss of catch	Low (-)	Possible	Medium-term	Low (-)
	Archaeology/Palaeontology	Areas of archaeological/paleontological importance may be disturbed, including shipwrecks.	To be determined			
	Marine Prospecting/Mining/Exploration	The presence of survey and support vessels may have an impact due to the legislative requirement of a 500 m safety zone around these vessels.	Low (-)	Possible	Medium-term	Low (-)
	Marine Transport Routes	The presence of survey and support vessels may have an impact due to the legislative requirement of a 500 m safety zone around these vessels.	Low (-)	Possible	Medium-term	Low (-)
	Socio-Economic	Creation of limited employment opportunities and limited revenues in local areas.	Low (+)	Possible	Medium-term	Low (+)

10.3 Potential Impacts and Risks associated with the No-Go Alternative

There would be no change to the biophysical environment with the No-Go Alternative. The No-Go Alternative implies that the Applicant would forgo an opportunity to provide employment opportunities in an area and sector identified for opportunities for job provision and economic growth, and for the sourcing of diamonds. This potential would not be reached with the "no-go" option.

10.4 Methodology used in determining significance of potential impacts

Refer to Table 11 below, which provides the impact assessment criteria applied in the rating of the impacts associated with each phase of the proposed prospecting activity for the Preferred and Only Alternative. Each impact is assessed in terms of: nature (character status); extent (spatial scale); duration (time scale); probability (likelihood) of occurring; reversibility of the impact; the degree to which the impact may cause irreplaceable loss of resources; the significance (size or magnitude scale) prior to mitigation; the degree to which the impact can be mitigated; and, the significance (size or magnitude scale) after mitigation.

Table 11: Impact Assessment Criteria (GBE Table)

Method and criteria for the rating of impacts

Impacts will be assessed in terms of the criteria presented in the table below:

CRITERIA	CATEGORY	DESCRIPTION
Extent or spatial influence of impact	Regional	West Coast District Municipality and Western Cape Offshore area
	Local	The area within 5km of the development
	Site specific	Immediate area of impact
Magnitude of impact (at the indicated spatial scale)	Fatally Flawed	Natural and/ or social functions and/ or processes are so severely altered that the application cannot be authorised
	High	Natural and/ or social functions and/ or processes are severely altered
	Medium	Natural and/ or social functions and/ or processes are notably altered
	Low	Natural and/ or social functions and/ or processes are slightly altered
	Very Low	Natural and/ or social functions and/ or processes are negligibly altered
	Zero	Natural and/ or social functions and/ or processes remain unaltered
Duration of impact	Construction period	Limited to the construction period
	Short term	Less than the duration of the activity
	Medium term	Impact persists until activity is completed
	Long term	Impact persists well beyond the completion of the activity
	Permanent	Impact is permanent
Probability	High	Likely
	Medium	Possible
	Low	Unlikely

Method for Rating of Impacts

The impacts are assessed (rated) in terms of their significance (high, medium, low), status, status type and confidence through a synthesis of the criteria given in the table above. The rating system is outlined in the table below.

Class	Description
Significance	▪ High: impacts of high magnitude locally for longer than 15 years and/or regionally and beyond. The impact results in major alterations to the environment even if effective mitigation measures are implemented and will have an influence on decision-making. ▪ Medium: impacts of moderate magnitude locally to regionally in the short term. The impact results in medium alterations to the environment and can be reduced or eliminated by the implementation of effective mitigation measures.

	▪ Low to very low: impacts will be localised and temporary. Impacts result in minor alterations to the environment and can easily be alleviated by the implementation of effective mitigation measures. ▪ No impact: a potential concern or impact, which, upon evaluation, is found to have no significant impact at all.
Status	
Confidence	The degree of confidence in predictions based on available information: ▪ Low ▪ Medium ▪ High
Reversibility	▪ the degree to which the impact can be reversed. ▪ the degree to which the impact may cause irreplaceable loss of resources. ▪ the degree to which the impact can be mitigated.

The positive and negative impacts that the proposed activity and alternatives will have

Positive impacts

- Creation of employment and job security with economic spin-offs.
- Investment into the local community.
- Provision of diamonds for local and international markets.

Negative impacts

The key potential negative impacts associated with the prospective activity include the following:

- Prospecting and processing activities:
  - Noise caused by the machinery and vessels on site.
  - Visibility of the prospecting operations.
  - Emissions from general prospecting activities (vessels using non-renewable fuel).
  - Disturbance of biodiversity from prospecting.
  - Contamination of habitat and marine area from hydrocarbon spills.
  - Contamination of ocean through unmanaged use of machinery.
  - Storage and use of hazardous chemicals in processing.
  - Disposal of sewage at sea. Effluent will be taken off site and disposed of at the municipal sewage works.
  - The specialist heritage and archaeological resources impact assessment will be prepared in the EIA Phase submitted to the South African Heritage Resources Agency (SAHRA) during the 30-day public participation comment period. Any additional recommendations and/or mitigation measures stipulated by SAHRA will be included in the Final EIA Report.

10.5 The possible mitigation measures that could be applied

Refer to Table 11 for the potential mitigation measures included under each impact. Detailed mitigation measures will be further developed as part of the Impact Assessment Phase.

10.6 The outcome of the Site Selection Matrix & Final Site Layout Plan

Refer to Figure 2, the prospecting areas, presented for comment as part of the Scoping Phase stakeholder engagement process.

10.7 Motivation where no alternative sites were considered

Alternatives have been considered for this project, as described in Section 6 above. Where alternatives are not likely to be considered in the Impact Assessment Phase (to be included in the DEIR), reasons have been provided in Section 6 above.

10.8 Statement Motivating the Preferred Sites

Refer to Section 7 above. The project site has been selected based on the results from bulk sampling and prospecting. The location and extent of the prospecting activities will be based on the information derived from the desktop and geophysical surveys as well as the specialist studies. Where practicable, the bulk sampling sites will be selected to avoid sensitive environments such as marine biodiversity of conservation importance and heritage features.

The Preferred Alternatives described above will be included in the impact assessment in the EIA phase, together with the mandatory “no-go” alternative that must be assessed for comparison purposes as the environmental baseline. The public participation process initiated in this scoping phase will serve to inform the selection of alternatives for detailed impact assessment in the EIA Phase.

11 PLAN OF STUDY OF ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

Refer to Section 6 and Section 10.8 above.

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

The aspects to be assessed are listed in Table 10.

11.3 Description of aspects to be assessed by specialists

A number of specialist studies will be undertaken in the Impact Assessment Phase to investigate the key potential direct, indirect and cumulative impacts (negative and positive) identified during Scoping. These specialist impact studies are as follows:

- Marine Ecology Impact Assessment.
- Offshore Palaeontological Impact Assessment & a Maritime Archaeology Impact Assessment.

The Terms of Reference (ToR) for each of the specialist studies is provided in Table 12. The ToR are subject to review on conclusion of the Scoping Study, taking into account issues raised by stakeholders and authorities through the Scoping Phase.

The specialist studies shall be based on the procedure outlined below:

11.3.1 Approach to the Study

Provide an outline of the approach used in the study. Assumptions, limitations and sources of information must be clearly identified. The knowledge of local people should, where possible, be incorporated in the study. The description of the approach shall include a short discussion of the appropriateness of the methods used in the specialist study. The assessment of the data shall, where possible, be based on accepted scientific techniques, failing which the specialist is to make judgments based on professional expertise and experience.

11.3.2 Description of the Affected Environment or Baseline

A description of the affected environment must be provided, both at a site-specific level and for the wider region, the latter to provide an appropriate context and cumulative impact analysis. The focus of this description shall be relevant to the specialists' field of expertise.

It is essential that the relative uniqueness or irreplaceability of the area be understood in the context of the surrounding region at a local, regional (and, if necessary, national) scale. This will largely be based on a comparison to existing data sources, where available.

The baseline should provide an indication of the sensitivity of the affected environment. Sensitivity, in this instance, refers to the ‘ability’ of an affected environment to tolerate disturbance (given existing and expected cumulative impacts).

Lastly, the baseline should provide a sufficiently comprehensive description of the existing environment in the study area to ensure that a detailed assessment of the potential impacts of the proposed development can be made. The baseline should include data collected through a thorough literature review as well as field surveys (where applicable).

11.3.3 Impact Identification and Assessment

Clear statements identifying the potential environmental impacts of the proposed project must be presented. This includes potential impacts of the upgrade and operation of the project. The specialist shall clearly identify the suite of potential direct, indirect and cumulative environmental impacts in the study. The assessment of these impacts should take into account any other existing proposals in the surrounding area.

Direct impacts require an assessment which must follow the impact assessment methodology laid out in Table 11. The significance of impacts must be assessed both without and with assumed effective mitigation. Indirect and cumulative impacts should be described qualitatively.

The specialist shall comparatively assess environmental impacts of the development (and each alternative if applicable), and shall indicate any fatal flaws, i.e., very significant adverse environmental impacts which cannot be mitigated and

which will jeopardise the project and/or activities in a particular area. All conclusions will need to be thoroughly backed up by scientific evidence.

11.3.4 Mitigation Measures

Specialists must recommend practicable mitigation measures or management actions that effectively minimise or eliminate negative impacts, enhance beneficial impacts, and assist project design. If appropriate, specialists must differentiate between essential mitigation and optimisation measures (i.e., implicit in the 'assuming mitigation' rating), and best practice measures (which reduce impacts, but do not affect the impact rating).

Specialists are also required to recommend appropriate monitoring and review programmes to track the efficacy of mitigation measures (if appropriate).

Specialists must indicate the environmental acceptability of the proposal (and alternatives if applicable), i.e., whether the impacts are acceptable or not. A comparison between the No-Go alternative and the proposed development alternative(s) must also be included.

Direct impacts require an assessment which must follow the impact assessment methodology laid out in Table 11. The significance of impacts must be assessed both without and with assumed effective mitigation. Indirect and cumulative impacts should be described qualitatively.

The specialist shall comparatively assess environmental impacts of the development (and each alternative if applicable), and shall indicate any fatal flaws, i.e., very significant adverse environmental impacts which cannot be mitigated and which will jeopardise the project and/or activities in a particular area. All conclusions will need to be thoroughly backed up by scientific evidence.

Table 12: Specialist Terms of Reference

Study	Terms of Reference for Specialist Studies
Offshore Palaeontological Impact Assessment & a Maritime Archaeology Impact Assessment	• Undertake a desktop study of the database of known and suspected wrecks in the area ascertained through the study of available written and oral resources; • Identify potential Maritime and Underwater Cultural Heritage (MUCH) sites within the designated area; and • • Recommend management measures for sites before and during development.
Marine ecology assessment	• Provide a general description of the local marine fauna (including cetaceans, seals, turtles, seabirds, fish, invertebrates and plankton species) within the Offshore concession areas and greater West Coast. The description to be based on, inter alia, a review of existing information and data from the international scientific literature, the Generic EMP prepared for marine diamond mining off the West Coast of South Africa and information sourced from the internet; • Identify, describe and assess the significance of potential impacts of the proposed operations on the local marine fauna, including but not limited to: – physiological injury; – physical damage to the seabed, alteration of sediment structure, alteration in benthic fauna community composition and potential reduction in benthic biodiversity due to prospecting activities; – impacts on benthic fauna due to the discharge of processed sediments, including direct mortality, smothering of relatively immobile or sedentary species and biochemical effects (e.g., direct toxicity and bioaccumulation); – behavioural avoidance of the prospecting area; – masking of environmental sounds and communication; and – indirect impacts due to effects on prey.

	• Identify practicable mitigation measures to avoid/reduce any negative impacts and indicate how these could be implemented in the start-up and management of the proposed project.

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

The impact assessment methodology that will be use in the EIA Phase is described in Section 10.4 above and is included in Table 11.

11.5 The proposed method of assessing duration and significance

Refer to Section 10.4 above and is included in Table 11.

11.6 The stages at which the competent authority will be consulted

The competent authority (Department of Mineral Resources & Energy) will be consulted in each phase of the EIA process. This includes:

- Pre-application;
- Scoping Phase; and
- Impact Assessment Phase.

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

11.7.1 Steps to be taken to notify interested and affected parties

The stakeholder engagement process initiated during the Scoping Phase (see Section 7) will continue in the Impact Assessment Phase of the EIA.

The key activities planned during the Impact Assessment Phase are outlined in Table 10 below.

Table 13: I&AP engagement activities planned during the Impact Assessment Phase

Task	Objectives	Timeframe
Update I&AP database	To register additional, I&APs throughout the Scoping & EIA Report (S&EIR) process	Throughout S&EIR process
Compile and release EIA Report for public comment	To assess the impacts of the project and formulate mitigation measures and management plans	Impact Assessment Phase
Public comment period	To provide I&APs with the opportunity to review and comment on the results of the Impact Assessment Phase	Impact Assessment Phase
Finalise EIA Report	To present the findings of the EIA process and incorporate I&AP comment in the final report which provides DMR with information for decision-making	Impact Assessment Phase

11.7.2 Details of the engagement process to be followed

Refer to Table 13 above.

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

Refer to Table 13 above.

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

The Impact Assessment Phase can be divided into key steps and outlined further below:

- Consultation with relevant authorities;
- Detailed specialist studies;
- Completion of the EIA Report and an EMPr, including a Closure, Decommissioning and Rehabilitation Plan;

- Stakeholder engagement; and,
- Submission of the Final EIA Report, EMPr and Closure, Decommissioning and Rehabilitation Plan to the competent authority, DMR.

11.8.1 Consultation with the Relevant Authorities

Consultation will be conducted with DMR and other relevant authorities to clarify their requirements for the Impact Assessment Phase of the proposed development, other permit, and license applications for the project and to ensure that comments from the key authorities can be received in time to allow for them to be addressed in the EIA. The authorities that will be consulted include:

- DMR
- DAFF: Marine Resources Management: Offshore and High Seas Fisheries
- Department of Environmental Affairs and Development Planning (DEADP)
- Department of Forestry, Fisheries and the Environment (DFFE): Oceans & Coast
- Department of Forestry, Fisheries and the Environment (DFFE)_National
- Department of Public Works Western Cape
- Department of Rural Development and Land Reform
- Western Cape Heritage Resources Agency
- South Africa Navy Hydrographic Office
- South African Heritage Resources Information System (SAHRIS)_National
- South African Maritime Safety Authority (SAMSA)
- South African National Biodiversity Institute (SANBI)
- Transnet National Ports Authority
- CapeNature

11.8.2 Specialist Studies

Detailed specialist assessments will be undertaken to investigate in detail any key potential environmental issues and impacts initially identified during Scoping that require further detailed investigation and following comment from the DMR. Refer to Section 11.3 above.

11.8.3 Compilation of the Environmental Impact Assessment Report

The compilation of the EIA Report and EMPr will include the following tasks:

- Assimilation of any detailed specialist studies / input into the EIA Report and EMPr;
- Identification and assessment of environmental impacts based on the results of any specialist studies / input and professional judgment of the EIA team. This will entail an assessment of the duration, extent, probability, and intensity of the impacts to determine their significance; Identification of mitigation measures and recommendations for the management of the proposed project to avoid and minimise environmental impacts and maximise benefits; and,
- Collation of the above information into an EIA Report and EMPr for the design, construction, and operational phases of the project.
- Preparation of a Closure, Decommissioning and Rehabilitation Plan.

11.8.4 Stakeholder Engagement

The key stakeholder engagement activities planned during the Impact Assessment Phase are outlined in Table 10 above.

11.8.5 Submission of the Final EIA Report and EMPr to DMR

All comments received will be incorporated into the Issues and Responses Summary. The Final EIA Report, including the EMPr and Closure, Decommissioning and Rehabilitation Plan, will then be submitted to DMR to inform their decision regarding environmental authorisation of the proposed development.

12 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 impacts and mitigation measures associated with the preferred alternative (as described in Section 10.1 above) included in Table 14 below are preliminary and will be re-visited in the EIA Phase, following public consultation and specialist assessments. In addition, mitigation measures will be included in the EMPr, a component of the Draft EIR.

Table 14: Potential Residual Risk Pre- & Post-Mitigation for the Preferred Alternative

Phase/Activity	Aspect	Potential Impacts & Risks	Significance (before mitigation)	Probability	Duration	Significance after mitigation	High Level Mitigation
Bulk sampling activities; and Geophysical sampling	Marine Ecology	Disturbance and/or impact on marine life as a result of normal discharges from survey and support vessels i.e., deck drainage, sewage and galley wastes.	To be determined				Compliance with the EMP and Marpol 73/78 standards. Inform all staff about sensitive marine species and the responsible disposal of wastes. Suitable waste handling and disposal protocols must be clearly explained and sign boarded.
		Accidental spillage of oils and other hazardous materials from the survey and support vessels disturbing and/or killing marine fauna.					Compliance with the EMP and Marpol 73/78 standards. Inform all staff about sensitive marine species and the responsible disposal of wastes. Compile Emergency Response Plan.
		Physical injury/mortality of marine life during as a result of survey and support vessel operation.					Constrain the spatial extent of impacts to the minimum required to minimise disturbance within the seabed. Limit duration of dredging activities. Inform all staff about sensitive marine species and the responsible disposal of wastes.
		Potential impacts of multi-beam bathymetry and/or sub-bottom profiler pulses, noise and lightning resulting in marine fauna avoiding the area, masking environmental sounds/communication between animals. It may also lead to					Constrain the spatial extent of impacts to the minimum required to minimise disturbance within the seabed. Limit duration of dredging activities.

		indirect impacts due to marine fauna being unaware of predators.					Inform all staff about sensitive marine species and the responsible disposal of wastes.
		Physical damage to the seabed, sediment structure alteration, alteration/reduction in benthic faunal community composition as a result of bulk sampling activities.					Constrain the spatial extent of impacts to the minimum required to minimise disturbance within the seabed. Limit duration of dredging activities. Preference should be given to dynamically positioned sampling vessels versus vessels requiring anchorage. Inform all staff about sensitive marine species and the responsible disposal of wastes.
		Increased turbidity in the water during the re-deposition of tailings back to the seabed.					Tailings and fine sediments to be replaced back to the seabed as soon as possible.
	Fisheries	Disruption of fishing activities/loss of access to fishing areas/loss of catch	Low (-)	Possible	Medium-term	Low (-)	Establish a communication and notification procedure
	Archaeology/Palaeontology	Areas of archaeological/paleontological importance may be disturbed, including shipwrecks.	To be determined				Exclude areas where shipwreck sites have been identified from bulk sampling programmes.
	Marine Prospecting/Mining/Exploration	The presence of survey and support vessels may have an impact due to the legislative requirement of a 500 m safety zone around these vessels.	Low (-)	Possible	Medium-term	Low (-)	Establish a communication and notification procedure
	Marine Transport Routes	The presence of survey and support vessels may have an impact due to the legislative requirement of a 500 m safety zone around these vessels.	Low (-)	Possible	Medium-term	Low (-)	Establish a communication and notification procedure.
	Socio-Economic	Creation of limited employment opportunities and limited revenues in local areas.	Low (+)	Possible	Medium-term	Low (+)	Where possible employ people from the local communities.

13 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

13.1 Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998)

The EIA report must include the: -

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

Potential socio-economic impacts will be addressed during the EIA process due to the nature of the process involved. High level socio-economic impacts and mitigation measures are included in Table 14.

A full consultation process is being implemented during the environmental authorisation process. The purpose of the consultation is to provide affected and interested persons with the opportunity to raise any potential concerns. Concerns raised will be captured and addressed within the public participation section of this report (attached as **Appendix B, page 82**) to inform the decision-making process.

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

An Offshore Palaeontological Impact Assessment & a Maritime Archaeology Impact Assessment will be prepared in the EIA Phase and submitted to the South African Heritage Resources Agency (SAHRA) during the 30-day public participation comment period.

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

Section 2 of NEMA sets out a number of principles (see section 5.9 above) that are relevant to the:

- EIA process, such as:
  - Adopt a risk-averse and cautious approach;
  - Anticipate and prevent or minimise negative impacts;
  - Pursue integrated environmental management;
  - Involve stakeholders in the process; and
  - Consider the social, economic, and environmental impacts of activities; and
- Project such as:
  - Place people and their needs at the forefront of concern and serve their needs equitably;
  - Ensure development is sustainable, minimises disturbance of ecosystems and landscapes, pollution, and waste, achieves responsible use of non-renewable resources and sustainable exploitation of renewable resources;
  - Assume responsibility for project impacts throughout its life cycle; and
  - Polluter bears remediation costs.

This EIA process complies with the principles set out in section 2 of NEMA through its adherence to the EIA Regulations, 2014, and associated guidelines, which set out clear requirements for, inter alia, impact assessment and stakeholder involvement, and through the assessment of impacts and identification of mitigation measures during the Impact Assessment Phase.

- The Preferred Alternative and No-Go Alternative will be considered in the Impact Assessment Phase (see Section 6).
- The potential social and environmental impacts of the project will be identified, assessed, and evaluated using the impact assessment methodology (Section 9.4) to understand the significance of each positive and negative impact.
- An EMPr will be compiled to ensure that potential environmental impacts are prevented or minimised.
- Mitigation measures will be recommended in the Impact Assessment Phase to allow for unavoidable impacts on the environment and people's environmental rights to be minimized and remedied.
- Opportunities for public participation are allowed for in the EIA process.
- The needs and interests of I&APs will be taken into account.
- All relevant information will be made available for public comment before submission to DMR, as part of the public participation process.
- Comments made by the relevant government departments will inform the decisions taken by DMR regarding Environmental Authorisation of the project.

14 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I, **Helene Botha,** 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 have been correctly recorded in the report.

Signed: H.E. Botha

Date: 13 September 2022

15 UNDERTAKING REGARDING LEVEL OF AGREEMENT

I, **Helene Botha,** 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.

Signed: H.E. Botha

Date: 13 September 2022

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