TRANS ATLANTIC DIAMONDS

DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED PROSPECTING IN SEA CONCESSION AREA 7C BY TRANS ATLANTIC DIAMONDS (PTY) LTD

NC 30/5/1/1/2/13061 PR

September 2022

PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

ANCHOR environmental

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September 2022

Report prepared for:

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TRANS ATLANTIC DIAMONDS

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Citation: Swart C, Ndou J, Dalasile S, Hutchings K and Clark BM. 2022. *Final Basic Assessment Report for the proposed prospecting in Sea Concession Area 7C by Trans Atlantic Diamonds (Pty) Ltd (DMRE Reference number: NC 30/5/1/2/2/13061PR). Anchor* Report no. 2038/1. Prepared by Anchor Environmental (Pty) Ltd for Trans Atlantic Diamonds (Pty) Ltd. 232 pp.

TABLE OF CONTENTS

GLOSSARY

Alien species	Species whose presence in a region is attributable to human actions that enabled them to overcome fundamental biogeographical barriers (i.e., human-mediated extra-range dispersal) (synonyms: Introduced, non-indigenous, non-native, exotic).
Amphipod/a	Crustaceans with no carapace and a laterally compressed body
Anthropogenic	Environmental pollution originating from human activity
Aquaculture	The sea-based or land-based rearing of aquatic animals or the cultivation of aquatic plants for food
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.
Bathymetry	The measurement of depth of water in oceans or seas.
Benthic/benthos	Pertaining to the environment inhabited by organisms living on or in the ocean bottom. The ecological region at the lowest level of a body of water such as an ocean, lake, or stream, including the sediment surface and some sub-surface layers
Biodiversity	The variability among living organisms from all terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.
Biomass	The mass of living biological organisms in a given area or ecosystem.
Biota	Living organisms within a habitat or region
Community	In ecology, a community is a group or association of populations of two or more different species occupying the same geographical area and in a particular time.
Community composition	The number of species in that community and their relative numbers.
Community structure	Taxonomic and quantitative attributes of a community of plants and animals inhabiting a particular habitat, including species richness and relative abundance structurally and functionally.
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.
Ecological function	The potential of an ecosystem to deliver a service that is itself dependent on ecological processes and structures.
Ecology	The relations of organisms to one another and to their physical surroundings.
Environment	The external circumstances, conditions and objects that affect the existence of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Fauna	General term for all the animals found in a particular location.
Faunal community	A naturally occurring group of native animals that interact in a unique habitat.
Filter-feeders	Animals that feed by straining suspended matter and food particles from water.
Flora	General term for all the plant life found in a particular location.
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.
Indigenous	Species within the limits of their native range (Synonyms: native).
Intertidal	The shore area between the high- and the low-tide levels.
Invasive	Alien species that have self-replacing populations over several generations and that have spread from their point of introduction.

Invertebrate	Animals that do not have a backbone. Invertebrates either have an exoskeleton (e.g., crabs) or no skeleton at all (worms).
Kelp	A member of the order Laminariales, the more massive brown algae.
Macrofauna	An aquatic plant large enough to be seen by the naked eye. Usually larger than 0.5 mm.
Megafauna	Large marine species such as sharks, rays, marine mammals and turtles. These animals are key components of marine ecosystems but, as they are long-lived and have low reproductive rates, their populations are usually the first to be reduced by human pressures.
Mitigation measures	Design or management measures that are intended to minimise or enhance an impact, depending on the desired effect. These measures are ideally incorporated into a design at an early stage.
Native	Species within the limits of their native range (Synonyms: indigenous).
Operational phase	The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.
Paleo-channel	Old or ancient river channels often infilled with course fluvial deposits which can store and transmit appreciable quantities of water.
Physico-chemical	Dependent on the joint action of both physical and chemical processes.
Phytoplankton	Ocean dwelling microalgae that contain chlorophyll and require sunlight in order to live and grow.
Plankton	Organisms drifting in oceans, seas, and bodies of fresh water. The word zooplankton is derived from the Greek zoon, meaning "animal", and planktos, meaning "wanderer" or "drifter". Typically comprised of phytoplankton and zooplankton, as well as the eggs, larvae and juveniles of larger animals.
Polychaete/a	Also known as the bristle worms. A paraphyletic class of annelid worms, generally marine. Each body segment has a pair of fleshy protrusions called parapodia that bear many bristles, called chaetae, which are made of chitin.
Rocky shore community	A group of interdependent organisms inhabiting the same rocky shore region and interacting with each other.
Scavenger	An animal that eats already dead or decaying animals.
Specialist study	A study into a particular aspect of the environment, undertaken by an expert in that discipline.
Species	A category of biological classification ranking immediately below the genus, grouping related organisms. A species is identified by a two-part name; the name of the genus followed by a Latin or Latinised un-capitalised noun.
Species diversity	The number of different species and relative abundance of each of those species present in an ecosystem.
Species richness	The number of different species represented in an ecological community. It is simply a count of species and does not take into account the abundance of species.

LIST OF ABBREVIATIONS

Anchor/ AEC	Anchor Environmental Consultants (Pty) Ltd.
BAR	Basic Assessment Report
B-BBEE	Broad Based Black Economic Empowerment
BCLME	Benguela Current Large Marine Ecosystem Programme
BCS	Benguela Current System
CA	Competent Authority
CBA	Critical Biodiversity Area
CBD	Convention on Biological Diversity
CPUE	Catch Per Unit Effort
CSR	Corporate Social Responsibility
DEADP	Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry, Fisheries and The Environment (Formerly DEFF and DAFF)
DIN	Dissolved Inorganic Nitrogen
DMRE	Department of Mineral Resources and Energy
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EBSA	Ecologically or Biologically Significant Marine Areas
ECO	Environmental Control Officer
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
EPWP	Expanded Public Works Programme
FLO	Fisheries Liaison Officer
GDP	Gross Domestic Performance
GDPR	Gross Domestic Product
GVA	Gross Value Added
IAPs	Interested and Affected Parties
IBA	Important Bird and Biodiversity Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IUCN	International Union for Conservation of Nature
LMP	Line Fish Management Protocol
M&EP	Monitoring and Evaluation Plan
MARPOL	The International Convention for the Prevention of Pollution from Ships
MBES	Multi Beam Echo Sounder
MM	Matzikama Municipality
MMI	Marine Mammal Institute
MMO	Marine Mammal Observer

MMSO	Marine Mammal and Seabird Observer
MPA	Marine Protected Area
MSL	Mean Sea Level
MUCH	Maritime and Underwater Cultural Heritage
NBA	National Biodiversity Assessment
NCSDF	Northern Cape Spatial Development Framework
NDM	Namakwa District Municipality
NDP	National Development Plan
NEMA	National Environmental Management Act No. 107 Of 1998, as Amended
NH_3-N	Ammonia
OMP	Operational Management Plan
PAM	Passive Acoustic Monitoring
PNE	Protected Natural Environment
PSDF	Provincial Spatial Development Framework
PSU	Practical Salinity Unit
PTS	Permanent Threshold Shift
REEs	Rare Earth Elements
ROV	Remotely Operated Vehicle
RQO	Resource Quality Objectives
RRZ	Rural Restructuring Zones
SADCO	Southern African Data Centre for Oceanography
SAHRA	South African Heritage Resource Agency
SAMLMA	South African Marine Linefish Management Association
SAMSA	South African Maritime Safety Authority
SANBI	South African National Biodiversity Institute
SAPFIA	South African Pelagic Fishing Industry Association
SBP	Sub-Bottom Profiler
SMMEs	Small, Medium and Micro Enterprises
SOPEP	Shipboard Oil Pollution Emergency Plan
TAC	Total Allowable Catch
TAD	Trans Atlantic Diamonds (Pty) Ltd
TAE	Total Allowable Effort
TLP	Tuna Pole and Line
TSS	Total Suspended Solids
TTS	Temporary Threshold Shift
VHF	Very High Frequency

1 ABSTRACT

1.1 Project background

Prospecting is one of the first in many steps of the mining process and can extend over a period of one to five years. It is the search for commodities such as gemstones, minerals, metals, in an area by means of drilling and excavation to determine if mining in that area is economically feasible. Prospecting is also used as an opportunity to collect baseline environmental and biological information, such as the species present in an area, to enable the monitoring of the potential impacts of future mining on the environment. Prospecting does not necessarily guarantee that a mining right will be granted or that an area will be mined.

Mining-related activities are deemed to be a key component of the current national and provincial economies and future mining projects are a means to assist government, both locally and internationally, in meeting broader societal needs. With the global population increasing by approximately 83 million people per year, there has been an increased need for goods and services such as food products, houses, transport, healthcare, schools, and the materials needed to manufacture the products needed to supply these needs. Minerals and metals are used not only in the manufacturing of jewellery, but also in the manufacturing of a broad range of products to fulfil numerous societal needs. Examples of uses include being used as catalytic converters, in modern medicine (x-ray machines, rheumatoid arthritis, pacemakers, dental implants, prosthesis), in information technology (cell phones, laptops, computers), to make glass, fuel, paints and concrete and to make high-strength metal alloys, which are again used to manufacture tools, ships, vehicles, aircrafts, bridges, buildings and electric motors, to name but a few.

South Africa possesses some of the world's richest resources, minerals and several other commodities which has the potential to supply the international markets. For the past 80 million years, sediment has been transported from the continental interior to the Atlantic Ocean via the Orange and Olifants River (Gurney *et al.* 1991). The first discovery of diamonds in marine deposits was in 1908 on the Namibian coastline near Lüderitz (Levinson 1983; Penney *et al.* 2007). Hereafter, vast diamond deposits have been discovered along the west coast of southern Africa; extending from Hottentot Bay (Namibia) in the north, southwards to the Olifants River in South Africa (Gurney *et al.* 1991; Penney *et al.* 2007).

Diamond-mining concession areas in South Africa are grouped into three categories: Land, Surf-Zone and Marine (offshore) Concession Areas (Figure 1.1; Clark *et al.* 1999; Penney *et al.* 2007). The Land and Surf-Zone concessions areas are considered as "onshore mining" operations with mines located between the Orange River mouth and slightly south of the Olifants River in South Africa.

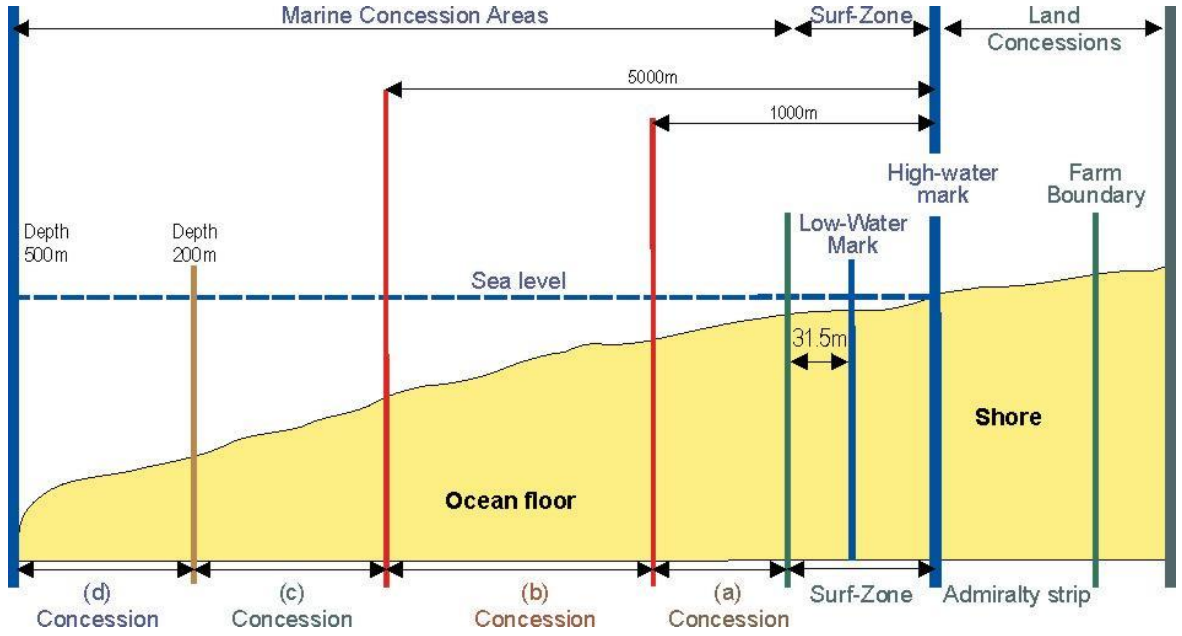

Figure 1.1 **Diagram of the onshore and offshore boundaries of the South African marine diamond mining concession areas (from Penney et al. 2007).**

Marine Concession Areas are those allocated offshore and extend southwards from the border of Namibia to an area just south of Saldanha Bay (Clark et al. 1999; Figure 1.2). These concession areas are further divided into four sub-areas (Figure 1.1): the A concession extends 31.5 m west of the low-water mark to 1 000 m west of the high water mark, the B concession extends from this boundary to 5 000 m west of the high water mark offshore from the western boundary of A, the C concession extends westward of this point to the 200 m isobaths, and the D concession extends offshore to the 500 m isobath.

Trans Atlantic Diamonds (Pty) Ltd (The Applicant) have applied for the right to prospect for precious metals (gold, silver and platinum), gemstones (alluvial diamonds, sapphires and garnets), ferrous and base metals such as rare earths (monazite mineral), black sand minerals (titanium minerals e.g. ilmenite and rutile), zirconium ore (zircon) and iron ore (magnetite), in Sea Concession Area 7C.

Concession Area 7C is 200 246 ha in extent and is situated approximately 5 km offshore of the Kamiesberg local Municipality (KLM) within the greater Namakwa District Municipality (NDM) in the Northern Cape (Figure 1.3). It lies adjacent the coastal town Hondeklipbaai, with Koingnaas located approximately 10 km east and inland of the concession area. The northern boundary extends from approximately 17 km north of Hondeklipbaai and the southern boundary approximately 12 km south of this town. The inshore boundary (closest to the shore) of this concession area starts in the ocean approximately 5 km (2.7 nautical miles) west of the high-water mark at a water depth of 70 m (70 m isobath). The concession area then extends between 65 km and 100 km (at its longest part) westwards from this point to 200 m water depth (200 m isobath). The Namaqua National Park lies approximately 16 km east and inland from this concession.

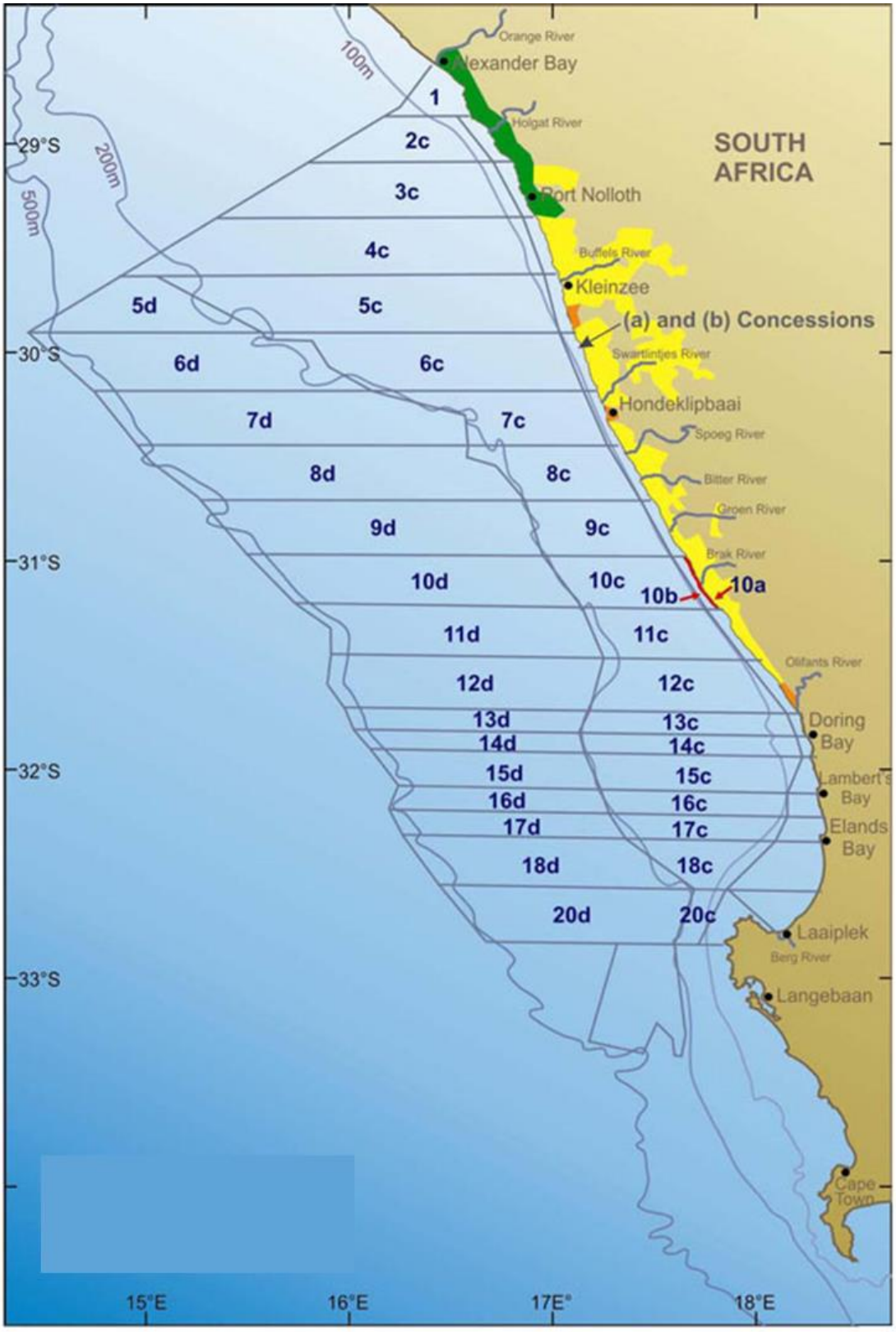

Figure 1.2. **The offshore diamond mining lease areas in South African waters. The coastal shelf waters have been divided into 20 contiguous, parallel strips which have been further subdivided into the onshore and offshore concession areas (A, B, C, D)**

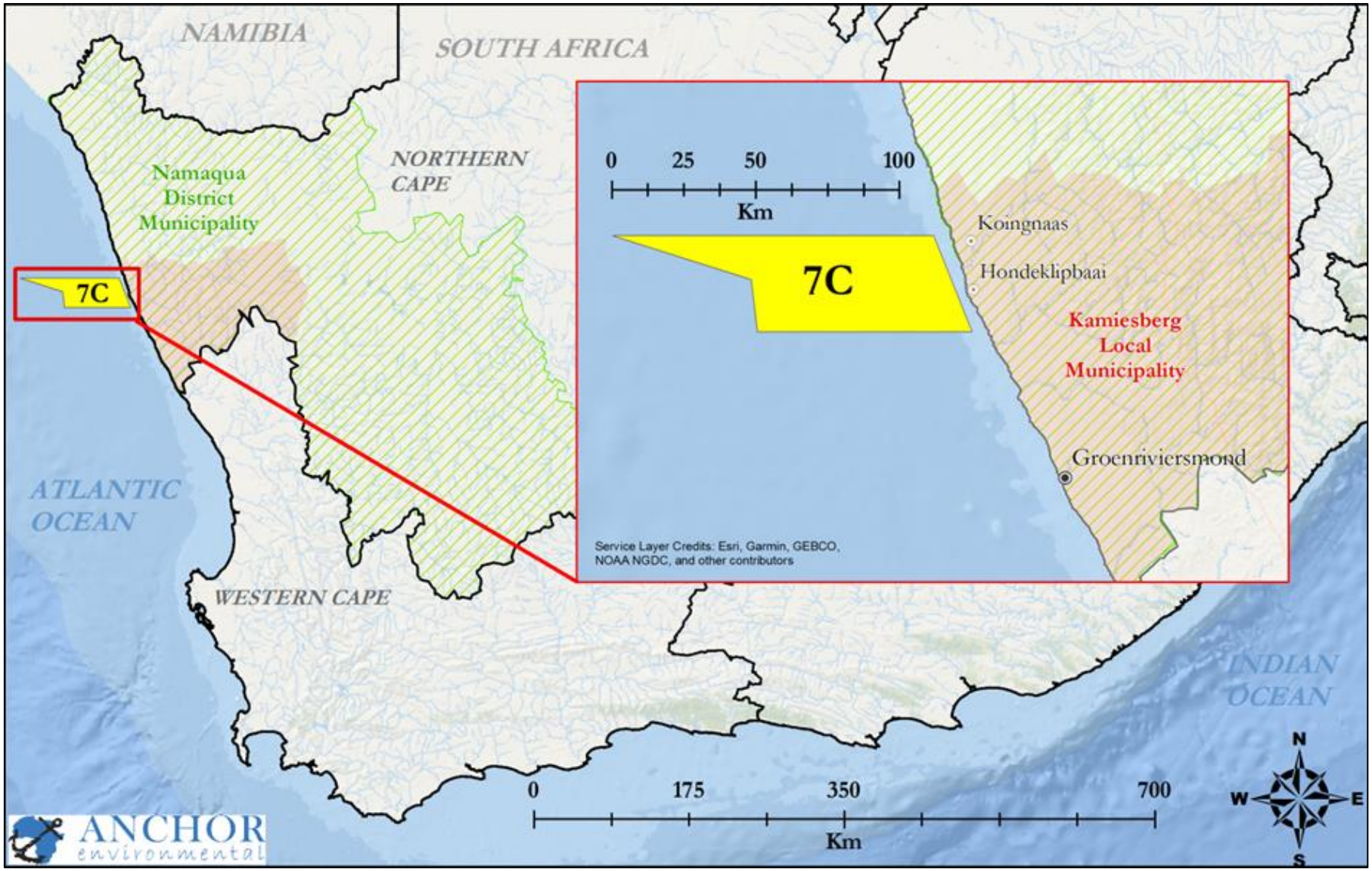

Figure 1.3. The location of Concession Area 7C along the West Coast of South Africa.

This application was submitted in terms of the Mineral and Petroleum Resources Development Act (28 of 2002), the National Environmental Management Act (107 of 1998) and the Environmental Impact Assessment Regulations, 2014 (as amended). In addition to prospecting rights, the Applicant is also required to apply for Environmental Authorisation (EA) from the competent authority, which in this case is the Department of Mineral Resources and Energy (DMRE), prior to the commencement of prospecting activities. The application process requires that a Basic Assessment (BA) of the potential impacts of the proposed activity be conducted. All findings are incorporated into the Draft Basic Assessment Report (BAR) and circulated, along with the Environmental Management Programme (EMPr), to the DMRE and the public for a 30-day commenting period. This commenting period is known as the 30-Day Public Participation Process. A Public Participation Meeting is also be held as part of the Public Participation Period to present the public with the findings and to record their recommendations, concerns and questions.

Hereafter, all specialist findings and public comment are incorporated into the Final BAR. The Final BAR along with the EMPr is then made available to the DMRE for a 107-days to review and make the final decision in terms of granting or rejecting the prospecting rights. It is also made available to the public for information purposes only. If the prospecting right are approved, it will allow TAD to determine if mining within Concession Area 7C is economically viable. It is understood that the Prospecting Rights will not provide the required environmental authorisation for mining activities to be undertaken. As such, any future intention to undertake mining within the application area would require a further application, investigation, and public consultation process.

An independent Environmental Assessment Practitioner (EAP) from Anchor Environmental Consultants (Pty) Ltd was appointed by the Applicant to submit the applications and to carry out a Basic Assessment and Public Participation process for prospecting rights application for Concession Area 7C.

1.2 Description of the proposed activity

The proposed prospecting programme is anticipated to be completed within five years. Sampling will be conducted in four phases and includes a combination of non-invasive (acoustic survey, data acquisition and analysis) and invasive activities (Van Veen grab, core and drill samples). No infrastructure will be placed on shore or in the sea. The vessel will be operating out of the Port of Cape Town or possibly Saldanha Bay and will not dock in or near Hondeklipbaai or other nearby towns. No access from land is required, neither will vessel crew be able to come ashore adjacent to the concession area.

A brief description of the proposed project plan follows below (see Figure 1.4):

1. **Geophysical/ Acoustic Survey:** Ship mounted acoustic equipment is used to send out sound towards the seabed. The sound energy is reflected from the seabed and travels back to the receiver. The received signals are used to create an image or map of the seafloor. This allows the identification of important rock types and areas where prospecting should occur and

sensitive areas such as reefs which need to be avoided. This equipment works in a similar manner to fish finders used by fisherman.

2. **Van Veen Grab sampling:** A Van Veen grab (clamshell bucket) collects sediment samples that are analysed to identify benthic macrofauna (small animals such as worms, mussels, and crustaceans) and sediment types (Figure 1.4). Sampling will be done at 20–50 sites, disturb a total surface area of 5 square meters (m^2) and a total volume of 1.5 cubic meters (m^3). Results from this survey will be used to describe and monitor the baseline sediment characteristics and invertebrate macrofaunal communities in the area and can be used as reference data to monitor potential impacts should the project proceed to the production phase (mining).
3. **Core sampling:** 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) (Figure 1.4). This information is then used to engineer the drilling tool. This 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 1.57 m^2, and collect a total volume of 4.71 m^3.
4. **Drilling:** Target areas will be sampled using a drill with a surface area of 5m^2 (Figure 1.4). Drilling will be done in three steps: (1) An initial 150 samples will be collected and analysed. (2) An additional 150 samples will be collected during follow-up sampling. Should these follow-up samples indicate that there could be a potential resource, only then will step 3 (resource development phase) commence. (3) An additional 60 samples will be collected in a resource area of 500 m x 300 m. Approximately 20 resource development areas will be required. This equates to 1 200 samples. In total, 1 500 samples will be collected and will cover a surface area of 7500m^2.

The total surface area that will be disturbed during Phases 1, 2, and 3 is estimated at 7 507 m^2 or 0.75 ha. This equates to 0.0068% of the total area of Concession Area 7C that will be disturbed. The information acquired will be used for understanding the seafloor topography, resource evaluation and to determine if diamond or other mineral mining within Concession Area 7C is economically viable. Information will also be used to inform the construction of the mining vessel and to identify areas for mining.

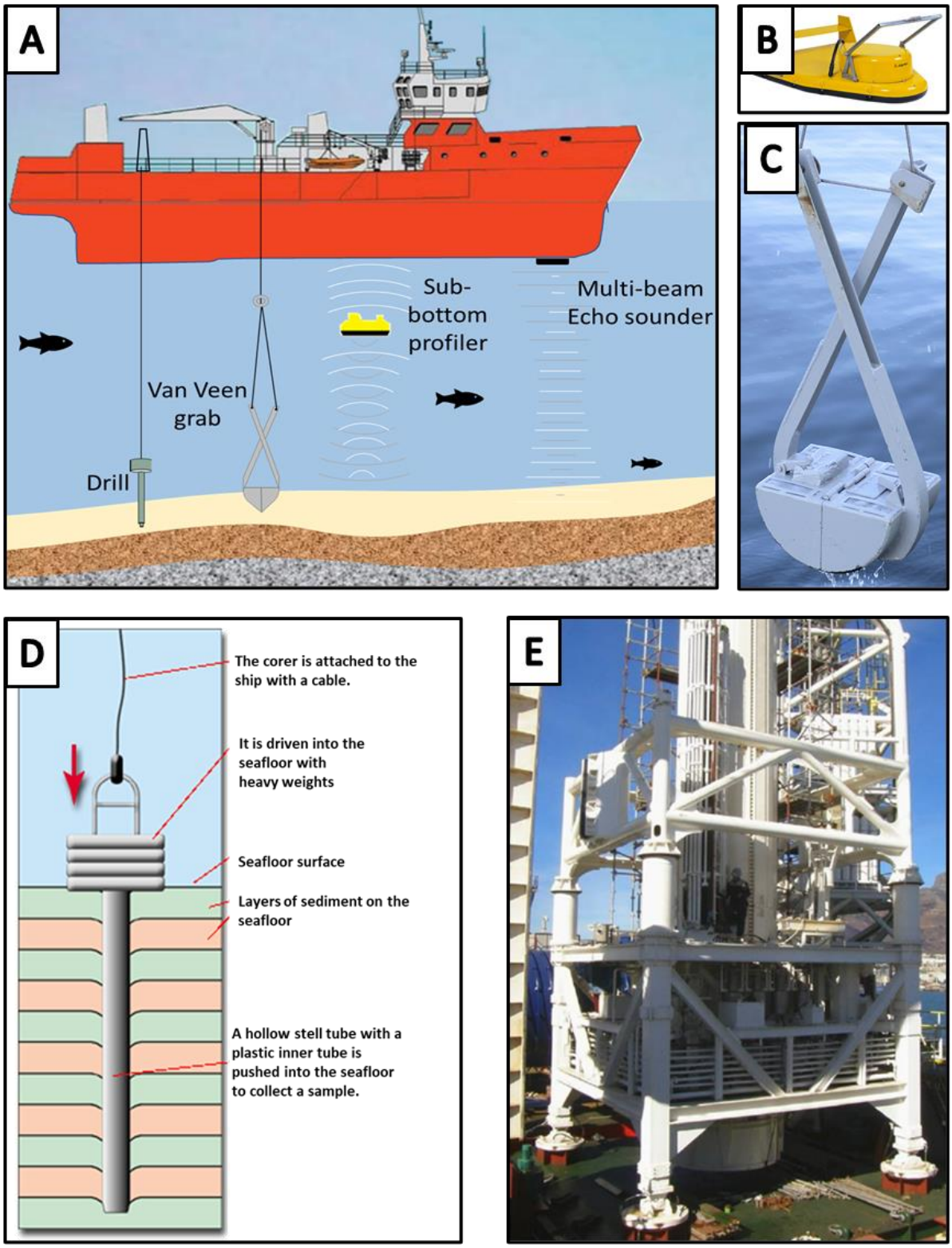

Figure 1.4. **The various sampling methods that will be used (a), including (B) acoustic equipment, (C) a Van Veen grab, (D) corers and (E) a drill.**

1.3 Impacts and risks identified

1.3.1 Summary of the key findings of the environmental impact assessment

The potential positive and negative impacts associated with prospecting in Concession Area 7C were grouped and assessed based on the following major receptors: (1) Marine ecology and fisheries, (2) Heritage resources, (3) Socio-economic aspects, (4) Noise, (5) Safety surrounding the material prospected (radioactivity), (6) Shipping traffic, (7) Visual integrity, and (8) Science and Research. Cumulative impacts and the no-go option were also considered.

The study assessed 30 potential impacts associated with prospecting in Concession Area 7C. Five of these were "SCOPED OUT" of the assessment due to being unlikely to occur. In total, 23 potential negative impacts ranging from MEDIUM to INSIGNIFICANT and two potential positive impacts of LOW and INSIGNIFICANT, were identified. With the implementation of effective mitigation measures, the negative impacts can all be reduced to LOW, VERY LOW, or INSIGNIFICANT.

The negative impacts are associated with the disturbance of fauna (invertebrates, fish, mammals, seabirds and turtles), submerged prehistoric resources, shipping activities, fishing activities, tourism, livelihood and income, sense of place, health and well-being, visual aspects, safety and noise levels. Mechanisms include disturbance by means of physical sampling activities, acoustic surveys or vessel movement and noise. Due to the location of the concession area relative to the nearest town and harbours (i.e., at least 5 km offshore) and the short duration of the activities, prospecting is not expected to have a significant impact on fishing activity, the visual integrity of the area, tourism, sense of place, noise levels or local crime rates.

Prospecting is expected to have the greatest impact on marine mammals (MEDIUM significance) due to the acoustic survey's potential to disrupt their echolocation and hence behaviour and critical activities such as feeding. Drilling activities would also have an impact of MEDIUM significance on the objectives of the EBSA and CBA (as per the 2022 Marine Spatial Planning Report), or if tailings are disposed of in sensitive areas.

The impact of prospecting on maritime heritage and cultural, prehistoric and palaeontological resources is expected to be LOW and VERY LOW, respectively, and could yield a positive outcome if any resources found are reported to the South African Heritage Resource Agency and retained for assessment and reported to.

Prospecting activities could also provide benefits in the form of local and regional socio-economic opportunities in addition to contributing towards scientific knowledge, specifically in terms of baseline environmental sediment, species and high-resolution bathymetry data. These benefits are, however, considered to be relatively low in the broader context.

The assessment of impacts in this concession area further revealed that the significance of the impacts is lower when compared to that of impacts identified in other nearshore concession areas. This could be attributed to the concession area's distance from and location relative to the coastline, fishing areas, aquaculture farms, harbours, shipping routes and towns. In light of the above, Concession Area 7C is considered to be situated in a suitable location where prospecting will have relatively low negative impacts and provide potential benefits.

1.3.2 Marine ecology and fisheries

Eleven potential negative impacts on the Marine Environment and Fisheries were identified, with impacts before mitigation ranging from MEDIUM to INSIGNIFICANT. With effective mitigation these impacts can all be reduced to VERY LOW or INSIGNIFICANT.

Impacts include sound disturbance to marine fauna due to acoustic surveys; survey vessel collision with marine megafauna; direct impact of seabed excavation and tailings disposal on benthic habitats (soft sediment and reef associated communities); impact of fine sediment plumes on surrounding benthos and water column; waste discharges during vessel operations; impacts on the EBSA and CBA; and impacts on fisheries and the livelihoods of fishing communities due to exclusion from fishing grounds and disturbance of target fish species. The potential impact of most concern is that of acoustic disturbance to marine mammals and impacts of drilling and tailings disposal on the EBSA and CBA. These impacts were assessed to be of MEDIUM negative significance prior to mitigation.

A portion of the concession area overlaps with a portion of the Namaqua Coastal EBSA and a CBA considered to be in natural condition and the impacts of the proposed prospecting activities must be considered in detail to determine their viability with respect to the key functions and value of the EBSA. According to the 2022 Marine Spatial Planning Report, non-destructive prospecting (which doesn't include bulk sampling or other related destructive activities) within CBA's or ESA's (in this case the area of an EBSA which is not also considered to be a CBA or MPA) are considered to be of restricted compatibility with the objectives of the EBSA and permissible should the impacts on the objectives of the EBSA or CBA be appropriately low (Harris *et al*. 2022). Destructive prospecting is, however, not compatible with management objectives in CBA areas.

It is the specialist's professional opinion that the proposed prospecting using the 3–5 m^2 drilling tool constitutes destructive sampling due to the volume of sediment removed from the sea floor, likely noise and vibration created, high sample intensity during the Resource Development Phase, and turbidity associated with the sediment plumes likely to be generated during onboard sample processing. The use of this drilling tool is not compatible with the CBA guidelines, and it is considered an essential mitigation to not undertake destructive sampling in the CBA.

The proposed sampling via coring and drilling is not expected to create significant underwater noise as the sound is largely restricted to the seabed material (sand/rock) and environmentally significant sound propagation in the water column is not anticipated. Seabird collision with the vessel is not anticipated as the vessel will not be creating fish offal to attract sea birds and is not expected to create light that will be brighter or more intense than that on any other operational vessel. Potential impacts of acoustic surveys on zooplankton were scoped out of the assessment as previous studies did not find any discernible effects on zooplankton.

It is known that migrating humpback, southern right whales, dusky dolphins and the near threatened Heaviside's dolphin are frequently encountered on the west coast of southern Africa. Of the proposed seismic survey activities, the Topas sub-bottom profiler system could present a risk to dusky and Heaviside's dolphins. Effective implementation of mitigation measures should ensure that potential impacts of the proposed prospecting activities on marine mammals and the EBSA and CBA in Concession 7C would be reduced to LOW, VERY LOW OR INSIGNIFICANT.

The limited spatial scale, temporary nature of operations (approximately 40–80 days over 5 years) and low volume of any sediment plumes generated during sampling are not anticipated to have noticeable impacts on small pelagic fish recruitment. It is noted that much of the West Coast constitutes a recruitment area for anchovies and only a tiny proportion may be impacted by the generation of turbidity plumes for a very short duration.

1.3.1 Marine Heritage Resources

Prospecting activities in Concession Area 7C could possibly have an impact on submerged Prehistoric Heritage, and Palaeontological Resources present within the concession area. The significance of impacts on such material was assessed to be VERY LOW. One shipwreck, *The Shanger*, is possibly located in the concession area and intrusive sampling could have a negative impact of LOW significance should it damage the wreck. There is potential for the status of the impacts to be changed from negative to positive if samples are retained for assessment of paleoenvironmental and prehistoric lithic material and if any resources found are reported to the South African Heritage Resources Agency.

1.3.2 Socio-economics aspects

Prospecting activities may have potential negative impacts on several fishing sectors and other economic activities within or adjacent to Concession Area 7C. These include potential impacts to, Traditional Linefish, Tuna Pole and Line, West Coast Rock Lobster (WCRL), small pelagic purse seine, aquaculture, tourism and small businesses, sense of place, health and well-being, local households and crime levels. Impacts on WCRL, Purse seine, aquaculture and crime are unlikely to occur and were therefore SCOPED-OUT of the assessment. The impacts on the other activities were assessed to be INSIGNIFICANT, except for impacts on the traditional linefish and tourism which were assessed to be VERY LOW. All impacts are expected to be reduced to INSIGNIFICANT after the implementation of appropriate mitigation measures. Regardless, these activities and impacts on these are likely very important at the individual and community level and mitigation measure to minimise potential negative impacts should be implemented. Potential positive impacts from the prospecting activities include the generation of local and regional economic opportunities, although the benefits of these are expected to be INSIGNIFICANT.

1.3.3 Noise impacts associated with prospecting

The proposed sampling via coring and drilling is not expected to create significant noise as the sound is largely restricted to the seabed material (sand/rock) and environmentally significant sound propagation in the water column is not anticipated. It is unlikely that the survey vessel or prospecting activities will generate any noise that could be heard from the shoreline. The potential noise impacts will be localised, of short-duration, low intensity and are therefore expected to be INSIGNIFICANT without the need for mitigation measures.

1.3.4 Safety surrounding materials prospected (radioactivity)

The natural maximum values of raw mineral radiation from any materials extracted during prospecting are not expected to exceed safety guidelines. All regulations and standards as set out by the South African Maritime Safety Authority (SAMSA), International Maritime Organization (IMO), the International Maritime Dangerous Goods (IMDG) Code and International Atomic Energy Agency Safety

Standards (IMDG) should be complied with when prospecting, extracting, working with, storing and transporting any minerals. This should ensure that any impacts associated with radioactive material be INSIGNIFICANT.

1.3.5 Potential interference with commercial shipping traffic

The majority of shipping traffic is located on the outer edge of the continental shelf, which is well offshore of the outer edge of Concession Area 7C. The impacts of prospecting activities within Concession Area 7C on shipping activities are therefore considered to be INSIGNIFICANT.

1.3.6 Impact on visual integrity of the ar*ea*

Hondeklipbaai and Koingnaas, are situated approximately 5 km and 10 km east of Concession Area 7C, respectively. Although the vessel may be visible from the shoreline, the vessel is also not considered to be more conspicuous than any other vessel in the area. As the entire survey phase is also expected to take approximately 40–80 days (over the next 5 years) to complete any visual impact is temporary and of low intensity, and the presence of the vessel and activity in Concession Area 7C are expected to have negligible impacts on the visual integrity of the area and was therefore assessed as INSIGNIFICANT.

1.3.7 Contribution to science and research

Data collected during the acoustic survey can be used to map important habitat or features such as reefs or shipwrecks that may be present in the area. Soil and biological samples will be collected during the prospecting activities using a clamshell bucket instrument called a Van Veen Grab. Results from this survey will be used to describe and monitor the baseline sediment characteristics and invertebrate macrofaunal communities in the area and can be used as reference data to monitor potential impacts should the project proceed to the production phase (mining). Should artefacts, fossils or any other heritage resources be discovered during the prospecting, these will be donated to scientific institutions and can make an invaluable contribution to the palaeontological knowledge and potential of the continental shelf. The contribution of information to science collected during prospecting will be positive but was assessed to be of LOW significance.

1.3.8 Impacts on marine research

Marine research activities conducted by the Department of Forestry, Fisheries and the Environment (DFFE) are conducted at a national level and the probability of an overlap in space and time with the relatively short duration of planned prospecting activities in concession 7C is considered very low. However, should the planned prospecting and fisheries survey vessels happen to coincide within the concession area, this could be easily managed and would result in NO impacts. This impact was therefore SCOPED OUT.

1.3.9 Cumulative impacts

There has been a recent increase in applications for prospecting and exploration rights along the west coast and increased prospecting/survey activity in the short term and marine mining in the long-term is anticipated. Cumulative impacts of marine prospecting and mining must be considered at a broader spatial scale in a strategic manner for each potential impact identified. Obtaining detailed information

on the scale, extent, methodology (and hence intensity) of various current and pending applications is, however, not possible within the prescribed timeframes of a Basic Assessment Process for a single application (such as this one). This requires and it is recommended that a revised strategic level EIA process based on marine spatial planning principles be undertaken to assess and manage potential cumulative impacts in a holistic manner with a medium to high level of confidence and to identify and implement regional level mitigation measures. It is, however, logical and reasonable, to anticipate that many of the potential impacts assessed for this project would continue together with other projects that are ongoing or scheduled to come on-line. The result is that the spatial extent of many impacts would change from "local" to "regional", whilst the duration would change from short-term (<2 years) to at least medium term (2-15 years) or even long-term (>15 years, mostly reversible in the case of prospecting, but not always for mining). The intensity of impacts is anticipated to remain as they are assessed here for operations of this nature but may be higher for other sea-based mineral and energy projects in different areas with different objectives. The cumulative effect of each of the identified impacts were assessed after mitigation and used a precautionary approach (assumption of simultaneous/consecutive prospecting and mining activities in the region) and ranged from MEDIUM to VERY LOW significance. The assessment of cumulative impacts has a low confidence rating due to the uncertainty of the timing and location of other anthropogenic activities in the region. Cumulative impact could not be assessed for heritage resources as the value and significance of these resources is a highly emotive and subjective field.

1.3.10 No-go option

Both positive and negative impacts area related to not continuing with the prospecting activities. These include lost opportunities in terms of collecting baseline environmental data, determining the presence of offshore mining resources and socio-economic benefits. The impacts, are, however, all considered to be of LOW significance. The positive implications of the no-go option, on the other hand, is that there would be no effects on the biophysical environment in the proposed area. This was also assessed to be of LOW significance considering the lost opportunity in terms of scientific data and economic opportunities.

1.4 Summary table of impacts

A summary of the potential impacts of the proposed development are presented below (Table 1-1). Cumulative impacts are summarised in Table 1-2. The following colour scheme to indicate whether the impact is positive or negative as well as the significance of impacts:

Negative	Positive
VERY HIGH	VERY HIGH
HIGH	HIGH
MEDIUM	MEDIUM
LOW	LOW
VERY LOW	VERY LOW
INSIGNIFICANT	INSIGNIFICANT

Table 1-1. Potential impacts associated with prospecting in Concession Area 7C, as identified during the Basic Assessment Process, before and after mitigation.

POTENTIAL IMPACT		EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
IMPACTS ON MARINE AND FISHERIES RESOURCES									
Impact 1	**Underwater noise disturbance to invertebrates**	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	Medium
	With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Probable	**VERY LOW**	-ve	Medium
Impact 2	**Underwater noise disturbance to fish**	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Medium
	No mitigation								
Impact 3	**Underwater noise disturbance to marine mammals**	Regional 2	High 3	Short-term 1	Medium 6	Probable	**MEDIUM**	-ve	Medium
	With mitigation	Regional 2	Medium 2	Short term 1	Low 5	Improbable	**VERY LOW**	-ve	Medium
Impact 4	**Underwater noise disturbance to seabirds**	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	Medium
	With mitigation	Local 1	Medium 2	Short term 1	Very low 4	Improbable	**INSIGNIFICANT**	-ve	High
Impact 5	**Underwater noise disturbance to turtles**	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
	With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
Impact 6	**Marine megafauna collisions with survey vessels**	Regional 2	Medium 2	Short-term 1	Low 5	Possible	**VERY LOW**	-ve	High
	With mitigation	Regional 2	Low 1	Short term 1	Very Low 4	Improbable	**INSIGNIFICANT**	-ve	High

POTENTIAL IMPACT		EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
Impact 7	**Benthic Impact of seabed sampling and tailings disposal**	Local 1	High 3	Medium-term 2	Medium 6	Definite	**MEDIUM**	-ve	High
	With mitigation	Local 1	Medium 2	Medium-term 2	Low 5	Definite	**LOW**	-ve	Medium
Impact 8	**Fine sediment plumes**	Local 1	Medium 2	Short-term 1	Very Low 3	Definite	**VERY LOW**	-ve	High
	With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Definite	**VERY LOW**	-ve	Medium
Impact 9	**Waste discharges during vessel operations**	Local 1	Low 1	Medium-term 2	Very low 4	Probable	**VERY LOW**	-ve	High
	With mitigation	Local 1	Low 1	Short term 1	Very low 3	Improbable	**INSIGNIFICANT**	-ve	High
Impact 10	**Impacts on objectives of Namaqua Coastal EBSA and CBA**	Local 1	High 3	Medium-term 2	Medium 6	Probable	**MEDIUM**	-ve	High
	With mitigation	Local 1	Low 1	Short term 1	Very low 3	Improbable	**INSIGNIFICANT**	-ve	High
Impact 11	**Impact on fisheries**	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	High
	With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High
IMPACTS ON MARINE HERITAGE RESOURCES									
Impact 12	**Impacts on submerged pre-history (cultural heritage and artefacts).**	Local 1	Low 1	Long-term (Irreversible) 3	Low 5	Possible	**VERY LOW**	– ve	Low
	With Mitigation	Local 1	Low 1	Long-term 3	Low 5	Possible	**VERY LOW**	+ ve	Low

POTENTIAL IMPACT		EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
Impact 13	**Impacts on palaeontological resources**	Local 1	Negligible 1	Long-term (Irreversible) 3	Low 5	Possible	**VERY LOW**	-ve	Low
	With Mitigation	Local 1	Low 1	Long-term 3	Low 5	Possible	**VERY LOW**	+ve	Low
Impact 14	**Impacts on maritime heritage**	Local 1	Medium 2	Long-term (Irreversible) 3	Medium 6	Improbable	**LOW**	-ve	Very Low
	With Mitigation	Local 1	Low 1	Long-term (Irreversible) 3	Low 5	Improbable	**LOW**	+ve	Low
IMPACTS ON SOCIO-ECONOMIC RESOURCES									
Impact 15	**Impacts on Traditional Linefish Sector**	Local 1	Low 1	Short-term 1	Very Low 3	Probable	**VERY LOW**	-ve	High
	With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High
Impact 16	**Impacts on West Coast Rock Lobster sector**	SCOPED OUT							
Impact 17	**Impacts on Tuna pole and linefisheries**	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
	With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
Impact 18	**Impacts on Small Pelagic Purse Seine Fisheries**	SCOPED OUT							
Impact 19	**Impacts on aquaculture**	SCOPED OUT							
Impact 20	**Local tourism and businesses**	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	Medium

POTENTIAL IMPACT		EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
	With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	Medium
Impact 21	**Sense of place, health and wellbeing**	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-	High
	No mitigation								
Impact 22	**Local households**	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
	No mitigation								
Impact 23	**Local crime**	SCOPED OUT							
Impact 24	**Local and regional socio-economic performance**	Local 1	Medium 2	Short-term 1	Very Low 4	Possible	**INSIGNIFICANT**	+ve	Medium
	No mitigation								
COMPLIANCE STATEMENT IMPACTS BY EAP									
Impact 25	**Noise impacts associated with prospecting**	Local 1	Low 1	Short-term 1	Low 3	Possible	**INSIGNIFICANT**	-ve	Local 1
	No mitigation								
Impact 26	**Impacts associated with prospecting radioactive material**	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	-ve	Low
	With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

POTENTIAL IMPACT		EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
Impact 27	**Potential interference with commercial shipping traffic**	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Low
	No mitigation								
Impact 28	**Impacts on the visual integrity of the area**	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Medium
	No mitigation								
Impact 29	**Contributions to Science**	Local 1	Low 1	Long-term 3	Low 5	Definite	**LOW**	+ve	High
	No mitigation								
Impact 30	**Impacts on marine science**	SCOPED OUT							
Impact no-go	**No-go alternative (negative impacts)**	Local 1	Low 1	Long-term 3	Medium 6	Possible	**LOW**	-ve	Medium
	No mitigation								
Impact no-go	**No-go alternative (positive impacts)**	Local 1	Low 1	Long-term 3	Low 5	Probable	**LOW**	+ve	Medium
	No mitigation								

Table 1-2. Assessment of cumulative impacts for all impacts reviewed in the Basic Assessment Report, except for heritage resources. Note that these impacts are assessed "after mitigation".

CUMULATIVE IMPACT	EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
IMPACTS ON MARINE AND FISHERIES RESOURCES								
Impact 1: Underwater noise disturbance to invertebrates	Regional 2	Low 1	Long-term 3	Medium 6	Probable	**MEDIUM**	-ve	Low
Impact 2: Underwater noise disturbance to fish	Regional 2	Low 1	Long-term 3	Medium 6	Possible	**LOW**	-ve	Low
Impact 3: Underwater noise disturbance to marine mammals	Regional 2	Medium 2	Long term 3	High 7	Improbable	**MEDIUM**	-ve	Low
Impact 4: Underwater noise disturbance to seabirds	Regional 2	Medium 2	Long term 3	High 7	Improbable	**MEDIUM**	-ve	Low
Impact 5: Underwater noise disturbance to turtles	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	-ve	Low
Marine 6: megafauna collisions with survey vessels	Regional 2	Low 1	Long term 3	Medium 6	Possible	**LOW**	-ve	Low
Impact 7: Offshore based seabed sampling and tailings disposal	Local 1	Medium 2	Long term 3	Medium 6	Probable	**MEDIUM**	-ve	Low
Impact 8: Fine sediment plumes	Local 1	Low 1	Medium-term 2	Very low 4	Definite	**VERY LOW**	-ve	Low
Impact 9: Waste discharge during vessel operations	Local 1	Low 1	Long term 3	Low 5	Improbable	**VERY LOW**	-ve	Low
Impact 10: Impacts on objectives of Namaqua Coastal EBSA and CBA	Local 1	Low 1	Long term 3	Low 5	Possible	**VERY LOW**	-ve	Low
Impact 11: Impact on fisheries	Regional 2	Low 1	Long-term 3	Medium 6	Possible	**LOW**	-ve	Low

CUMULATIVE IMPACT	EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
IMPACTS ON MARINE HERITAGE RESOURCES								
NOT POSSIBLE TO ASSESS								
IMPACTS ON SOCIO-ECONOMIC REOURCES								
Impact 15: Impacts on Traditional linefish Sector	Regional 2	Medium 2	Long-term 3	Medium 7	Possible	**LOW**	-ve	Medium
Impact 16: Impacts on West Coast Rock Lobster sector	SCOPED OUT							
Impact 17: Impacts on Tuna pole and linefisheries	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	-ve	Low
Impact 18: Impacts on Small Pelagic Purse Seine Fisheries	SCOPED OUT							
Impact 19: Impacts on aquaculture	SCOPED OUT							
Impact 20: Local tourism and businesses	Regional 2	Low 1	Long-term 3	Medium 6	Possible	**LOW**	-ve	Low
Impact 21: Sense of place, health and wellbeing	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	-ve	Low
Impact 22: Local households	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	-ve	Low
Impact 23: Local crime	SCOPED OUT							
Impact 24: Local and regional socio-economic performance	Regional 2	Medium 2	Long-term 3	High 7	Possible	**MEDIUM**	+ve	Low

CUMULATIVE IMPACT	EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
COMPLIANCE STATEMENTS BY THE EAP								
Impact 25: Noise impacts associated with prospecting	Local 1	Low 1	Long-term 3	Low 5	Possible	**VERY LOW**	-ve	Low
Impact 26: Impacts associated with prospecting radioactive material	Regional 2	Medium 2	Long-term 3	High 7	Improbable	**MEDIUM**	-ve	Low
Impact 27: Potential interference with commercial shipping traffic	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Low
Impact 28: Impacts on the visual integrity of the area	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Low
Impact 29: Contributions to Science	National 3	High 3	Long-term 3	Very High 9	Definite	**VERY HIGH**	+ve	Low
Impact 30: Impacts on marine science	SCOPED OUT							

1.5 Potential mitigation measures

1.5.1 Marine ecology

Essential mitigation measures

- The destructive 3-5 m^2 drilling method should not take place within the area considered to be a CBA. Should the acoustic survey and coring identify potentially economically viable resources, suitable offsets must be identified and implemented prior to commencement of the resource development phase.
- Vessel operator must keep watch for marine megafauna in the path of the vessel during vessel operation.
- At least two on-board independent Marine Mammal and Seabird observers (MMSOs) with experience in marine megafauna (including, but not limited to, all marine mammals (cetaceans and seals), sea turtles and seabirds) identification and observation techniques must be employed to carry out daylight observations and ensure compliance with mitigation measures during geophysical surveying. It must be ensured that there are sufficient MMOs on board the vessel to prevent fatigue and meet health and safety requirements, during the survey periods.
- It is recommended that activity be restricted to specific areas or a time of year as far as possible, feasible and reasonable, and as per the recommendations from an MMSO and specialist. This includes:
    - Avoid planning any surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations;
    - Avoid planning any surveys during mating season (confirm these times with MMSOs); and,
    - Confine surveys to seasons when cetaceans are scarce to ensure minimal disturbance (confirm these times with MMSOs).
- MMSOs to conduct pre-survey visual scans of at least 30 minutes for the presence of megafauna around the survey vessel prior to any vessel movement.
- Protocol must be followed to avoid mortalities and/or injuries to marine animals when they are encountered. If no protocol exists, this must be developed by the Scientific Officer in consultation with the applicant and specialists, prior to commencement.
- "Soft starts" should be carried out for equipment with source levels greater than 210 dB re 1 µPa at 1 m over a period of 20 minutes to give adequate time for marine mammals to leave the vicinity. Where this is not possible, the equipment should be turned on and off over a 20-minute period to act as a warning signal and allow cetaceans to move away from the sound source.
- Terminate the survey if any marine mammals show affected behaviour within 500 m of the survey vessel or equipment until the mammal has vacated the area.
- Passive Acoustic Monitoring (PAM) technology must be incorporated into the survey programme. A designated onboard PAM Observer uses the PAM technology to detect the

vocalisations of marine species, particularly during periods of low visibility, such as at night or during adverse weather conditions and thick fog, to prevent collision and impact due to acoustic survey. It must be ensured that there are sufficient PAM operators on board the vessel to prevent fatigue and meet health and safety requirements, during the survey periods.

- Operations must be suspended if any obvious mortalities or injuries to marine life are observed.
- Marine mammal incidence data and sound source output data from surveys must be made available on request to the Marine Mammal Institute (MMI), the Department of Forestry, Fisheries and the Environment (DFFE) and the DMRE.
- Ensure that MMSOs compile a survey close–out report incorporating all recorded data to the relevant DFFE authorities
- Record encounters with marine life (seabirds, turtles, seals, fish), their behaviour and response to vessel, acoustic survey activity, feeding behaviour around the survey vessel; data on position, distance from the vessel, swimming speed and direction and obvious changes in behaviour (e.g., startle responses or changes in surfacing/diving frequencies, breathing patterns).
- Wait until all marine megafauna have cleared an area of 500 m radius of the survey vessel (centre of the sound source) before resuming with acoustic survey. If, after a period of 30 minutes, megafauna is still within 500 m of the vessel, the normal "soft start" procedure should be allowed to commence for at least 20-minutes duration. Behaviour during "soft starts" must be monitored.
- Vessel transit speed must not exceed 12 knots (22 km/hr), except within 25 km of the coast where it should be kept to less than 10 knots (18 km/hr) as well as when sensitive marine fauna are present in the vicinity.
- Sound containment and improvement of equipment used must be implemented.
- The potential marine impacts must be reassessed after completion of the geophysical surveys and biological analysis as these might elucidate areas that would need to be avoided and species of conservation concern.
- Should any ecologically sensitive features such as reefs be identified within the concession area during the initial acoustic survey, these areas must be avoided and suitably buffered. Appropriate buffers must be determined by a suitably qualified specialist. Once suitable buffers have been mapped it should be illustrated on a map and form part of the EMPr.
- Baseline grab samples should be collected before core samples to determine the nature of benthic communities before disturbance.
- Grab samples collected should be analysed as soon as possible to determine the benthic macrofaunal communities in the area. Results from this survey could be used to inform additional mitigation measures if required. Results will represent baseline data against which any change in macrofaunal communities in the area can be benchmarked after prospecting and mining.
- If possible, prospecting should primarily take place on the seaward side of concession area, to minimise the risk to endangered and vulnerable coastal systems.

Best Practice Mitigation (Recommended)

- No destructive sampling or tailing discharge to take place in the part of the concession which falls wholly within the Namaqua Coastal EBSA and a CBA.
- Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats, reefs and important fishing areas.
- Inform and empower all staff about sensitive marine species and suitable disposal of waste.
- Ensure compliance with relevant MARPOL standards.
- Develop a waste management plan using waste hierarchy.
- A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations.
- Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm).
- All process areas should be bunded to ensure drainage water flows into the closed drainage system.
- Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system.
- Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages.
- All hydraulic systems should be adequately maintained, and hydraulic hoses should be frequently inspected.
- Spill management training and awareness should be provided to crew members of the need for thorough cleaning-up of any spillages immediately after they occur in order to minimise the volume of contaminants washing off decks.

1.5.2 Fisheries, socio-economic and other shipping

Essential mitigation measures

- Prior to survey commencement, the following key stakeholders should be consulted and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof:
    - Fishing industry / associations (contactable via liason@fishsa.org):
        - SA Marine Linefish Management Association (SAMLMA);
        - South African Tuna Association (SATA);
        - Local fishing communities;
    - Other associations and organs of state
        - DFFE;
        - SAMSA;
        - South African Navy Hydrographic office; and
        - Overlapping and neighbouring right holders.
- These stakeholders should again be notified at the completion of surveying when the survey vessel(s) is/are off location. The operator must request, in writing, that the South African Navy Hydrographic office release Radio Navigation Warnings and Notices to Mariners throughout the survey periods. The Notice to Mariners should give notice of (1) the co-ordinates of the proposed survey area, (2) an indication of the proposed timeframes of surveys and day-to-day

location of the survey vessel(s), and (3) an indication of the required safety zone(s) and the proposed safe operational limits of the survey vessel. These Notices to Mariners should be distributed timeously to fishing companies and directly onto vessels where possible.

- Undertake surveys when fishing effort is lowest i.e., August to December. It is recommended that the snoek line fishing peak season (April-May) be avoided as far as possible, feasible and reasonable.
- The survey and sampling vessels must be certified for seaworthiness through an appropriate internationally recognised marine certification programme (e.g,. Lloyds Register, Det Norske Veritas). The certification, as well as existing safety standards, requires that safety precautions should be taken to minimise the possibility of an offshore accident. Collision prevention equipment should include radar, multi-frequency radio, foghorns, etc. Safety equipment and training of personnel to ensure the safety and survival of the crew in the event of an accident is a further legal requirement.
- Appoint a Fisheries Liaison Officer (FLO) to facilitate communication with the small pelagic purse seine fishing industry association. The FLO should report daily on vessel activity and respond and advice on the action to be taken in the event of encountering purse seine fishing vessels in the survey area.
- Monitor water-quality surrounding the sediment plumes.
- Should any negative impacts be detectable, restrict prospecting activities during important tourism events and seasons.
- In addition, restrict operational activities to the section of the concession area out of sight from the shore.
- It is recommended that additional compensation and resource support measurements be introduced to reduce the severity of the impacts on the socio-economic performance. These should include:
    - A Skills Development through training programs and formal education opportunities such as financial management skills
- Support of local initiatives, investments, and entrepreneurship.
- Assistance should be given to support local communities in navigating new Small Scale Fisheries Policy structures.
- Assistance should be given to support the development of a streamlined communication platform between local community, community representatives, stakeholders, and government officials.

1.5.3 Heritage resources

Essential mitigation measures

- The contractor must be notified that archaeological sites could be exposed during sampling activities, as well as the procedure to follow should archaeological material be encountered during sampling.
- Reporting of sites to the heritage practitioner for assessment and evaluation.
- Retain samples of the coarser fraction (i.e. gravel and stone (20 mm +) of sorted seabed sediment from each grab sample for assessment by an archaeologist for the presence of important material.

- Retain any core and drill sample sections which contain alluvial material, particularly where organic remains are present and subject to palaeo-environmental assessment.
- Any fossils such as petrified bone, teeth and shell casts, usually phosphatic, found during the processing of cores must have the details of context recorded, must be kept for identification by an appropriate specialist and, if significant, be deposited in an appropriate institution such the IZIKO SA Museum.
- The possible detailed study and dating of a set of cores, possibly as a B.Sc. Honours or M.Sc. project should be considered.
- If shipwreck material is encountered during the course of sampling in any of the concession areas, the following mitigation measure should be applied:
    - Cease work in the directly affected area to avoid damage to the wreck until the South African Heritage Resources Agency (SAHRA) has been notified and the contractor has complied with any additional mitigation as specified by SAHRA; and
    - Where possible, take photographs of them, noting the date, time, location and types of artefacts found. Under no circumstances may any artefacts be removed, destroyed or interfered on the site, unless under permit from SAHRA.

Best Practice Mitigation (Recommended)

It is recommended that the onboard Trans Atlantic representative must undergo a short induction on archaeological site and artefact recognition, as well as the procedure to follow should archaeological material be encountered during sampling.

1.5.4 Prospecting radioactive material

Essential mitigation measures

- When prospecting, extracting, working with, storing and transporting any material, there must be compliance with all regulations and standards as set out by the following organisations:
    - South African Maritime Safety Authrisation (SAMSA);
    - International Maritime Organisation (IMO);
    - International Maritime Dangerous Goods (IMDG) Code; and
    - International Atomic Energy Agency Safety Standards.

1.5.5 Cumulative impacts on the environment and community

Essential mitigation measures

Mitigation measures as recommended for each individual impact should be implemented. Furthermore, a strategic level Environmental Impact Assessment (EIA) process based on marine spatial planning principles should be conducted to assess and manage potential cumulative impacts in a holistic manner and to identify and implement further mitigation measures.

1.6 Roles and responsibilities for environmental management programme implementation

FUNCTION
Project Manager/ Applicant
Role The Project Manager is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). An independent environmental control officer (ECO) must be contracted by the Project Manager to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of environmental authorization (EA). The Project Manager is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent. **Responsibilities** • Be fully aware of the conditions of the EA; • Overall management of the project and EMPr implementation; • Ensure that all stipulations within the EMPr are communicated and adhered to by the Applicant, Sampling Contractor(s) and any crew on board the vessel; • Monitor the implementation of the EMPr throughout the project; • Ensure that periodic environmental performance audits are undertaken on the project implementation; • Provide updated information to the public; and • Communication of all modifications to the EMPr to the relevant stakeholders.
Scientific Officer (Internal monitoring)
Role The Scientific Officer reports directly to the Project Manager, oversees site works, liaises with the contractor(s) and the ECO. The Scientific Officer is responsible for the day to day implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and for ensuring the compliance of all contractors with the conditions and requirements stipulated **Responsibilities** • Oversees site works, liaison with Contractor, Project Manager and ECO; • Will issue all notices of non-compliances to contractors; and - Ratify the Monthly Environmental Reporting the EMPr. • Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; • Conduct environmental awareness training on site together with ECO and contractors; • Ensure that the necessary legal permits and / or licenses are in place and up to date • Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) and its sub-contractor(s); • Conduct environmental internal audits against the EMPr standard. • Assist the contractors in addressing environmental challenges • Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; • Assist the contractor in investigating environmental incidents and compile investigation reports; • Monitor the implementation of the EMPr throughout the project by means of weekly checklists and regular meetings;
Environmental Control Officer (ECO) (External or Independent monitoring)
Role

The ECO should be appointed by the applicant/ project manager for the duration of the project. The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller that monitors all environmental concerns and associated environmental impacts. The ECO conducts site inspections, manages problems and suggest mitigation and should be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the Scientific Officer. The ECO provides feedback to the Scientific Officer and Project Manager regarding all environmental matters. All role players answer to the Environmental Control Officer for non-compliance. The ECO must also report to the relevant CA as and when required.

Responsibilities

- Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with these standards;
- Undertake regular site inspections / audits of the activities according to the EMPr, including any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr;
- Monitoring the performance of the Contractors and recording compliance with the EMPr, EA and associated Method Statements;
- Liaison between the Project manager, Scientific Officer, Contractors, authorities and other stakeholders;
- Issuing of site instructions to the Contractor for corrective actions required;
- Reviewing all documents submitted by the Scientific Officer (method statements, incident reports, complaints register, etc.)
- Facilitate environmental awareness training;
- In case of non-compliances, the ECO must first communicate this to the Scientific Officer, who must address this matter. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; and
- Review the EMPr and update it if necessary.

Sampling Contractor/ Employees on vessel

Role

The contractors are required to provide Method Statements detailing the equipment, materials, labour and method(s) that will be used by them to conduct the sampling/ work and also setting out in detail how the management actions contained in the EMPr will be implemented during activities to mitigate environmental impacts.

The Contractor has overall responsibility for ensuring that all work, activities, are in line with the Environmental Management Programme and that Method Statements are implemented as described. All instructions relating to the EMPr will be given to contractors via the scientific officer. Contractors will report issues of concern to the scientific officer, who in turn will report on progress to the TAD.

Contractors include the captain on the vessel, the crew handling the equipment and doing sampling, geologist, etc.

Responsibilities

- Preparing method statements of work that will be done;
- Conducting the sampling activities as per the method statements and EMPr;
- Ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly; operated and maintained, to facilitate proper access and enable any operation to be carried out safely; and
- Attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones.

Fisheries Liaison Officer (FLO)

Role

A fisheries liaison officer (FLO) should be appointed to facilitate communication with affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area.

Responsibilities

- Liaison between fishing sectors and Project Manager and Scientific Officer

Marine Mammal and Seabird Observer (MMSO)

Role

A designated onboard Marine Mammal and Seabird Observer (MMSO) keeps watch for marine megafauna in the path of the vessel during all vessel activity, including the geophysical surveying. Marine megafauna will include, but are not limited to, all marine mammals (whales, cetaceans, seals, etc.), sea turtles, fish and seabirds. They are also in charge of managing the passive acoustic monitoring (PAM) system during the survey activity to detect marine mammals that could be at risk.

Responsibilities

- Keeps watch for marine megafauna to prevent collision and impact due to acoustic survey.
- Records all sightings and incidents with marine megafauna and fish, including behaviour.

Passive Acoustic Monitoring (PAM) Observer

A **Role**

A designated onboard Passive Acoustic Monitoring (PAM) Observer uses passive acoustic hydrophones to detect the vocalisations of marine species. This person can also be a MMSO, but must not be the designated MMSO.

Responsibilities

- Managing the PAM system
- Listens out for underwater marine megafauna to prevent collision and impact due to acoustic survey.

1.7 Recommendation

The EAP recommends that Environmental Authorisation for prospecting rights within sea Concession Area 7C be granted to the applicant, on condition that mitigation measures be implemented and adhered to. This is because the significance of potential negative impacts due to prospecting in this area was assessed to range from LOW significance to INSIGNIFICANT with the implementation of mitigation measures. The EAP further recommends that the destructive 3-5 m^2 drilling method should not take place within the area considered to be a CBA. Should the acoustic survey and coring identify potentially economically viable resources, suitable offsets must be identified and implemented prior to commencement of the resource development phase. The EAP also recommends that the DMRE commissions an updated Strategic Environmental Impact Assessment to better understand and manage cumulative impacts of marine and coastal mining along the South African West Coast. It is further requested that the DMRE considers extending the period granted for conducting Basic Assessment and Environmental Impact Assessment Processes for prospecting and mining applications in remote locations as the limited time granted creates challenges in undertaking consultations with isolated communities.

1.8 Application process and timeline

Phase 1: Lodge Application

A prospecting right and environmental authorisation application were lodged with the DMRE. These applications were accepted by the DMRE on 24 May 2022. The DMRE informed Anchor about the acceptance of the application on 31 May 2022.

Phase 2: Registration Period, Initial Comment and Pre-Consultation Meeting

Notices were sent out to stakeholders on 3, 4 and 5 June 2022 to inform them that the application for prospecting rights and environmental authorisation in Concession Area 7C has been accepted by the DMRE and to invite them to register as Interested and Affected Parties (I&APs). Stakeholders were also asked to provide initial comment during the Pre-consultation phase which extended until 24 June 2022. A pre-consultation meeting was held at the Eric Baker Community Hall in Hondeklipbaai on 8 June 2022. The purpose of this meeting were to consult with the communities before the specialist and impact studies are carried out. The aim was to inform the communities and other interested and affected parties of the project and associated activities, to get the community's input and answer questions so that these can be taken into account during the impact studies. The pre-consultation was also used as an opportunity to obtain contact details of other important community representatives and organisations to inform them of the process and the official public participation process. All this information and findings were then compiled together with the stakeholder questions and comments into a report and submitted to the Department of Mineral Resources and Energy (DMRE).

Phase 3: Request for Extension of submission of Final BAR

A request for extension of the submission of the Final BAR was submitted to, and granted by, the DMRE on 8 June 2022. The motivation behind the request was related to the Fisheries Specialist still awaiting more recent Fisheries data from the Department of Forestry, Fisheries and the Environment.

Phase 4: Circulate Draft BAR & Official Public Participation Period

The Draft Basic Assessment Report (BAR) is being made available on our website (https://anchorenvironmental.co.za/) and at the Hondklipbaai and Koingnaas Municipal Buildings for 30 days during the Public Participation Period which will extend from Wednesday 21 September 2022 to 23:59 on Friday 21 October 2022.

Phase 5: Public Participation Meeting

Public meetings will be held at the Eric Baker Community Hall in Hondeklipbaai on 11 October 2022 at 16:00 and on 12 October 2022 at the Koingnaas Community Centre at 16:00. During these meetings, members of Anchor (the EAP) and TAD (the applicant) provided more detail on the proposed prospecting activity and consulted with I&APs who then had the opportunity to ask questions and provide comment on the proposal.

Phase 6: Submit Final BAR to the DMRE

Stakeholder comments will be addressed and included in a Comments and Responses Table which will form part of the Final BAR. Comments and recommendations are also used to inform the EMPr. The final BAR will be submitted to the DMRE for review on 1 November 2022.

Phase 7: Decision by the DMRE

The DMRE has 107 days to review all the documents and decide whether to grant Environmental Authorisation for prospecting in Concession Area 7C.

1.9 Invitation to partake in the Public Participation Process

You are herewith notified of the 30-day Public Participation Period for public comment: **From 21 September 2022 to 23:59 on 21 October 2022.** This Draft Basic Assessment Report, with information about the project, is available from the website (https://anchorenvironmental.co.za), at the Lepelsfontein Community Hall and Kotzesrus Church Hall (Northern Cape), during this time. These will also be circulated during the Public Participation Meeting.

You are also invited to the Public Participation Meeting closest to you:
Hondeklipbaai: 11 October 2022 at 16:00 at the Eric Baker Community Hall, Northern Cape
Koingnaas: 12 October 2022 at 16:00 at the Koingnaas Community Hall, Northern Cape

Cheruscha Swart
Environmental Assessment Practitioner (Reg no.2021/3298)
& Ecologist
Anchor Environmental Consultants (Pty) Ltd
8 Steenberg House, Silverwood Close, Tokai,
Cape Town, South Africa
Tel: +27 21 701 3420
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Website: anchorenvironmental.co.za

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

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).

2 PROSPECTING RIGHTS APPLICANT

Name of the Applicant:	**Trans Atlantic Diamonds (Pty) Ltd**
Responsible Person	Anthony Peter
Contact number	021 418 1587
Fax number:	n/a
Physical address:	Office 1603 Portside, 4 Bree Street, Cape Town, Western Cape, 8001
Postal address:	Office 1603 Portside, 4 Bree Street, Cape Town, Western Cape, 8001
Email address:	anthony@transatlanticdiamonds.com/ talia@transatlanticdiamonds.com
File reference number SAMRAD:	NC30/5/1/1/2/13061PR

3 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 for Environmental Authorisation must (a) be prepared in a format that may be determined by the Competent Authority and (b) in terms of section 17 (1) (c) of the same regulation, the competent Authority must check whether the application has taken into account the 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 EAP 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 uninterpreted information and that it unambiguously represents the interpretation of the applicant.

Objective of the basic assessment process

The objective of the basic assessment process is, through a consultative process, to –

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
(b) identify the alternatives considered, including the activity, location, and technology alternatives;
(c) describe the need and desirability of the proposed alternatives,
(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the these aspects, to determine:

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

(ii) the degree to which these impacts—

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be managed, avoided or mitigated;

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

(i) identify and motivate a preferred site, activity and technology alternative;

(ii) identify suitable measures to manage, avoid or mitigate identified impacts; and (iii) identify residual risks that need to be managed and monitored.

4 CONTACT PERSON AND CORRESPONDENCE ADDRESS

Details of the EAP

Name of The Practitioner	**Cheruscha Swart**
Contact number:	021 701 3420
Fax number:	021 701 5280
Physical Address	Suite 8, Steenberg House, Silverwood Close, Steenberg Estate, Tokai, 7945
Postal address:	Suite 8, Steenberg House, Silverwood Close, Steenberg Estate, Tokai, 7945
Email address:	cher@anchorenvironmental.co.za/ sisanda@anchorenvironmental.co.za

Expertise of the EAP

Cheruscha attained a Master of Science degree (MSc) in Zoology (Cum Laude) and an Honours (BSc Hons) and Bachelor of Science degree (BSc) in Biodiversity and Ecology from the University of Stellenbosch. She is a Registered Environmental Assessment Practitioner (EAPASA Number 2021/3298) with eight years of research and consulting experience in several disciplinary fields, three of which have been spent conducting Basic, Scoping and Environmental Impact Assessments. Her training and experience have made her highly competent within a variety of disciplines, including environmental monitoring, Basic and Environmental Impact Assessments, environmental legislation, Environmental Management Programmes, terrestrial and marine biodiversity and ecology, invasion biology, conservation biology, plant and animal sciences and marine invertebrate taxonomy and biology. See Appendix 1 for more details. The CVs of the additional contributing consultants are also included as part of Appendix 1.

Summary of the EAP's past experience

Cheruscha has eight years of research and consulting experience in several disciplinary fields, three of which have been spent conducting Basic Assessments. Scoping studies and Environmental Impact Assessments. Within Anchor Environmental Consultants, her primary role is that of Environmental Assessment Practitioner, leading consultant on several environmental specialist studies and collaborating consultant on other projects. Tasks include applications for prospecting, aquaculture and other operational rights, environmental licenses and environmental authorisations; specialist impact assessments and baseline studies; environmental monitoring of important conservation and disturbed habitats; and monitoring environmental compliance of various operations. Projects include, amongst others, land-based and offshore prospecting operations; offshore mining operations; greenhouse agricultural projects; land- and sea-based aquaculture facilities; and monitoring the health of bays and ports along the West Coast. Cheruscha is the author of three peer reviewed scientific publications and numerous scientific reports, with several other projects and publications in preparation. See CV attached as Appendix 1. CVs of co-authors on this report are also included.

5 INTRODUCTION

5.1 Project background

Prospecting is one of the first in many steps of the mining process and can extend over a period of one to five years. It is the search for commodities such as gemstones, minerals, metals, in an area by means of drilling and excavation to determine if mining in that area is economically feasible. It is also used to analyse the structure of the earth's crust and the rocks of which it is composed, to assist in the engineering of the mining equipment. Prospecting is also used as an opportunity to collect baseline environmental and biological information, such as the species present in an area, to enable the monitoring of the potential impacts of future mining on the environment. Prospecting does not necessarily guarantee that a mining right will be granted or that an area will be mined. Should results from the prospecting campaign indicate that mining in an area would be economically worthwhile, the client must then apply for a mining right along with Environmental Authorisation (EA) for mining in that area. This would require an additional Environmental Impact Assessment (EIA), specialist studies and public participation process of approximately 6 to twelve months.

The main function of the DMRE is to regulate mining and matters relating to mineral and petroleum resources under the Mineral and Petroleum Resources Development Act (MPRDA). The DMRE is also the competent authority responsible for granting EAs and for regulating EIAs and Environmental Management Programmes (EMPrs) for new and existing mining activities. The Department of Forestry, Fisheries and the Environment (DFFE), on the other hand, is the main appeal authority, while the Department of Water and Sanitation (DWS) regulates any wastewater generated by mining operations that could potentially affect water resources.

For the past 80 million years, sediment has been transported from the continental interior to the Atlantic Ocean via the Orange and Olifants River (Gurney *et al*. 1991). The first discovery of diamonds in marine deposits was in 1908 on the Namibian coastline near Lüderitz (Levinson 1983; Penney et al. 2007). Hereafter, vast diamond deposits have been discovered along the west coast of southern Africa; extending from Hottentot Bay (Namibia) in the north, southwards to the Olifants River in South Africa (Gurney *et al.* 1991; Penney *et al*. 2007).

Diamond-mining concession areas in South Africa are grouped into three categories: Land, Surf-Zone and Marine (offshore) Concession Areas (Figure 5.1); Clark *et al.* 1999; Penney *et al.* 2007). The Land and Surf-Zone concessions areas are considered as "onshore mining" operations with mines located between the Orange River mouth and slightly south of the Olifants River in South Africa.

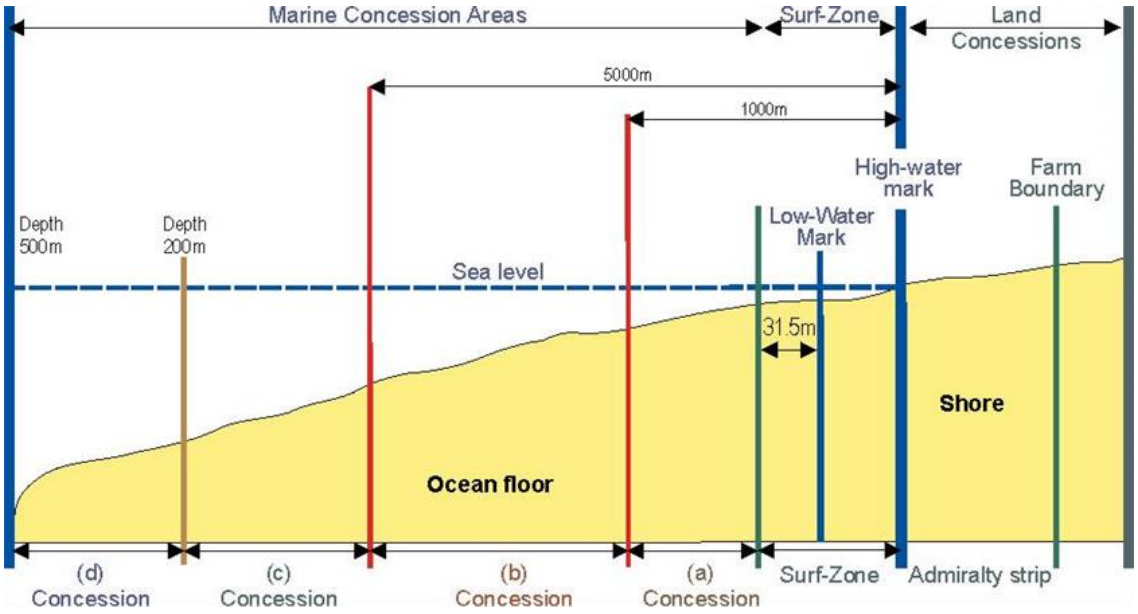

Figure 5.1. Diagram of the onshore and offshore boundaries of the South African marine diamond mining concession areas (from Penney et al. 2007).

Marine Concession Areas are those allocated offshore and extend southwards from the border of Namibia to an area just south of Saldanha Bay (Clark *et al.* 1999). These concession areas are further divided into four sub-areas (Figure 5.1): the A concession extends 31.5 m west of the low-water mark to 1000 m west of the high water mark, the B concession extends from this boundary to 5 000 m west of the high water mark offshore from the western boundary of A, the C concession extends westward of this point to the 200 m isobaths, and the D concession extends offshore to the 500 m isobath. Water depth across the concession area ranges from approximately 120 m to 202 m (Figure 5.3).

Trans Atlantic Diamonds (Pty) Ltd (The Applicant) has been a licensed rough diamond dealer since October 1986. They act as an independent, online rough diamond sales channel which connects both buyers and sellers, while providing a sales solution for producers, small artisanal miners and suppliers. With over thirty years of diamond industry experience, they are well recognised within the trade, and have pioneered tender and auction services across the globe.

They are applying for a Prospecting Right to undertake geophysical surveying and sampling to target potentially diamondiferous and other deposits (including precious metals (gold, silver and platinum), gemstones (alluvial diamonds, sapphires and garnets), ferrous and base metals such as rare earths (monazite mineral), black sand minerals (titanium minerals e.g. ilmenite and rutile), zirconium ore (zircon) and iron ore (magnetite), in terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), as amended) (MPRDA) that may exist within Concession Area 7C.

Concession Area 7C is 200 246 ha in extent and situated approximately 5 km offshore of the Kamiesberg local Municipality (KLM) within the greater Namakwa District Municipality (NDM) in the Northern Cape(Figure 5.4). It lies adjacent the coastal town Hondeklipbaai, with Koingnaas located approximately 10 km east and inland of the concession area. The northern boundary extends from approximately 17 km north of Hondeklipbaai and the southern boundary approximately 12 km south of this town. The inshore boundary (closest to the shore) of this concession area starts in the ocean

approximately 5 km (2.7 nautical miles) west of the high-water mark at a water depth of 70 m (70 m isobath). The concession area then extends between 65 km and 100 km (at its longest part) westwards from this point to 200 m water depth (200 m isobath). The Namaqua National Park lies approximately 16 km east and inland from this concession.

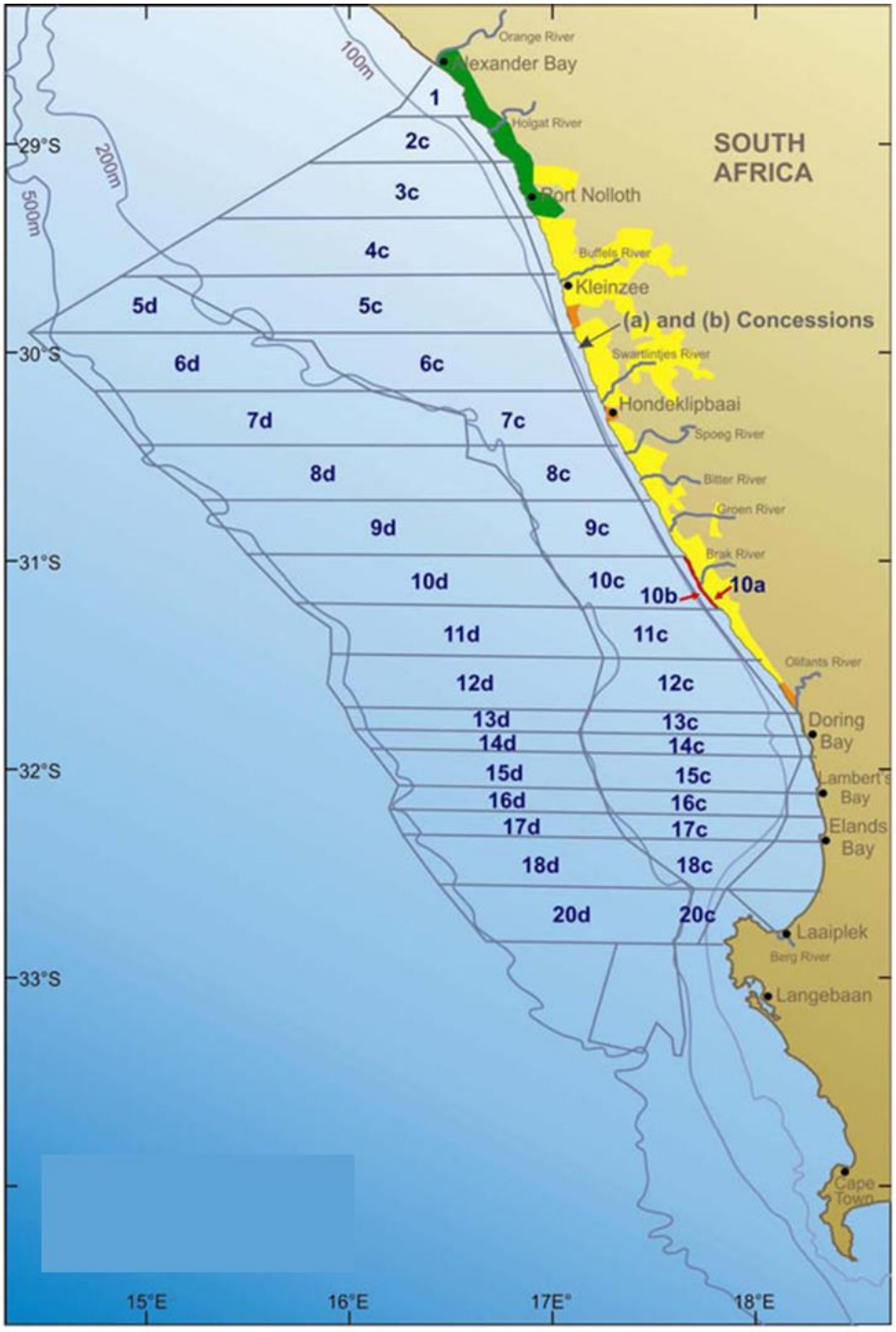

Figure 5.2. **The offshore diamond mining lease areas in South African waters. The coastal shelf waters have been divided into 20 contiguous, parallel strips which have been further subdivided into the onshore and offshore concession areas (A, B, C, D).**

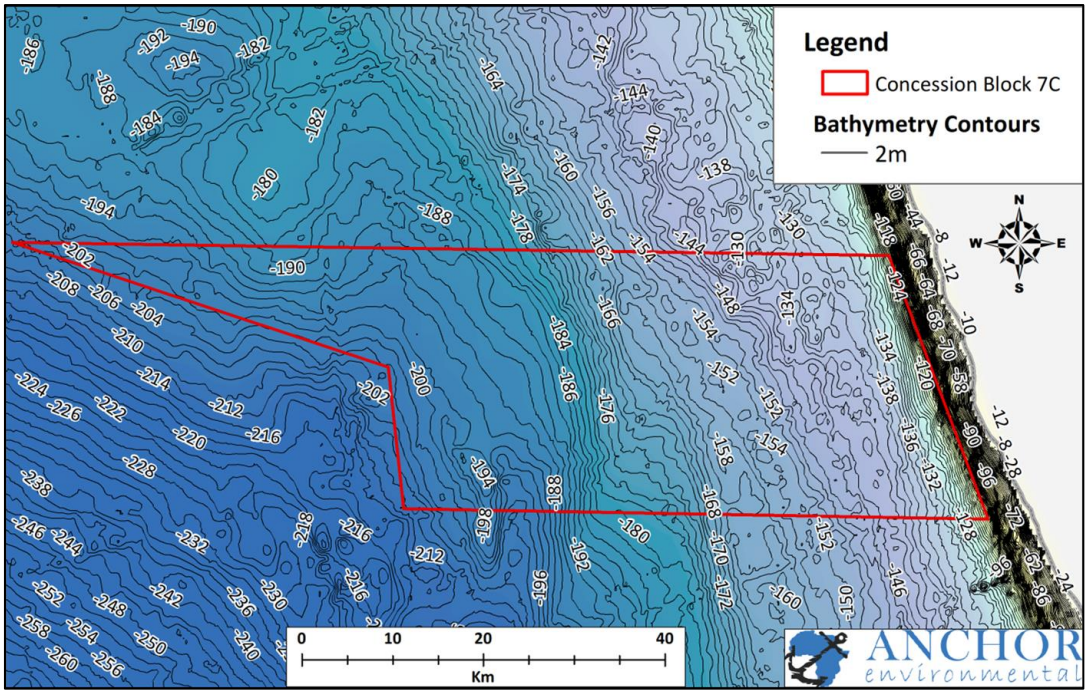

Figure 5.3. **Sea Concession Area 7C off the Northern Cape Coast with bathymetry (at 2 m intervals).**

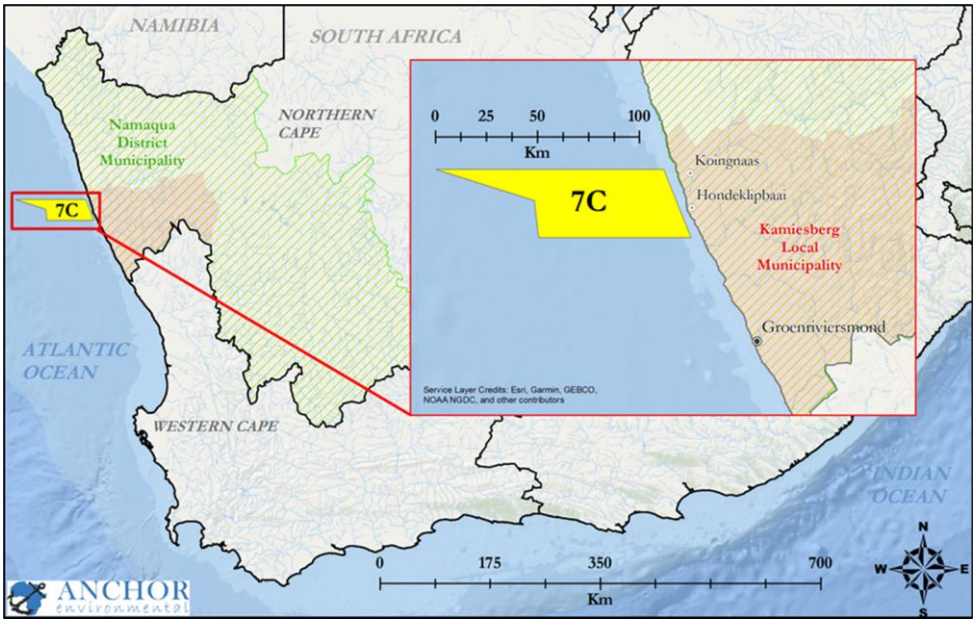

Figure 5.4. **The location of Concession Area 7C along the West Coast of South Africa.**

The proposed prospecting programme will be completed within five (5) years, and it is anticipated that the following non-invasive and invasive activities will be conducted:

Non-invasive activities:

- Desktop study;
- Geophysical survey and seafloor mapping;

- Data acquisition and synthesis;
- Geological modelling and;
- Feasibility study.

Invasive activities:

- Van Veen grab
- Coring
- Drilling

If the prospecting right is approved, it will allow Trans Atlantic Diamonds (Pty) Ltd to determine if mining within concession area 7C is economically viable. It is understood that the Prospecting Right will not provide the required environmental authorisation for mining activities to be undertaken. As such, any future intention to undertake mining within the application area would require a further application, investigation and public consultation process.

Should prospecting reveal an economically viable resource and Environmental Authorisation following an application for a mining right be granted, all diamonds mined in the 7C concession area will be offered to the South African Diamond & Precious Metal Regulator (SADPMR) and will be put to tender on the Diamond Exchange and Export Centre, which is part of the SADPMR, with the intention of local beneficiation. All other mineral and metals will be sold to local companies where applicable or exported.

The prospecting activity triggers several Listed Activities in the Environmental Impact Assessment Regulations, 2014 (as amended), promulgated in terms of the National Environmental Management Act (Act No. 107 of 1998). The Applicant is therefore required to apply for Environmental Authorization (EA), in addition to prospecting rights, from the competent authority, i.e., the Department of Mineral Resources and Energy (DMRE) in the Northern Cape (Springbok), to commence with the activity. To apply for EA, a Basic Assessment of the proposed activity and its potential impacts, along with a Public Participation Process, must be conducted. These findings then need to be submitted as a Basic Assessment Report (BAR), along with an EMPr, to the DMRE and to the public for review and comment.

The Applicant has appointed an independent Environmental Assessment Practitioner from Anchor Environmental Consultants (Pty) Ltd (Anchor) to assist with applying for prospecting rights, Environmental Authorisation and conducting a Basic Assessment and Public Participation Process.

5.2 Application process and timeline

Phase 1: Lodge Application

A prospecting right and environmental authorisation application were lodged with the DMRE. These applications were accepted by the DMRE on 24 May 2022. The DMRE informed Anchor about the acceptance of the application on 31 May 2022.

Phase 2: Registration Period, Initial Comment and Pre-Consultation Meeting

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Phase 3: Request for Extension of submission of Final BAR

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Phase 4: Circulate Draft BAR & Official Public Participation Period

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Phase 6: Submit Final BAR to the DMRE

Stakeholder comments will be addressed and included in a Comments and Responses Table which will form part of the Final BAR. Comments and recommendations are also used to inform the EMPr. The final BAR will be submitted to the DMRE for review on 1 November 2022.

Phase 7: Decision by the DMRE

The DMRE has 107 days to review all the documents and decide whether to grant Environmental Authorisation for prospecting in Concession Area 7C.

5.3 Assumptions and limitations

- It is assumed that all relevant project description information has been provided by Trans Atlantic Diamonds and that all information provided is correct.
- There is currently no high-resolution bathymetry data available for Concession Area 7C. Information pertaining to the geology, bathymetry and topography of the area is therefore based on a desktop approach and drawn from what is available for the surrounding areas. This information might therefore change pending the results of acoustic surveys to be undertaken as part of the prospecting activities. After completion of the survey, information should be reviewed and the EMPr updated.
- The precise location of the grab, core and drill samples are yet to be determined, pending the results of the seafloor mapping.
- It is assumed that the project description and activities will not change after the completion of this report.
- South Africa's record of maritime and underwater cultural heritage resources is based on information derived in the main from historical documents and other secondary sources and from very limited primary sources such as geophysical data and other field-based observations and site recordings. Similarly, direct evidence for submerged pre-colonial archaeological sites and materials on the South African continental shelf is very limited, but sites found in similar offshore contexts elsewhere in the world and the known terrestrial archaeology of the West Coast illustrate the potential for such sites around our coast.
    - While every effort has been made to ensure the accuracy of the information presented below, the reliance on secondary data sources means that there are considerable gaps and inaccuracies in this record and the locations of most of the wrecks referred to in the following sections are approximate.
    - The potential also exists for currently unknown and/or unrecorded maritime heritage sites to be encountered within the concession area in the course of prospecting activities.

6 DESCRIPTION OF THE PROPOSED ACTIVITY

6.1 Location and details of the overall Activity.

Farm Name:	**Sea Concession Area 7C**
Application area (Ha):	200 246 ha
Magisterial district:	Namakwa District Municipality
Distance and direction from nearest town:	Concession Area 7C starts approximately 5 km offshore of the Kamiesberg local Municipality within the greater Namakwa District Municipality in the Northern Cape. It lies adjacent the coastal town Hondeklipbaai, with Koingnaas located approximately 10 km east and inland of the concession area. The northern boundary extends from approximately 17 km north of Hondeklipbaai and the southern boundary approximately 12 km south of this town. The inshore boundary (closest to the shore) of this concession area starts in the ocean approximately 5 km (2.7 nautical miles) west of the high-water mark at a water depth of 70 m (70 m isobath). The concession area then extends between 65 km and 100 km (at its longest part) westwards from this point to 200 m water depth (200 m isobath). There are also several land-based mines adjacent to this area, while the Namaqua National Park lies approximately 16 km east and inland from this concession.
21-digit Surveyor General Code for each farm portion:	N/A

6.2 Locality map

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

Concession Area 7C is situated offshore of the Kamiesberg local Municipality within the greater Namakwa District Municipality in the Northern Cape (Figure 5.1; Figure 6.1). It lies adjacent the coastal town Hondeklipbaai, with Koingnaas located approximately 10 km east and inland of the concession area. The northern boundary extends from approximately 17 km north of Hondeklipbaai and the southern boundary approximately 12 km south of this town. The inshore boundary (closest to the shore) of this concession area starts in the ocean approximately 5 km (2.7 nautical miles) west of the high-water mark at a water depth of 70 m (70 m isobath). The concession area then extends between 65 km and 100 km (at its longest part) westwards from this point to 200 m water depth (200 m isobath). The Namaqua National Park lies approximately 16 km east and inland from this concession.

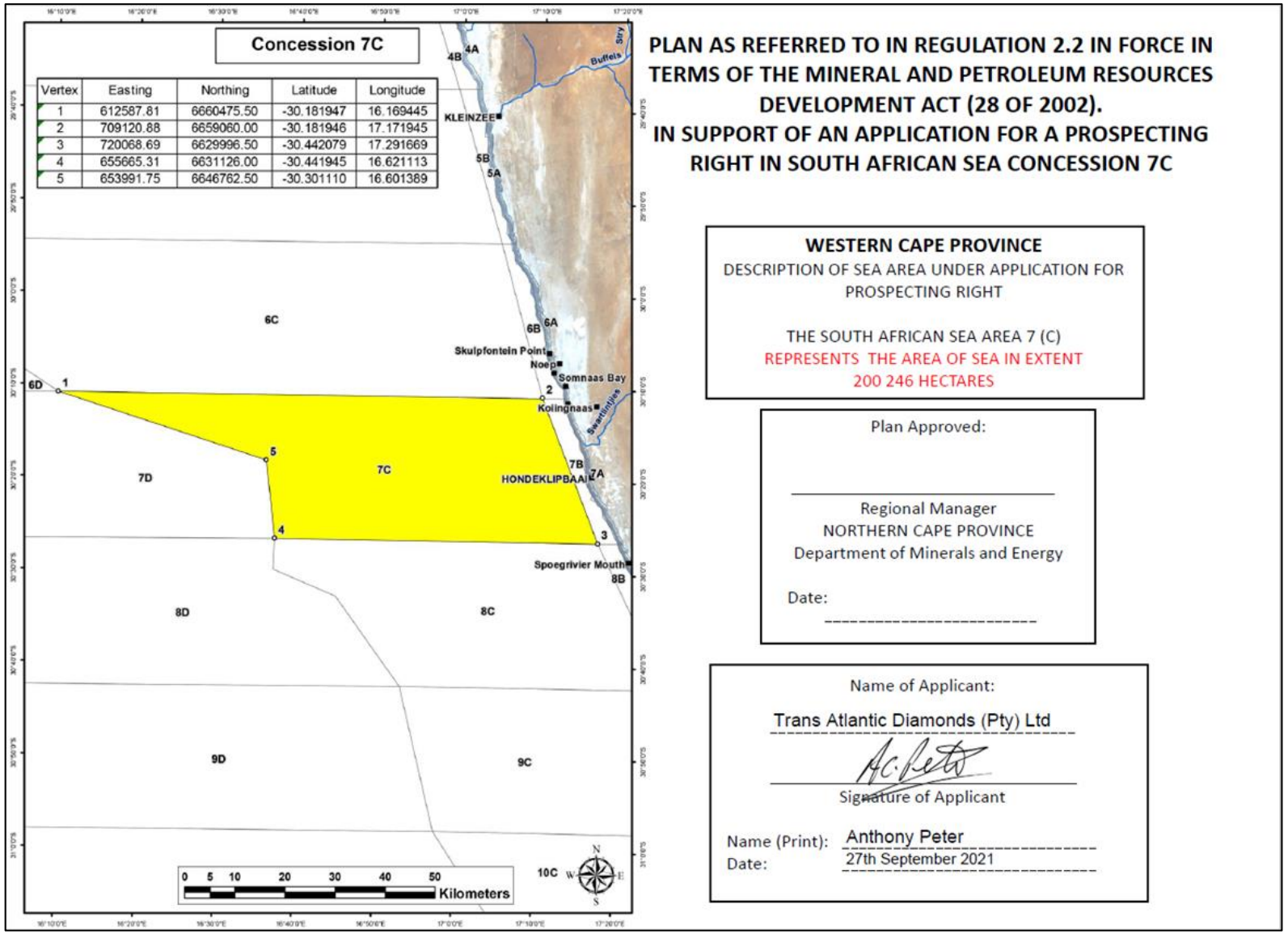


Figure 6.1. **Site Plan of Concession Area 7C as referred to in Regulation 2(2) in terms of the Mineral and Petroleum Resources Development Act (28 of 2002).**

6.3 Description of the scope of the proposed overall activity.

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

TAD is proposing to prospect within Sea Concession Area 7C using both non-invasive and invasive sampling activities, none of which require infrastructure. As the activity is located offshore and comprises prospecting only, no land-based infrastructure will be required. Prospecting will be conducted using a dedicated survey vessel such as the IMD SA survey vessel DP Star (Figure 6.2) or the Explorer (Figure 6.3).

Figure 6.2. The DP STAR, an example of a vessel that could potentially be used for prospecting and exploration.

Figure 6.3. The EXPLORER, an example of a vessel that could potentially be used vessel for prospecting and exploration.

6.4 Listed and specified activities

Table 6-1 Listed and specified activities

NAME OF ACTIVITY **(E.g. For prospecting – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc**	**Aerial extent of the Activity Ha or m²**	**LISTED ACTIVITY**	**APPLICABLE LISTING NOTICE 1, 2 OR 3 (*GNR 544, GNR 545 or GNR 546)***
The activities for the proposed project will involve prospecting for diamonds, gemstones, minerals and various metals that may exist within the application area.	200 246 ha	X	GNR 544, as amended by GN327, Activity 20. This activity states that "*any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including (a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource*" requires environmental authorisation.
Geophysical survey and seafloor. mapping	200 246 ha		No listed activity triggered
A Van Veen grab will be employed to collect between 20 and 50 samples for baseline biological assessment. Each grab has a total volume of 0.03 m^3 and is anticipated to disturb an area covering approximately 0.1 m^2. The total volume of sediment that will be collected is estimated at 1.5 m^3, while the total surface area that will be disturbed is estimated to be 5 m^2.	Approximately 5 m^2 over the area of 200 246 ha	X	GNR 544, as amended by GN327, Activity 20.

NAME OF ACTIVITY **(E.g. For prospecting – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc**	**Aerial extent of the Activity Ha or m²**	**LISTED ACTIVITY**	**APPLICABLE LISTING NOTICE 1, 2 OR 3 (*GNR 544, GNR 545 or GNR 546)***
One of the prospecting activities will be drilling by means of one of three methods: vibracore, sonic core or gravity core. Between 100 and 200 samples will be collected across the entire concession area. Each core has a diameter of 10 cm, length of 3 m and, depending on the type of core, can penetrate to depths of 3-5 m. Each core collects approximately 0.024 m^3 of sediment and will disturb a total surface area of 0.00785 m^2. The total volume of samples that will be collected by 200 cores is estimated at 4.8 m^3, while the total surface area that will be disturbed is estimated to be 1.57 m^2.	A total surface area of approximately 1.57 m2 is estimated to be disturbed across the entire concession area of 200 246 ha	X	GNR 544, as amended by GN327, Activity 20.
Prospective target areas will be surveyed using a uniquely designed drill tool that can dredge gravel from the seabed. Pending the final tool design, the drill bit footprint will be between 3 and 5 m^2. The expected average hole depth will be 3 m. Sample volumes are anticipated to be in the range of 9 to 15 m^3 per sample. An estimated total of 300 samples spaced at roughly 300 m apart from north to south will be required. It is expected that phase 3 (resource development phase) may require a greater density of samples (arranged in a 25 m to 50 m sampling grid). The drilling phase will constitute three steps: 1. Step 1: A total of 150 samples will be collected. 2. Step2: Follow-up sampling will require an additional 150 samples. 3. Step 3: Should these follow-up samples indicate that there could be a potential resource, a resource area of 500 m x 300 m will then require an additional 60 samples spaced on a 50 m grid. Approximately 20 resource development areas will be required.	A total surface area of approximately 7500m^2 (or 0.75 ha) is estimated to be disturbed across the entire concession area of 200 246 ha.	X	GNR 544, as amended by GN327, Activity 19a which states that "*The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from: (iii) the sea…*". Activity 20 as indicated above.
Desktop study and literature review	200 246 ha		No listed activity triggered
Data acquisition and synthesis	200 246 ha		No listed activity triggered
Geological modelling	200 246 ha		No listed activity triggered
Feasibility study and resource estimation	200 246 ha		No listed activity triggered

6.5 Description of the activities to be undertaken

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

6.5.1 Minerals to be prospected for

Most of the diamond production in South Africa is attributed to large-scale, land-based mining operations. Marine and coastal diamond mining operations are rapidly increasing. However, the mining of various other valuable materials in the Benguela region (off the west coast of southern Africa) is also rapidly increasing in economic importance. Years of erosion and natural forces (wind, rain, water currents) have washed gemstones and other valuable minerals from their primary deposits in kimberlite pipes to beaches (including submerged paleo beach terraces) where they were deposited. TAD is proposing to prospect for precious metals (gold, silver and platinum), gemstones (alluvial diamonds, sapphires and garnets), ferrous and base metals such as rare earths (monasite mineral), black sand minerals (titanium minerals e.g. ilmenite and rutile), zirconium ore (zircon) and iron ore (magnetite)) within Sea Concession Area 7C (Table 6-2).

Note that the natural maximum value of raw mineral radiation is not expected to exceed the safety guidelines and that all regulations and standards as set out by the South African Maritime Safety Authority (SAMSA), International Maritime Organization (IMO), The International Maritime Dangerous Goods (IMDG) Code and International Atomic Energy Agency Safety Standards (IMDG) will be complied with when prospecting, extracting, working with, storing and transporting any minerals. As an example, natural maximum values of raw Monazite radiation around workers in a factory was measured at 0.62 mSv y, which is lower than the reference level range for abnormally high levels of 1-20 mSv y for natural background radiation (as published in the International Commission of Radiological Protection (Iwaoka *et al.* 2017).

Table 6-2. Details relating to the proposed prospecting, including minerals to be prospected and location details.

ITEM	DETAIL

Type of mineral(s)	• Precious metals (gold, silver and platinum)
	• Gemstones (alluvial diamonds, sapphires and garnets),
	• Ferrous and base metals:
	  ○ rare earths (monasite mineral)
	  ○ black sand minerals (titanium minerals e.g., ilmenite and rutile)
	  ○ zirconium ore (zircon)
	  ○ iron ore (magnetite)

Locality	Concession Area 7C is situated offshore of the Kamiesberg local Municipality within the greater Namakwa District Municipality in the Northern Cape. It lies adjacent the coastal town Hondeklipbaai, with Koingnaas located approximately 10 km east and inland of the concession area. The northern boundary extends from approximately 17 km north of Hondeklipbaai and the southern boundary approximately 12 km south of this town. The inshore boundary (closest to the shore) of this concession area starts in the ocean approximately 5 km (2.7 nautical miles) west of the high-water mark at a water depth of 70 m (70 m isobath). The concession area then extends between 65

	km and 100 km (at its longest part) westwards from this point to 200 m water depth (200 m isobath).
Extent of the area required for prospecting	200 246 ha
Geological formation	Mineralised Quaternary sediments overlying Pre-Cambrian and Cretaceous bedrock

6.5.2 The need for and use of these minerals

The global population increases by approximately 83 million people every year. This has led to an increased need for goods and services such as food products, houses, transport, healthcare, schools, etc., and has, in turn, driven technological progress and advances, industrialisation, globalisation and consumerism.

Industrialisation is the shift from a predominantly agricultural economy and society to one dominated by mass-production and technologically advanced goods and services. This has increased our incomes, standards and quality of living and need for recreation and leisure. Globalisation is the increased interdependence of the world's economies and cultures, and the trade in technology, goods, services and information to meet the growing needs of the growing population. This has further led to a culture of consumerism, where there is an increasing encouragement and desire for the acquisition and consumption of goods and service. Unfortunately, the growing world and South African population and associated growing needs, requires an increase in products to meet these needs. Examples include transportation, fuel, cell phones, laptops, farming equipment, houses, fishing vessels, factories for production of goods, etc. Materials used in the production of these products are mostly sourced from the environment.

South Africa possesses some of the world's richest resources, minerals and several other commodities, which has the potential to supply the international markets (Minerals and Mining Policy for South Africa, 1998). Trans Atlantic Diamonds are therefore proposing to prospect for precious metals (gold, silver and platinum), gemstones (alluvial diamonds, sapphires and garnets), ferrous and base metals such as rare earths (monasite mineral), black sand minerals (titanium minerals e.g., ilmenite and rutile), zirconium ore (zircon) and iron ore (magnetite), which are considered pivotal in today's modern society and everyday life.

Gold, platinum, silver, diamonds and other gemstones, and other precious metals are not only used in the manufacturing of jewellery, but also in a plethora of other areas. Platinum, gold and silver are most commonly used as catalytic converters, in modern medicine (treatment of cancer, rheumatoid arthritis and other diseases, pacemakers, dental implants, prosthesis), in information technology (cell phones, laptops, computers), to make glass and in fuel, to name but a few of the uses. Diamonds are an important commodity in the global economy that has grown from approximately 1 million carats in the late 1800's to 176.7 million carats in 2005 (Janse 2007) and is now considered a billion-dollar industry. Apart from being used in the jewellery industry, diamonds are also used in several other industries. They are, for example, used in the automotive industry and are components of high-tech vehicles. Being the hardest known material on earth, diamonds are used in polishing, cutting and drilling tools. These gems are also used in surgical tools and instruments (x-ray machines, dentist drills, 3-D non-invasive bioimaging machines), modern medicine (drug delivery system to disease-infected

organs, cancer treatment, tissue engineering) and information technology. Garnets are used in construction as skid-resistant road aggregates, in paints and as fillers in concrete used in harsh environments. Rare Earth Elements (REEs) are used as components in information technology, wind turbines and defence technologies. Ilmenite and rutile are the primary sources of titanium and titanium oxide. The latter minerals are used in the manufacturing of lightweight, high-strength metal alloys, which are again used to manufacture a wide variety of parts and tools including information technology, aircraft parts, sporting equipment and artificial joints. Zircon is used in high accuracy optics, in ceramics and in construction material as it can withstand high temperatures. Iron ore is probably the most used metal in everyday life. It is used in the construction of machinery, tools, ships, vehicles, aircrafts, bridges, buildings, and electric motors.

The National Development Plan 2030 (NDP) and Operation Phakisa aims to boost the growth of the economy and alleviate poverty and inequality amongst South Africans through faster and inclusive growth development. A manner of achieving this is to focus on South Africa's natural resources and creating opportunities that will advance the NDP strategy. Mining is identified in the NDP as an industry that has large potential for growth and employment opportunities and for it to continue to contribute largely to the South African economy, new mineral resources need to be identified through prospecting. Both frameworks promote the sustainable use of the country's natural resources as well as the conservation, preservation and restoration of the environment.

In terms of the above, it is evident that mining-related activities are deemed to be a key component of the current national and provincial economies and future mining projects are a means to assist Governments in meeting broader societal needs. It is important to remember that potential future mining is still years down the line and that the current application process is focused on prospecting which is a key initial step in the mining process and necessary for resource estimation and planning.

Unfortunately, the impacts of globalisation, industrialisation and consumerism are complex. Though it is key in economic growth and innovation and in meeting the everyday needs of people, thereby benefiting society as a whole, it also has numerous wide-ranging negative social (mental health and moral) and environmental impacts. One of the roles of Environmental Assessment Practitioners is to assess, mitigate and manage the impacts of globalisation and industrialisation as best possible.

6.5.3 Description of the proposed activities

The proposed prospecting programme will take place during spring and/or summer and when weather conditions are suitable, and seas are calm. The proposed prospecting programme will be completed over approximately 40-80 days, depending on the number of resource development areas identified, and 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 (Table 6-3 and Table 6-4) 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 over the entire extent of 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) (Figure 6.4).

Table 6-3. Non-invasive and invasive sampling activities planned during prospecting in Concession Area 7C.

Non-invasive sampling activities	Invasive sampling activities
Desktop study	Core sampling using either a Vibracore, Gravity core or Sonic core
Geophysical survey and seafloor mapping	Drilling with a specialised drilling tool
Feasibility study and resource estimation	Van Veen grab sampling

Table 6-4. The four sampling phases

Phase	Activity
Phase 1	Desktop Study
	Geophysical Exploration
Phase 2	Van Veen grab sampling
	Core sampling
Phase 3	Drill sampling
Phase 4	Feasibility study and resource estimation

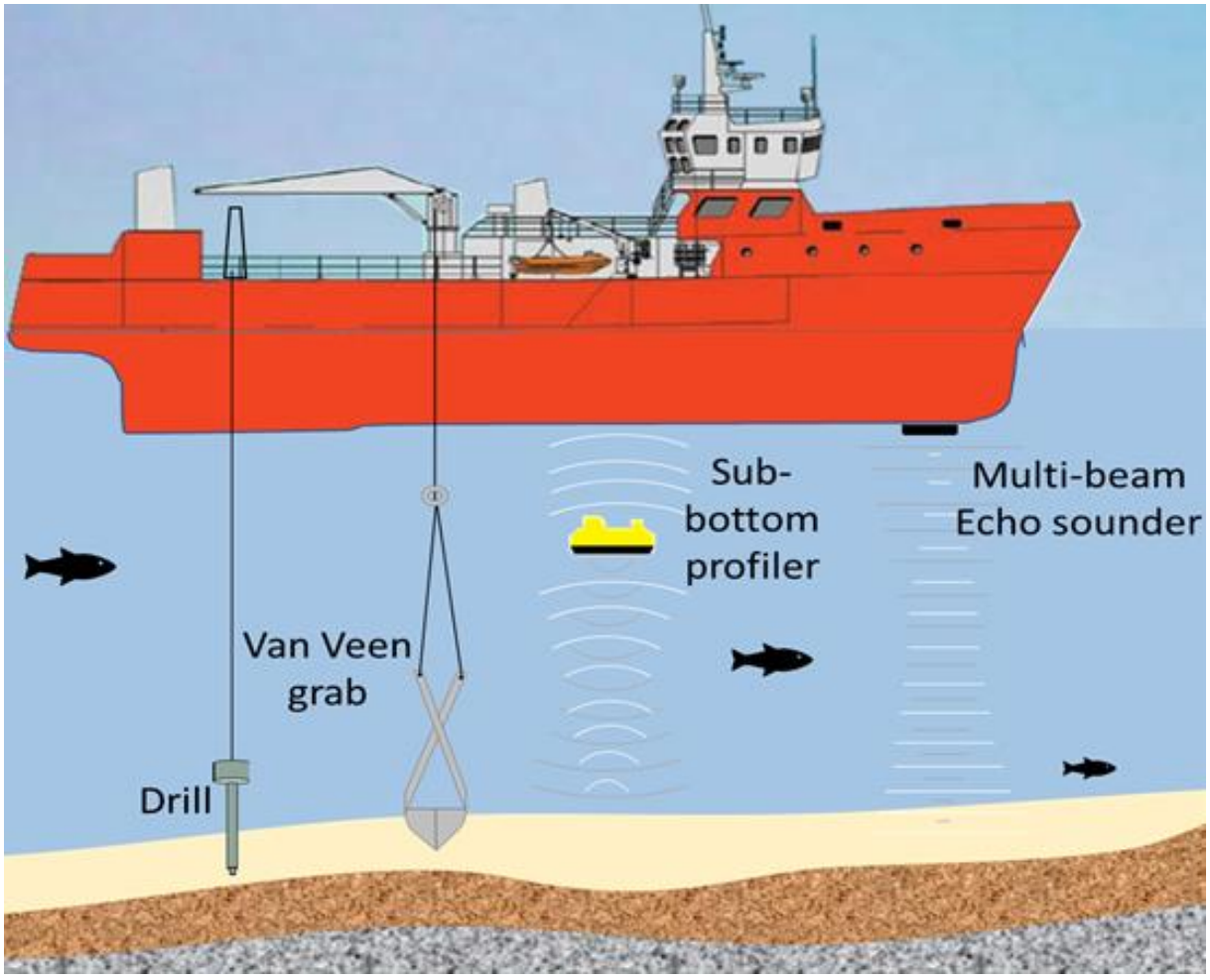


Figure 6.4. Illustration of some of the various sampling methods that will be used.

6.5.3.1 Phase 1

Desktop study

A comprehensive literature review will be undertaken to investigate the depositional environments, sediment stratigraphy and geological units of the area. Data will be obtained from a variety of sources including previous explorations in neighbouring concession areas, published papers, data from field surveys, databases, etc. This review will allow the applicant to identify target sites that are likely to contain diamonds or other valuable minerals within the concession area. It will also enable the applicant to identify potential challenges and the best means to address these challenges with a view to minimising environmental impacts and costs. This will allow for a more efficient and effective prospecting sampling programme.

Geophysical exploration

Geophysical surveying will be undertaken to collect high-resolution acoustic and multibeam echosounder data along lines 50 m to 200 m apart, throughout the concession area. Surveys will be conducted using a dedicated survey vessel such as the IMD SA survey vessel DP Star (Figure 6.2) or the Explorer (Figure 6.3). The vessel will have a hull-mounted multibeam echo sounder (MBES) and a Topas sub-bottom profiler system that are designed to collect high-resolution acoustic data (Figure 6.5). As these devices are hull mounted, no physical or environmentally destructive impacts are anticipated for this sampling method. Potential noise or sound impacts on biota will, however, be considered. The acoustic equipment will be similar to that typically used in diamond prospecting i.e., hull-based transducers that generate sounds waves at frequencies of 70-455 kHz. The information collected during the acoustic survey will be reviewed by both the geologist and the Environmental Control Officer/ Scientific Officer to identify target areas for sampling, any areas that need to be avoided and to inform the appropriate core sampling and drilling method that must be implemented. The preferred alternative within the site is thus subject to change pending results from the geophysical survey.

Figure 6.5. An example of a sub-bottom profiler. Source: Seatronics.

The IMD SA survey vessel DP Star is regularly used for similar survey work along the west coast of southern Africa. This type of survey typically does not require the vessel to tow any cables, however, it will be "restricted in its ability to manoeuvre" during the survey due to the operational nature of this work. Geophysical surveying will be undertaken along survey lines spaced 1000 m to 100 m apart

throughout the concession area. Geophysical surveying will be undertaken over a two-month period of suitable, calm sea and weather conditions (the survey speed of the DP Star is typically 100 km/day and it is estimated that this would take approximately 10 days). The bathymetry of 7C will be modelled using processed seismic survey data before sampling can take place — it is estimated that this would take approximately one month.

The use of this geophysical survey equipment allows the operator to produce a digital terrain model of the seafloor. The MBES provides depth sounding information on either side of the vessel's track across a swath width of approximately two times the water depth, while the Topas sub-bottom profiler generates profiles up to 60 m beneath the seafloor, thereby giving a cross section view of the sediment layers. The source sound level of the MBES is variable but will be a maximum of 221 dB re 1µPa @ 1m, with a frequency range of between 200 and 400 kHz. The Topas sub-bottom profiler uses shallow (35 to 45 kHz) and medium penetration (1 to 10 kHz) "Chirp" acoustic pulses. This equipment has a variable power output and can therefore have the power ramped up in accordance with survey requirements and be contained within acceptable environmental noise levels. As such, it is also capable of "soft starts". The use of a magnetometer to detect magnetic signatures will also be required. Sampling will be undertaken in targeted areas as through the analysis of the acoustic survey data.

6.5.3.2 Phase 2:

Van Veen grab sampling

This is a popular method used to collect sediment samples for biological, environmental and geotechnical studies. It usually comprises a clamshell bucket made of stainless steel that collects sediment from the seafloor. A Van Veen grab with a sampling capacity of approximately 50 kg will be used to collect baseline environmental data on sediment and benthic macrofauna (Figure 6.6). These samples will be collected at 20–50 sites at a sampling rate of approximately 30 samples per day (maximum) and equate to two working days. The grab can penetrate to depths of 20 to 50 cm and collects surficial sediment samples that will be subjected to subsampling. Those for biological analyses will be stored in formalin or ethanol whereafter they will be sent for biological analysis, while the geotechnical subsamples will be frozen and sent to a laboratory to test for shear strength, grain size composition, etc. Biological samples will be analysed to identify and characterise benthic macrofauna communities (small animals such as worms, mussels, and crustaceans), whilst geotechnical samples will be used to determine the geological units of the seafloor. Total volume of the grab is 0.03 m^3 and it will disturb an area covering approximately 0.2 m^2. The total area expected to be disturbed by the Van Veen grab will be approximately 10m^2, and the total volume of all grab samples (assuming 50 grabs are taken) is 1.5 m^3. Results from this survey will represent baseline data against which any change in macrofaunal communities in the area can be benchmarked after prospecting and mining (should the project proceed to production).

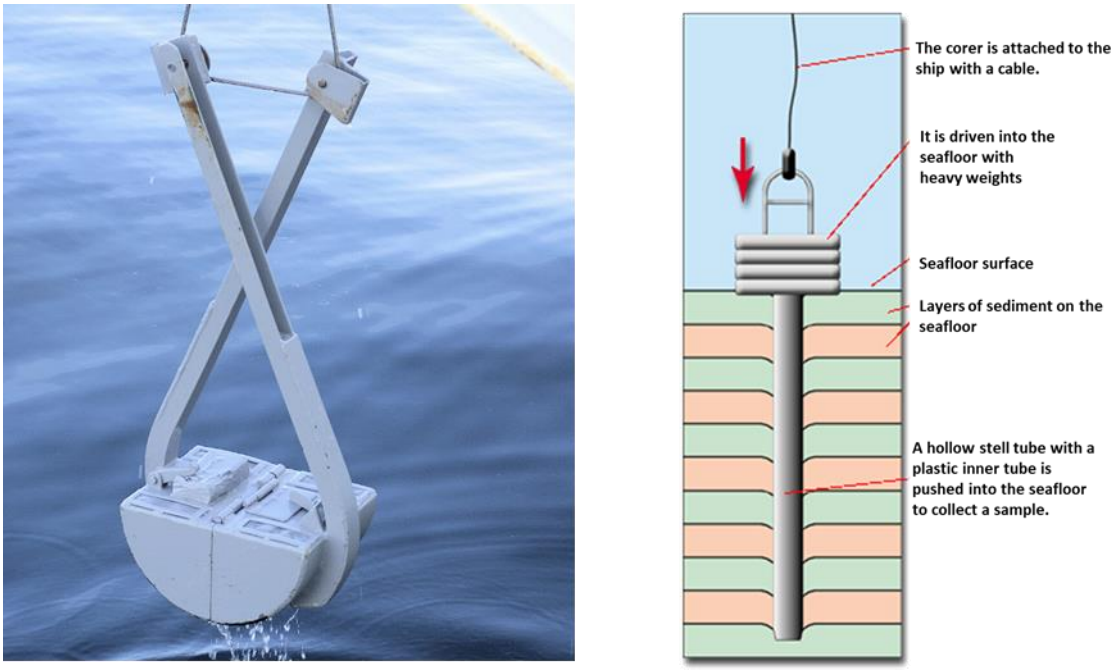


Figure 6.6. **(Left) A Van Veen grab works like a claw to grab sediment containing macrofauna from the seafloor. (Right) Example of a corer. Source: British Ocean Sediment Core Research Facility.**

Coring

Geotechnical samples will be collected at 100–200 sites using a special type of equipment called a core (Figure 6.6). A core is a type of barrel or hollow casing used to penetrate the seafloor to collect sediment samples. These samples are analysed to determine the sea floor geology (types of material present, i.e. sand, gravel and/ or rock and the hardness of the rock), topography (trenches or elevations) and sediment stratigraphy (how sand and rock are layered). This information is then used to engineer the drilling tool (for phase three of the prospecting activities – see below) and the future mining vessel. Geotechnical sampling is also used for resource evaluation, i.e. determining whether there are materials that can be mined in the area and whether it will be economically viable. One of three types of cores will be used, i.e., either a vibracore, gravity core or sonic core. The type of coring will depend on the geological formations of the seafloor. The sonic core is an advanced form of drilling that employs high-frequency, resonant energy generated inside the Sonic head to advance a core barrel or casing into subsurface formations, i.e. can penetrate some subsurface rock, whilst gravity and vibracoring can only sample unconsolidated material. The diameter of core samples will be approximately 10 cm, the corers will penetrate to depths of 3–5 m. Material collected by the cores will be brought to the surface for analysis. The volume per core is estimated at 0.024 m^3. Core samples do not require onboard processing (i.e. no sediment spill in the ocean) as all material collected will remain intact within core tubes which will be analysed on land. The core samples will be collected from a purpose-built survey vessel with equipment sourced from IMD SA and/or Underwater Mining Solutions. The exact sampling sites will be informed by the information acquired during the geophysical surveying and the recommendations from the environmental impact assessment (marine ecology specialist study). The core samples will disturb a total surface area of 1.57 m^2, while the total volume of samples that will be collected by the cores will be 4.71 m^3.

The concession area over which the coring will span is 200 246 ha rendering the total coring area (1.57 m^2) inconsequential. It is estimated that core samples will be sampled at a rate of approximately ten cores per day which would amount to a total of twenty days' work.

6.5.3.3 Phase 3

Drilling

Prospective targets will be analysed by a uniquely designed drill tool that can dredge gravel from the seabed (Figure 6.7). Pending the final tool design, the drill bit footprint is estimated to be between 3 and 5 m^2 diameter. The expected average hole depth will be 3 m. Sample volumes are anticipated to be in the range of 9 to 15 m^3 per sample. This does not constitute bulk sampling in terms of the Mineral and Petroleum Resources Development Act, Act 28 of 2002 (pers comms DMRE), however, as the material is for prospecting purposes only, not commercial gain, nor are large sections of the seafloor being dredged out. The drilling phase will constitute three steps.

1. Step 1: A total of 150 samples will be collected at an initial sample density of 0.06 samples/ha. The 150 samples will cover a surface area of 750 m^2 (based on a drill size of 5 m^2). Samples will be spaced at roughly 300 m apart from north to south. A sampling rate of 30 samples per day would equate to a period of approximately five days (this does not consider weather delays).
2. Step 2: Follow-up sampling will require an additional 150 samples. These 150 samples will also cover a surface area of 750 m^2 (based on a drill size of 5 m^2). Samples will be spaced at roughly 300 m apart from north to south. A sampling rate of 30 samples per day would equate to a period of approximately five days (this does not consider weather delays).
3. Step 3: Should these follow-up samples indicate that there could be a potential resource, only then will resource development commence. A potential resource area of not larger than 500 m x 300 m will then require an additional 60 samples spaced on a 50 m grid. Approximately 20 resource development areas will be required. This equates to 1 200 samples covering a surface area of 6 000 m^2 (based on a drill size of 5 m^2). A sampling rate of 30 samples per day would equate to a period of approximately 40 days.

Material will be processed onboard by a processing plant and tailings will be discarded overboard in a designated area to avoid sensitive habitats, reefs and important fishing areas and take into account currents and wind direction. The formation and persistence of sediment plumes in the water column, as a result of the discarding of tailings, is largely dependent of the sediment particle size and prevailing oceanographic conditions. Discard material that consists mostly of sand has a minimal suspension time (plumes will settle quickly), whilst muddy sediments form longer lasting plumes. The total surface area that will be disturbed during Phases 1, 2, and 3 is estimated at 7 507 m^2 or 0.75 ha. This equates to 0.0068 % of the total area of Concession Area 7C and lead to the removal of 22500 m^3 of sediment. The information acquired during these three phases will be used for understanding the seafloor topography, resource evaluation and to determine if diamond or other mineral mining within Concession Area 7C will be economically viable. Information will also be used to inform the construction of the mining vessel and to identify areas for mining.

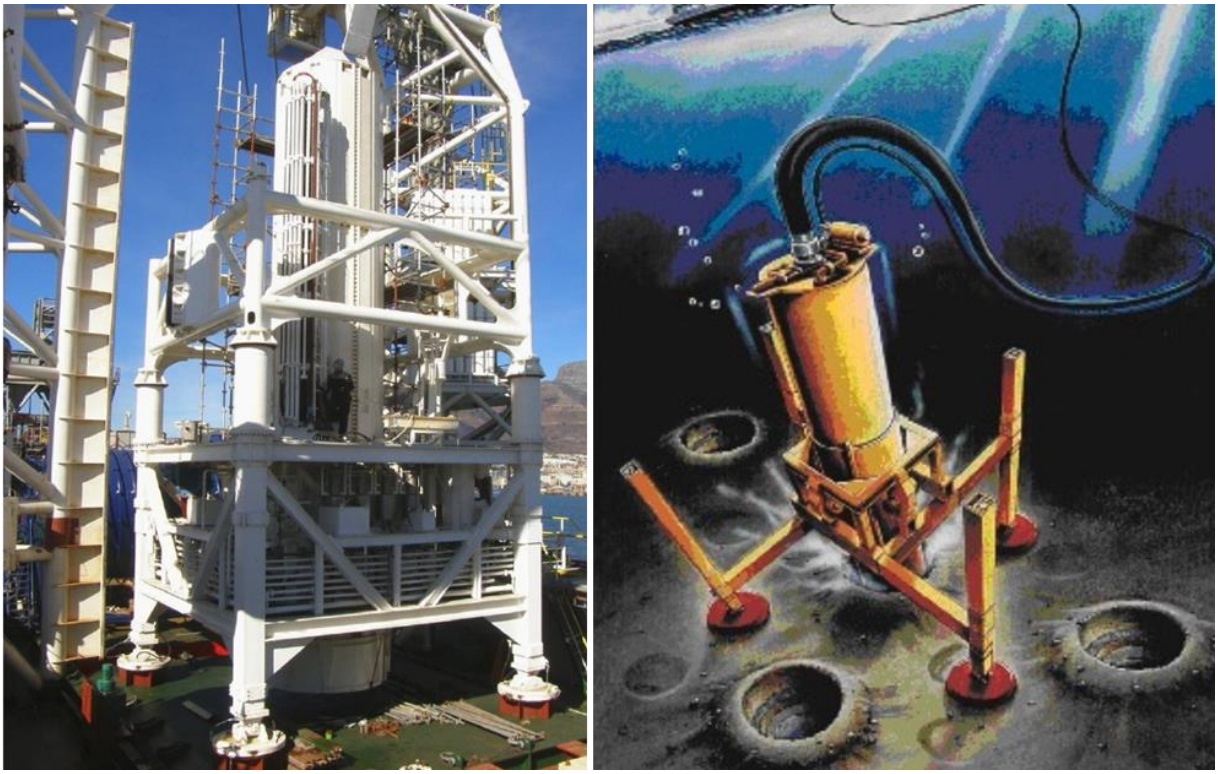


Figure 6.7. **A sampling drill tool onboard The Explorer with a drill bit footprint 5m² (left) and an artists impression of a smaller sampling drill tool with a drill bit footprint of 3m².**

6.5.3.4 Phase 4:

Feasibility study and resource estimation

Should Phases 1, 2 and 3 yield positive results and the targeted features be identified, a feasibility study will be conducted to assess the likely magnitude of the resource and the economic viability of mining in the proposed prospecting area. This will be a desktop study and will consider the data collected as part of the prospecting activities. The outcome of this will be a Feasibility Study Report. The report will include data on the seafloor topography, sediment stratigraphy and geological units; distribution of potentially mineralised deposits; an evaluation of the drill samples; resource evaluation of areas that are mineralised; an estimate of the extent and size of the resource present; results and recommendations for future mining operations, and recommendations on mining vessel design and construction.

6.6 Policy and legislative context

Table 6-5. The most important legislation applicable to prospecting in Concession Area 7C.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
Mineral and Petroleum Resources Development Act, 2002. In terms of this Act, a Prospecting Right must be obtained before any prospecting activities may commence	Throughout the entire prospecting process	The applicant must submit a prospecting right application in terms of Section 16 (1) of this Act, along with an application for Environmental Authorisation (EA) to the Regional Manager. The prospecting right application must be accepted within 14 days, provided that no other entity or person holds a Prospecting Right, Mining Right, Mining Permit or Retention Permit for the same land and mineral. Once the application is accepted, a Basic Assessment Process, including stakeholder consultation and reporting, must be conducted as per Chapter 5 of the National Environmental Management Act, 1998 (NEMA).
National Environmental Management Act, 1998. NEMA sets out a number of governing environmental principles that should be taken into account and applied by all organs of state when making decisions that significantly affect the environment. It provides the minimum requirements for the procedures for investigating, assessing and communicating the potential impacts of activities on the environment and society and for the granting of Environmental Authorisation for any activity. It requires that any activity should not only be environmentally sustainable, but economically and socially as well. The cultural, social, economical, psychological, developmental and physical needs of people should be considered along with the environment.	Throughout the entire prospecting process	A Basic Assessment Process will be conducted, and the appropriate environmental authorisation obtained before commencing with any activities. Measures will be taken to ensure that the activity preserves and promotes the environmental and socioeconomic integrity of the area. Interested and Affected Parties (I&APs) will be consulted and informed about the proposed activities and their potential impacts (both positive and negative). Comments received from I&APs will be communicated to the authorities for consideration as part of the Basic Assessment Report.
Environmental Impact Assessment (EIA) Regulations, 2014 (as amended). The EIA regulations, 2014 (as amended) promulgated in term of Chapter 5 of NEMA controls certain listed activities. These activities are published as Listing Notice (LN) 1 in Government Notice (GN) No. R983 (as amended) as LN 2 in GN No.R 984 (as amended) and as LN 3 in GN No. R985 (as amended). These activities are prohibited until Environmental Authorisation (EA) has been granted by the competent authority. Activities triggered under LN 1 and 3	Throughout the entire prospecting process	The proposed project triggers Listing Notice (LN) 1. A Basic Assessment Process will be undertaken and a Basic Assessment Report and stakeholder consultation report submitted as part of the application for EA. No activity will commence before EA has been granted by the Competent Authority.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
requires that a Basic Assessment be conducted, while activities triggered under LN 2 requires that a Scoping and Environmental Impact Assessment Report be conducted. See the Department of Environmental Affairs and Development Planning. 2011. EIA guideline and Information document series: Information document on biodiversity offsets		
National Environmental Management: Air quality Act, 2004. The offshore area of activity and the South African Exclusive Economic Zone (EEZ) does not fall within any municipal or provincial jurisdiction. There is thus a no formal means by which an application can be made for incineration from vessels in the offshore area. This activity is, however, permitted in terms of the International Convention for the prevention of pollution from ships, 1973/1978 (MARPOL) to which South Africa is a signatory.	Throughout the entire prospecting process	South Africa is a signatory of the International Convention for the prevention of pollution from ships, 1973/1978 (MARPOL). As such, all vessels have the responsibility to ensure that they prevent, minimise and mitigate potential pollution by vessels. To manage the potential impact of air pollution by vessels, all contractors and employees will be subjected to an environmental awareness campaign.
National Environmental Management: Waste Act, 2008.	Throughout the entire prospecting process	The client must ensure that this act is adhered to throughout the entire process.
Convention for the prevention of pollution from ships, 1973/1978 (MARPOL).	Throughout the entire prospecting process	Convention for the prevention of pollution from ships, 1973/1978 (MARPOL). As such, all vessels have the responsibility to ensure that they prevent, minimise and mitigate potential pollution by vessels. While a waste management license is not required for offshore waste management activities, such as those related to sewage, the generation of potential waste will be minimised through ensuring employees are subjected to the appropriate environmental awareness campaigns before commencement. All waste generated will be disposed of in a responsible and legal manner.
National Heritage Resources Act, 25 of 1999.	During coring, drilling and grab sampling	A heritage impact assessment has been conducted to ensure that there are no substantial impacts on heritage sites. No prospecting activities shall take place within 50 m of any identified heritage resources such as shipwrecks.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
Companies Act 71 of 2008 The aim of this act is to: • provide for the incorporation, registration, organisation and efficient management of companies, the capitalisation of profit companies, and the registration of offices of foreign companies carrying on business within the Republic; • record-keeping and reporting by companies;	Throughout the entire prospecting process	The client must ensure that this act is adhered to throughout the entire process.
Restitution of Land Rights Act 22 of 1994 The Act provides for the restitution of rights to land to persons or communities dispossessed of their rights after 19 June 1913 as a result of historical racially discriminatory laws and practices	N/A	As this is an offshore application, this act is not applicable to this application.
Climate Change – Carbon Tax Act 15 of 2019 A taxpayer is liable to pay a carbon tax where it conducts any activities set out in Schedule 2 of the Carbon Tax Act and emits GHG emissions above the listed thresholds. Tax liability may be reduced through using the various allowances available and in some instances, the tax is only payable where the allowances are exceeded.	Throughout the entire prospecting process	The client has the responsibility to ensure that they pay carbon tax should they emit emissions above the listed thresholds or ensure that they reduce their emissions.
Climate Change – National Climate Change Response White Paper This paper provides guidance across all levels of government, sectors, and stakeholders in terms of climate change adaptation efforts in South Africa in the short to medium-term. Financial institutions must integrate environmental considerations into their decision-making frameworks and contribute to climate change mitigation and resilience. The paper acknowledges that financial institutions can play an important role in mobilizing finance to mitigate the impacts of climate change in South Africa and supporting a just transition to a low carbon economy.	Throughout the entire prospecting process	The client has the responsibility to ensure that they integrate environmental considerations and mitigation measures to reduce the impacts of climate change as a result of any operations they conduct into their decision-making frameworks and business plans.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
National Water Act 36 of 1998 South Africa's waters are governed by the Water Services Act of 1997 and the National Water Act (NWA) of 1998. The NWA requires that certain water users obtain a license with the Department of Water Affairs and follow specific requirements. Activities that typically require water use licenses are abstraction of water from dams or boreholes for irrigation, forestry operations, discharging wastewater into water courses and altering the physical structures of rivers and streams.	N/A	As this is an offshore prospecting activity that will not require any water uses, this act is not applicable to this activity.
The Occupational Health and Safety Act No. 85 of 1993 The Act governs health and safety at all workplaces. It is focused on the health and safety of persons at work and places the responsibility on employers "to do everything reasonably practical" to protect the welfare of their employees The Act requires that every company with more than 20 employees has to have a health and safety committee, which should be tasked with identifying potential hazards, examining the causes of any workplace incidents, investigating employee complaints and consulting with health and safety inspectors. The Act also directs employers to provide and establish precautionary measures and systems to prevent workplace injuries.	Throughout the entire prospecting process	The client has to ensure that they adhere to the conditions set out in this act throughout the entire process. They also have to appoint a Health and Safety Officer to supervise the health and safety performance of the company, as well as to represent the employer and management at Health and Safety Committee meetings.
National Environmental Management: Protected Areas Act *"To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes"*	During coring, drilling and grab sampling	Results from the Screening Report and specialist marine impact assessments should be taken into consideration to avoid prospecting in a protected area or area of conservation concern.
Maritime Zones Act (No 15 of 1994) The Act defines the maritime zones of South Africa which include the contiguous zone, territorial waters, the maritime cultural zone, the exclusive economic zone and the continental shelf. South Africa	Throughout the entire prospecting process	Concession Area 7C lies within the territorial waters. Any offshore are subject to National law and should be adhered to.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
has the right to exercise and implement all laws within the contiguous zone.		
Constitution of South Africa This is the supreme law that provides the legal framework for the existence of the Republic of South Africa.	Throughout the entire prospecting process	The conducting of prospecting activities in the area shall be done in such a manner that avoids significant environmental impacts. In instances where this cannot be avoided, impacts must be minimised or mitigated in order to protect the environmental rights of South Africans.
National Environmental Management: Biodiversity Act 10 of 2004. This act provides legal protection and management of South Africa's biodiversity within the context of the National Environmental Management Act and the sustainable use of biological resources.	Throughout the entire prospecting process	Strict compliance with the EMPr should be adhered to and mitigation measures implemented to reduce disturbance of biodiversity and aid in recovery.
Relevant specific environmental management Act (SEMA(s)) and their regulations. This refers to and includes subordinate regulations made in terms of section 1 of NEMA and specifically refers to the Protected Areas, Biodiversity, Air Quality, Integrated Coastal Management and Waste Acts.	Throughout the entire prospecting process	Applicable SEMA acts should be taken into account during the planning and design phase so that appropriate protocols are developed and maintained during the operational phase such as for waste management and protection of biodiversity areas.
CapeNature Western Cape Biodiversity Spatial Plan (WCBSP, 2017) A spatial assessment and biodiversity plan that is delineated on a Geographic Information System map that includes Critical Biodiversity, Ecological Support Areas to inform sustainable development in the Western Cape.	Planning and Design Phase	This spatial plan should be taken into account during the plan and design phase to inform areas for prospecting and activities should be adjusted accordingly.
•The Western Cape Provincial Spatial Development Framework (2014) (Department of Environmental Affairs & Development Planning)8	Throughout the entire prospecting process	This legislative framework should be taken into account to promote growth and development of local communities and should be considered during the planning and design phase.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
This includes land development policies, strategies, objectives as well as growth and development strategies for the province, all of which are spatially represented.		
The Mining and Biodiversity Guideline (2013) Outlines six principles that should be applied during any stage of the mining for decision-making. The document uses biodiversity information for decision-making throughout the mining cycle	Throughout the entire prospecting process	This should be employed to provide a practical guideline when making decisions regarding impacts to biodiversity with respect to the prospecting activities.
The Western Cape Land Use Planning Guidelines: Rural Areas (2019) Aims at Safeguarding priority biodiversity areas and their functionality and ecological infrastructure and ensuring sustainable development in rural locations throughout the Western Cape	Throughout the entire prospecting process	This guideline will inform the planning and design of the prospecting survey and can be used to develop protocols for implementation in the operation phase.
Western Cape Guideline on Biodiversity Offsets DEA&DP 2015. Western Cape Guideline on Biodiversity Offsets. Prepared by Susie Brownlie and Mark Botha for DEA&DP, Cape Town12	Throughout the entire prospecting process	This guideline should be used during the planning and design phase such that residual impacts of the prospecting activity on biodiversity should be reduced.
National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (NEM: ICMA) ICMA governs the sustainable use of goods and services that are generated by coastal and marine ecosystems.	Throughout the entire prospecting process	The required discharge and dumping permits need to be obtained in terms of NEM: ICMA with reference to the discharge of sediment into the marine environment Implement the Provincial Coastal Management Programme (PCMP). Its purpose is to provide an integrated, coordinated and uniform approach to coastal management in accordance with the and the.
Marine Spatial Planning Act of 2019 Makes provision for marine spatial planning system in South Africa so that the environment can be accessed by all users of the ocean, to facilitate responsible use of the ocean and conservation for future generations.	Planning and Design Phase	When planning the prospecting survey, areas of biological significance need to be taken into account and avoided.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
National Estuarine Management Protocol (promulgated in GN No. 533 of 18 June 2021). This protocol was developed to determine a vision and objectives for integrated and effective management of South African estuaries.	Throughout the entire prospecting process	Relevant guidelines, Estuarine Management Plans and Mouth Management Plans need to be considered should activities impact the Olifants River Estuary
International Regulations for Preventing Collisions at Sea (Colregs 1972) These regulations refer to navigational rules that need to be adhered to by maritime vessels to minimise the likelihood of collisions.	Operation Phase	To prevent collision with other maritime vessels during survey operations, the operation vessel should adhered to this regulation, implement a safety zone and effectively signal this to other vessels.

6.7 Need and desirability of the proposed activities.

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

The global population increases by approximately 83 million people every year. This has led to an increased need for goods and services such as food products, houses, transport, healthcare, schools, etc., and has, in turn, driven technological progress and advances, industrialisation, globalisation and consumerism.

Industrialisation is the shift from a predominantly agricultural economy and society to one dominated by mass-production and technologically advanced goods and services. This has increased our incomes, standards and quality of living and need for recreation and leisure. Globalization is the increased interdependence of the world's economies and cultures, and the trade in technology, goods, services and information to meet the growing needs of the growing population. This has further led to a culture of consumerism, where there is an increasing encouragement and desire for the acquisition and consumption of goods and service. Unfortunately, the growing world and South African population and associated growing needs, requires an increase in products to meet these needs. Examples include transportation, fuel, cellphones, laptops, farming equipment, houses, fishing vessels, factories for production of goods, etc. Materials used in the production of these products are mostly sourced from the environment.

South Africa possesses some of the world's richest resources, minerals and several other commodities which has the potential to supply the international markets with more than it can consume (Minerals and Mining Policy for South Africa, 1998). According to the Minerals and Mining Policy for South Africa, 1998, the national mining industry is said to be one of the few "world-class industries" in the country with the potential to create broad scale employment opportunities and wealth. Trans Atlantic Diamonds are therefore proposing to prospect for precious metals (gold, silver and platinum), gemstones (alluvial diamonds, sapphires and garnets), ferrous and base metals such as rare earths (monasite mineral), black sand minerals (titanium minerals e.g., ilmenite and rutile), zirconium ore (zircon) and iron ore (magnetite)), which are considered pivotal in today's modern society and everyday life.

Gold, platinum, silver, diamonds and other gemstones, and other precious metals are not only used in the manufacturing of jewellery, but also in a plethora of other areas. Platinum, gold and silver are most commonly used as catalytic converters (for silicone production for example), in modern medicine (treatment of cancer, rheumatoid arthritis and other diseases, pacemakers, dental implants, prosthesis), in information technology (cell phones, laptops, computers), to make glass and in fuel, to name but a few of the uses.

Garnets are used in construction as skid-resistant road aggregates, in paints and as fillers in concrete used in harsh environments. Rare Earth Elements (REEs) are used as components in information technology, wind turbines and defence technologies. Ilmenite and rutile are the primary sources of titanium and titanium oxide. The latter minerals are used in the manufacturing of lightweight, high-strength metal alloys, which are again used to manufacture a wide variety of parts and tools including information technology, aircraft parts, sporting equipment and artificial joints. Zircon is used in high accuracy optics, in ceramics and in construction material as it can withstand high temperatures. Iron

ore is probably the most used metal in everyday life. It is used in the construction of machinery, tools, ships, vehicles, aircrafts, bridges, buildings, and electric motors.

Diamonds are an important commodity in the global economy that has grown from approximately 1 million carats in the late 1800's to 176.7 million carats in 2005 (Janse 2007) and is now considered a billion-dollar industry. Apart from being used in the jewellery industry, diamonds are also used in several other industries. They are, for example, used in the automotive industry to make vehicles and also form part of high-tech vehicles. Being the hardest known material on earth, diamonds are used in polishing, cutting and drilling tools. These gems are also used in surgical tools and instruments (x-ray machines, dentist drills, 3-D non-invasive bioimaging machines), modern medicine (drug delivery system to disease-infected organs, cancer treatment, tissue engineering) and information technology.

While the majority of diamond production in South Africa is attributed to large-scale land-based mining operations, marine and coastal diamond mining operations are rapidly increasing. In 2005, six of the 14 Southern African Development Community (SADC) member states (Angola, Botswana, Democratic Republic of Congo, Namibia, South Africa and Tanzania) together produced 87.8 million carats of diamonds (US$7.5 billion) which is equivalent to 53% of world production (DME, 2006; Penney *et al.* 2007). Diamond mining production in South Africa alone, however, has decreased slightly from around 15 million carats in 2007 to around 9.9 million carats to in 2017 (DMR 2017). Although the overall South African Mining Industry production decreased by 4.0% in 2016, which was regarded as the largest annual fall since the global recession of 2009, diamond production still grew in that year (1%) and was recognized as the most successful mineral for the year in 2016. Furthermore, the latter commodity escalated further reaching 17% production growth in 2017 (STATS SA 2018).

While the most important source of diamonds is kimberlite pipes, the second major source is alluvial diamonds, which are formed through the erosion of the kimberlite pipes, resulting in the release of diamonds into rivers and ultimately, the sea. Today, these deposits extend from the coast down to 150 m depth (approximately 50–60 km offshore) where they are found in gullies and potholes which have been covered with sediment over time. It is this marine diamondiferous gravel that is of interest to the modern marine diamond mining industry (Penney *et al.* 2007). Diamond mining in the Benguela region (off the west coasts of southern Africa) has been shown to be economically important (DME, 2006; Penney *et al.* 2007) and therefore the proposed prospecting activities are ideally placed in Concession Area 7C offshore of the Western Cape Coast of South Africa.

Mineral prospecting also aligns itself with two national policies: The National Development Plan 2030 (NDP) and Operation Phakisa. The main objective of the NDP is to alleviate poverty and inequality amongst South Africans through faster and inclusive growth development. A manner of achieving this is to focus on South Africa's already unprecedented amounts of natural resources and creating opportunities that will advance the NDP strategy. Mining is identified in the NDP as an industry that has large potential for growth and employment opportunities and for it to continue to contribute largely to the South African economy, new mineral resources need to be identified through prospecting.

Operation Phakisa was established to facilitate and boost the growth of the economy to help achieve the objectives of the NDP, and to operate across industries. Mining Phakisa is a programme established under this operation whose objective is to warrant the economic sustainability of the South African mining industry and to promote the growth and contribution thereof at a national level.

Both of these frameworks promote the sustainable use of the country's natural resources as well as the conservation, preservation and restoration of the environment.

The Northern Cape Provincial Spatial Development Framework 2012 (PSDF) and Western Cape PSDF 2014 also notes that "the greatest value from marine and coastal resources is generated through the mining and fishing sectors" and that the Northern and Western Cape has an abundance of diamond deposits. This has led to the development of a large diamond mining sector, which has become the dominant activity of the coastal zone.

In terms of the above, it is evident that mining-related activities are deemed to be a key component of the current national and provincial economies and future mining projects are a means to assist Governments in meeting broader societal needs. It is important to remember that potential future mining is still years down the line and that the current application process is focused on prospecting which is a key initial step in the mining process and necessary for scientific knowledge, environmental baseline data, resource estimation and planning.

6.8 Alternatives considered

6.8.1 Motivation and full description for the overall preferred site, activities and technology alternative and proposed preferred alternatives within the site.

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

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

Kimberlite pipes are believed to have formed by high-pressure and deep-rooted volcanic eruptions. They are igneous intrusions or "pipes" projecting through the Earth's crust and a major source of diamonds and other minerals such as rutile, zircon, garnets, ilmenite and magnetite (Gurney *et al.* 1991; Penney *et al.* 2007). These pipes transport the diamonds and minerals from the upper mantle to the surface of the Earth. These deposits were then further transported by means of erosion, wind, rain and rivers and deposited primarily in the sea in gravel terraces along riverbanks and on the coast. The Orange and Olifants rivers are believed to be the major westward transport mechanisms responsible for the deposition of diamondiferous sediments along west coast of South Africa and southern Namibia (Gurney *et al.*1991; Penney *et al.* 2007). With the influence of currents, swell and tidal action, diamonds gradually accumulated on gravel beaches along the coast (Penney *et al.* 2007). Today, these deposits extend from the coast down to 150 m depth (approximately 50–60 km offshore) where they are found in gullies and potholes which have been covered with sediment over time. It is this marine diamondiferous gravel which is of interest to the modern marine diamond mining industry (Penney *et al.* 2007).

With the Benguela region being rich in diamond, mineral and other deposits, the former Department of Minerals and Energy (now the Department of Mineral Resources and Energy — DMRE) established designated mineral sea concession areas in 1994, extending from Saldanha Bay to the Orange River mouth on the west coast of South Africa. Prospecting and mining activities are only permitted by individuals that are in possession of a mining or prospecting right, and only within specially designated areas that allow the industry, the trade of commodities, the associated activities and potential impacts, environmental management and the responsible extraction of minerals, to be monitored. Companies can apply for prospecting and/ or mining rights within concession areas for which rights are available. As this is a competitive industry, few concession areas are available at any given time. The Applicant has applied for prospecting rights in four other concession areas (14A, 14C, 11C and 14A) of which the results are still pending. Although several other concession areas were also considered by the applicant, the prospecting and mining rights for many of these were already held by other companies.

As the intention of the proposed prospecting activity is to search for diamondiferous, gemstone, mineral and metal deposits, and to ensure the economic feasibility of mining within a certain concession area, an area known to contain these resources needs to be selected. As such, few location alternatives exist. Diamonds and other commodities have been discovered in neighbouring "C" concession areas and some are actively mined. In addition, the preferred site is thought to contain palaeo-beach deposits which are known from prospecting and mining in other concession areas, to contain diamondiferous gravels.

The National Web based Environmental Screening Tool (Appendix 2), SANBI BGIS database and the 2022 National Coastal and Marine Spatial Biodiversity Plan (Harris *et al.* 2022) was consulted to review the Ecosystem Threat Status and to identify Marine protected Areas, Ecologically and Biologically Significant Areas and Critical Biodiversity Areas in the region. GIS layers were extracted and overlaid on a map of Concession Area 7C in ArcGIS. This enables the identification of areas of conservation concern. Although Concession Area 7C falls partly (4% overlap) within the proposed Namaqua Coastal Ecological and Biologically Significant Area (EBSA), it falls outside of any MPAs (Figure 6.8) and has a threat status of "Least Concern" according to the SANBI Ecosystem Threat Status (Figure 6.9).

The concession area does, however, overlap with sections of an area classified as being a Critical Biodiversity Area (CBA) and in a natural state (Figure 6.10). According to the 2022 Marine Spatial Planning Report, non-destructive prospecting (which excludes bulk sampling, but includes acoustic sampling, coring, and grab sampling) within CBAs or Ecological Support Areas are considered to be of restricted compatibility with the objectives of the EBSA and CBA and permissible should the impacts on the objectives be appropriately low (Harris *et al*. 2022). Should the non-destructive forms of prospecting indicate the presence of sufficient mineral resources, then future mining might be possible should suitable mitigations and like-for-like offsets be put in place (Harris *et al*. 2022). Should these mitigation measures not be achievable, the recommendation is that the activity remains prohibited (Harris *et al*. 2022). Destructive prospecting (which would include drilling) is, however, not compatible with these management objectives and should not occur in the parts of Concession area 7C that overlap with the CBA.

No invasive sampling will be undertaken on reef areas as these are known to be hotspots for marine biodiversity. As no geophysical sampling has been conducted in this area to date, the exact position

of reefs and other areas that need to be avoided have not yet been identified. These areas will be identified only after the non-invasive seismic surveys have been completed. Consultation with stakeholders during the Public Participation Process will further elucidate areas that need to be avoided. The preferred alternative within the site is thus subject to change pending results from the geophysical survey and consultation with stakeholders.

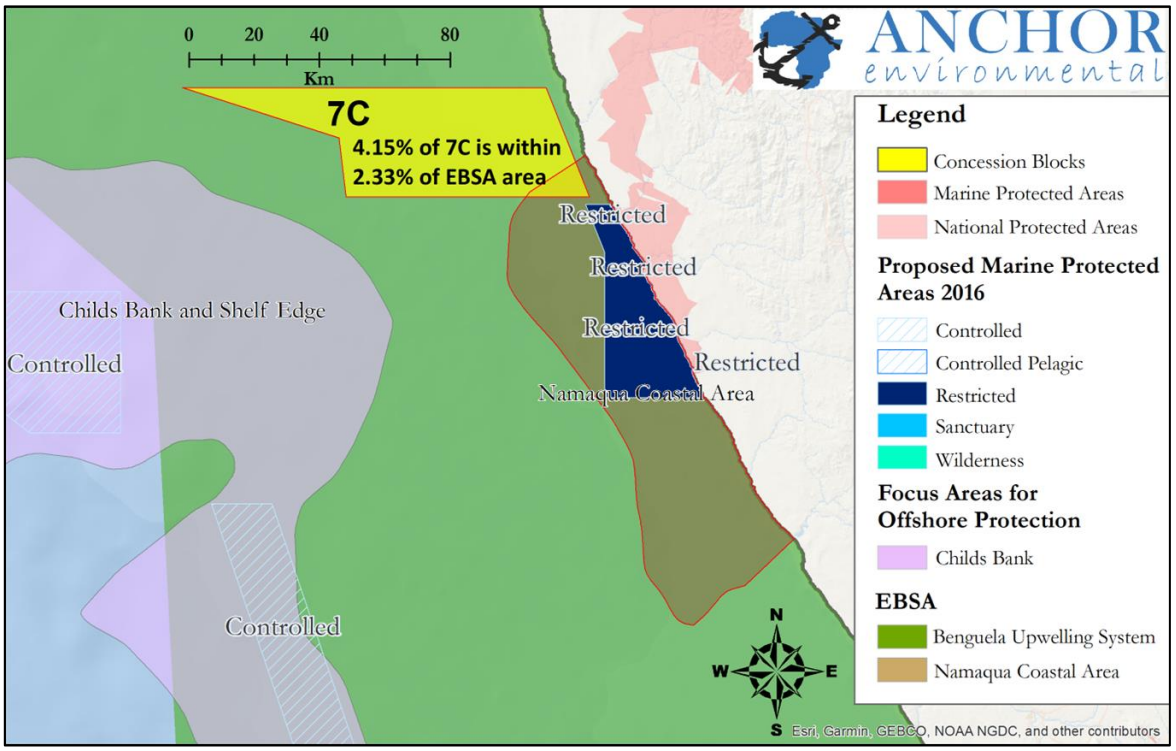


Figure 6.8. Marine protected Areas (dark blue), proposed EBSA's and the location of Concession Area 7C. Source: https://bgis.sanbi.org/

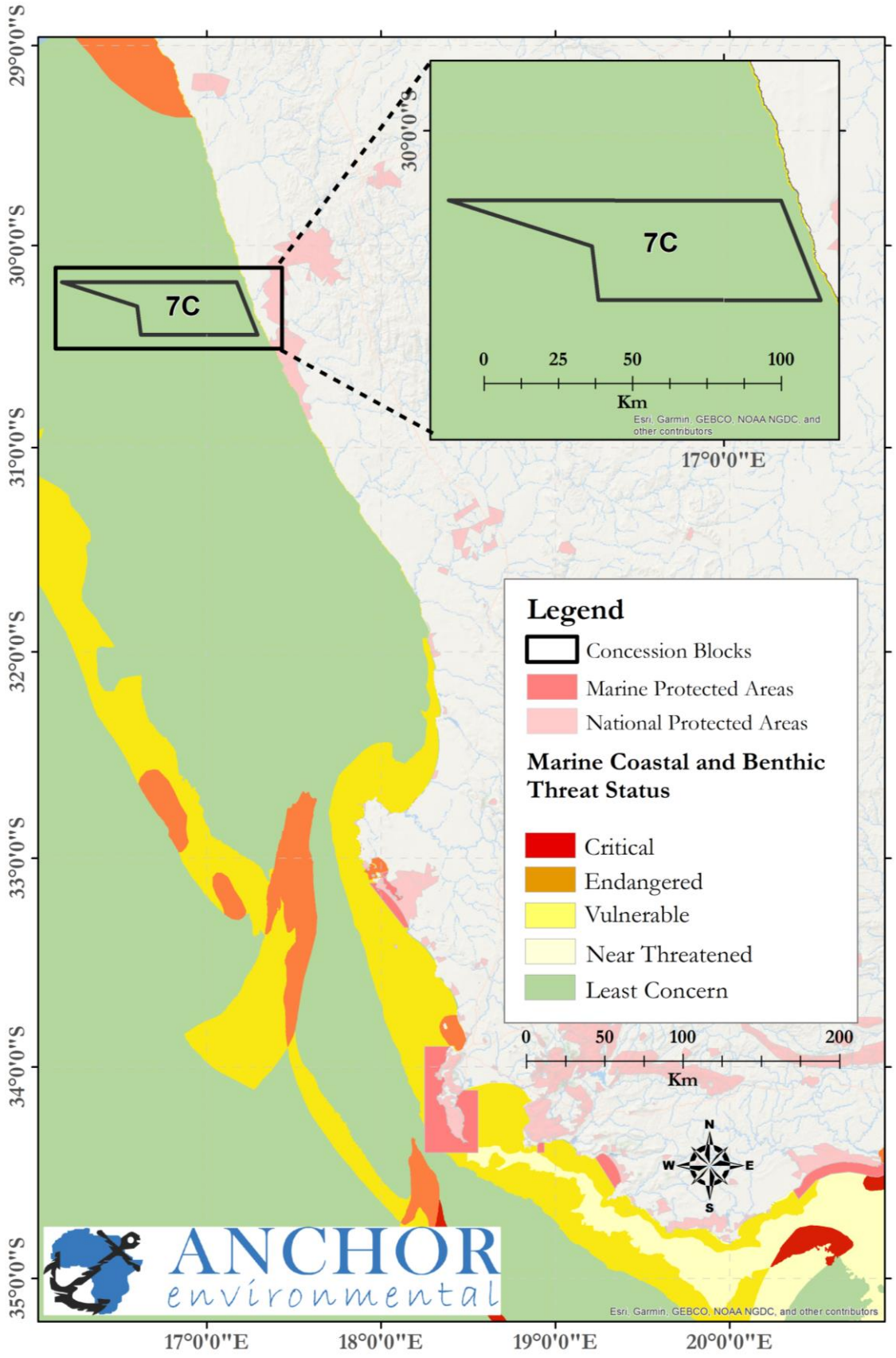


Figure 6.9. SANBI Ecosystem Threat Status and location of Concession Area 7C. Source: https://bgis.sanbi.org/

Figure 6.10. Concession Area 7C with respect to Critical Biodiversity Areas and the Namaqua Coastal Area EBSA (Harris *et al.* 2022).

b) the type of activity to be undertaken

Alternatives which exist in terms of the activities include prospecting by means of bulk sampling or prospecting without bulk sampling. Bulk sampling entails use of dredge equipment to sample large volumes over large areas of the sea floor. The impact of bulk sampling is expected to be higher than that without bulk sampling. For this reason, prospecting without bulk sampling has been selected as the preferred alternative. The preferred activities, i.e. geophysical surveys and drilling, are the primary methods used for mineral prospecting, and will facilitate the discovery and estimation of mineral resources within the concession area. These activities will include invasive and non-invasive methods such as geophysical surveys, drilling and baseline biological sampling outlined in section 5.5 above. These methods have been developed through many years of research and development by the mining industry and are the preferred methods for resource estimation and cannot easily be replaced by any other methods.

c) the design or layout of the activity

Areas of conservation concern in addition to reef areas will be avoided. As no geophysical sampling have been conducted in this area to date, the exact position of reefs and other areas that need to be avoided have not yet been identified. Consultation with stakeholder during the Public Participation Process will further elucidate areas that need to be avoided. The preferred alternative within the site is subject to change pending results from the geophysical survey and consultation with stakeholders.

d) the technology to be used in the activity

The preferred activities will include invasive and non-invasive methods such as geophysical surveys, coring, drilling and baseline biological sampling and will facilitate the discovery and estimation of natural mineral resources with the sea concession area. These methods are thus the preferred activities and cannot be replaced by other methods. Several types of core and drill tools do exist. The Van Veen grab sampling, core sampling and drill sampling will disturb a total surface area of approximately 5 m^2, 1.57 m^2 and 6 500 m^2, respectively. This amounts to a total of 0.75 ha which is 0.0068% of the total area of the concession area.

e) the operational aspects of the activity

The preferred timing for this project is to undertake geophysical and sampling surveys within five years. There is some flexibility in terms of which months of the year the sampling and surveying will be undertaken and this will be informed by the specialist studies and consultation with interested and affected parties (I&APs). For example, every effort will be made to avoid sampling and prospecting during seasonal migrations of marine mammals, fish and birds and at times when fishing fleets are operating in the concession area. Results of the BA and associated specialist studies will also be used to guide selection of the most appropriate survey and sampling equipment. This is detailed in the project EMPr. No infrastructure and no services in terms electricity, water supply, or sewerage facilities are required.

f) the option of not implementing the activity (No-go option)

According to EIA regulations and guidelines (as amended), a no-go option should also be included. As such, the absence or non-occurrence of prospecting in the concession area is considered to have both positive and negative implications. The advantage of the no-go option will mean that there are no impacts on the bio- and geophysical environment in the proposed prospecting area while the disadvantages of not prospecting will lead to a loss of opportunity to extract an economically viable natural resource, prevention of socioeconomic benefits and loss of economic and growth development opportunities. Given the high existing levels of unemployment and poverty within South Africa, this is considered significant.

7 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES

7.1 Description of the affected baseline environment

7.1.1 Regional oceanography

The Benguela is one of the world's most productive systems, supporting rich fishing grounds and attracting large colonies of sea birds and seals (Branch 1981). Wind is the primary driver of productivity in the system. The prevailing south-easterly winds displace surface water offshore during the summer, and cause cold, nutrient rich water to rise from deeper water masses to replace this surface water. These upwelling events are the trigger for minimum temperatures and maximum nutrient levels (Branch and Griffiths 1988). The oceanic primary producers, phytoplankton, bloom when upwelled inorganic nutrients become available for photosynthesis in the presence of sunlight. These are consumed by zooplankton, which are in turn consumed by small pelagic fish species such as anchovy and sardine. The Benguela is one of the world's most productive systems, supporting rich fishing grounds and attracting large colonies of sea birds and seals (Branch 1981).

The West Coast is subject to semi-diurnal tides, with each successive high (and low) tide separated by 12 hours. Spring tides occur once a fortnight during full and new moons. Tidal activity greatly influences the biological cycles (feeding, breeding and movement) of intertidal marine organisms, and has an influence on when people visit the coastline to partake in various activities such as bathing and the harvesting of marine resources.

The west coast of South Africa typically experiences high wave energy and is dominated by south-westerly swells (Branch and Griffiths 1988). Southerly and south-westerly waves frequently exceed 2 m (Figure 7.1). The average water temperature during the summer months is cool due to upwelling (approximately 11°C) and slightly warmer during downwelling events, which are caused by westerly winds or occasional Benguela Niños when unseasonal westerly winds result in a breakdown of the upwelling front with movement of warm oceanic water towards the coast (Laird and Clark 2018).

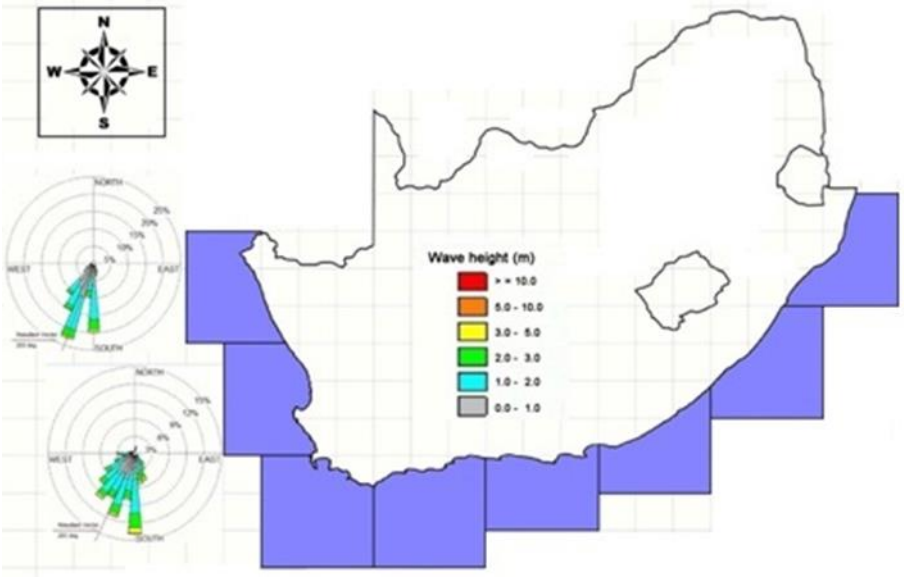


Figure 7.1 **Wave roses showing the frequency of significant wave heights and direction on the West Coast (Source: SADCO Voluntary Observing Ships data).**

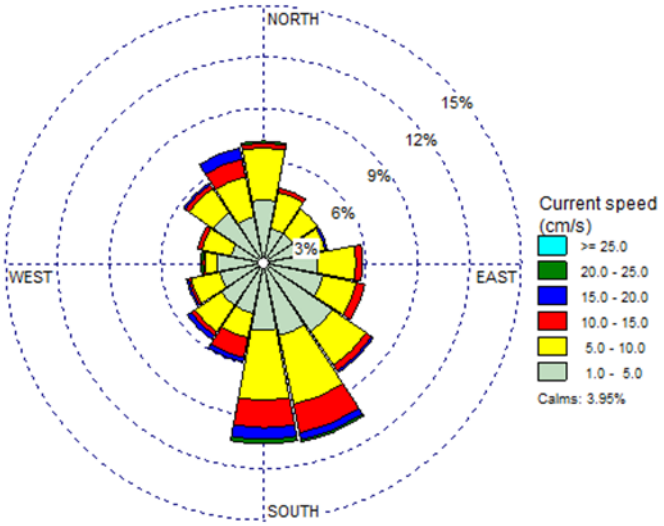


Figure 7.2 **Current rose showing current direction and strength data at -12 m water depth approximately 15km north of the Olifants River Mouth (inshore and south of Concession Area 7C). (Source: Laird and Clark 2018).**

7.1.2 Biogeography

Concession Area 7C is positioned in the southern section of the Benguela Current System (BCS), which extends along the west coast of southern Africa between Cape Agulhas and Angola. The area falls within the Namaqua inner shelf ecozone, which is nested within the Southern Benguela Ecoregion as defined by Sink *et al.* (2012) (Figure 7.3).

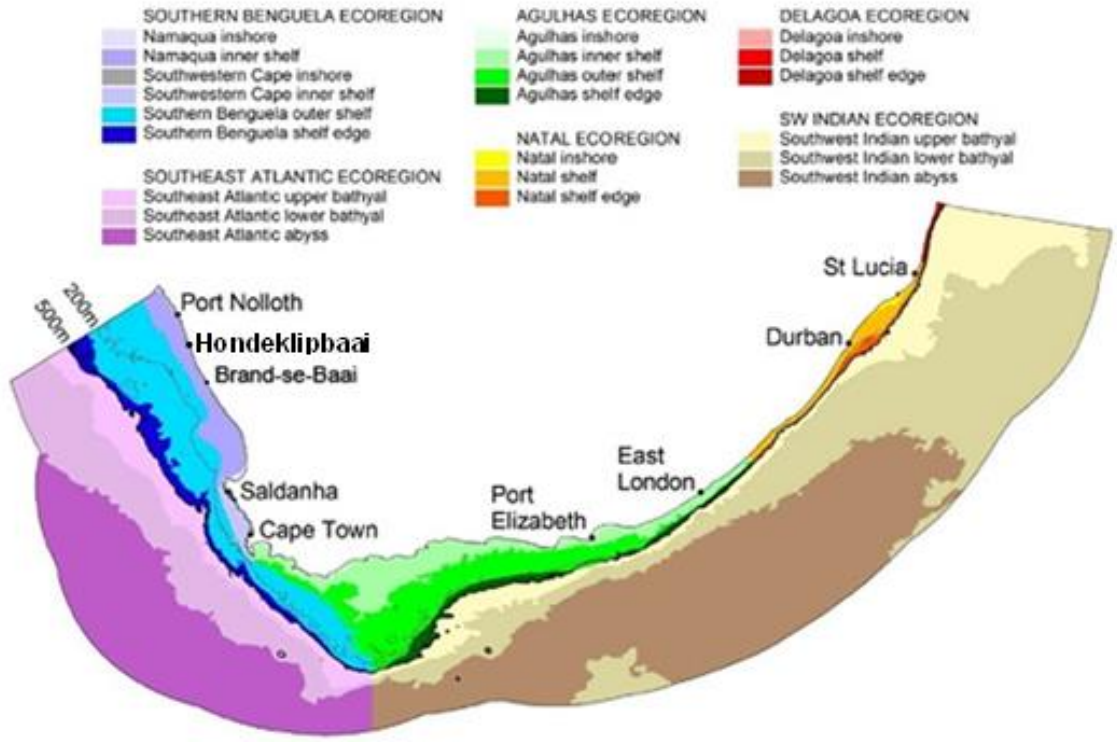


Figure 7.3. Six marine ecoregions with 22 ecozones incorporating biogeographic and depth divisions in the South African marine environment as defined by Sink *et al.* (2012).

7.1.3 Ecology

Wind-driven coastal upwelling is the predominant physical driver that shapes the high levels of biological productivity in the southern Benguela, providing nutrients for primary producers, and food for diverse fauna, such as pelagic (pilchards, anchovy) and demersal (hakes, kingklip) fish stocks, near-shore fisheries (linefish, rock lobster), mammals (seals and whales) and seabirds (penguins, gannets, cormorants etc.). There are three broad marine habitats within or adjacent to the 7C Concession Area. These include sandy benthic habitat, rocky reefs, and the water column or pelagic habitat.

7.1.3.1 Subtidal sandy benthic habitat

Benthic epifauna are animals that inhabit the surfaces of subtidal sand, while infauna are those that burrow or dig into the soft sediments (Castro and Huber 1997). The distribution of infauna and the depth at which organisms can live in the substrate is largely dependent on sediment particle size. More porous, larger grained substrates allow for greater water circulation through the sediment, thereby replenishing the oxygen that is used up during the decomposition processes.

Much of the benthic infauna on the western coast are deposit feeders (e.g. worms), feeding and extracting nutrients from sediment, organic matter and detritus (Castro and Huber 1997). Suspension feeders feed on detritus and plankton suspended in the water column (e.g. some crab species), while filter feeders actively pump and filter water to extract suspended particles (e.g. bivalves). Most bottom-dwelling fish inhabiting soft bottom habitats are predators (e.g. rays and skates, flat fish such

as sole). Predators such as crabs, hermit crabs, lobsters and octopuses, which inhabit rocky areas, may move to sandy benthos to feed (Castro and Huber 1997). Similarly, reef-associated fish also rely on sandy substrate for food.

Macrofauna living within benthic substrata play an important role in the reworking of sediments. These organisms assist in promoting the exchange of oxygen and nutrients within the substrate by enhancing sediment porosity. Macrofaunal communities also provide an important food source for fish and other invertebrate species.

Benthic macrofauna are the biotic component most frequently monitored to detect changes in the health of a marine environment as they are short-lived, and their community composition responds rapidly to environmental change (Warwick 1993). They also tend to be directly affected by pollution, are easy to sample quantitatively, and are scientifically well-studied compared to other sediment-dwelling components. Anthropogenic physical disturbance will negatively affect benthic macrofauna and is likely to result in the proliferation of opportunistic pioneer species following a disturbance event. Harmer *et al*. (2013) showed that polychaetes are generally most abundant, followed by amphipods and gastropods. The soft sediment infauna of the Namaqua inner shelf ecozone of the west coast of South Africa is moderately well studied. Benthic sampling undertaken by Anchor Environmental Consultants in concessions 1B, 1C and 2C (similar depth range and biogeographical zone as 7C) yielded a benthic macrofaunal community consisting of 45 species with an average biomass of 85.9 g/m^2 (1B), 31.8 g/m^2 (1C) and 38.9 g/m^2 (2C) respectively (Mostert *et al*., 2016 and Biccard *et al*., 2020a). This is much lower than the diversity and biomass of macrofaunal communities found in the shallower, sheltered and retentive bays along the west coast (diversity: >150 species; biomass: St. Helena Bay = 846.53 g/m^2, Saldanha = 970.78 g/m^2) (Biccard *et al*. 2020c; Clark *et al*. 2020). Available evidence suggests that the macrofaunal communities of Concession Area 7C are more similar to those found in the offshore, open coast areas such as 1C and 2C than the sheltered, productive west coast bays, but this will be confirmed during the proposed baseline sampling.

7.1.3.2 Offshore rocky reefs

The offshore environment is divided into six areas: the inner and outer shelf, the shelf edge, the upper and lower bathyal zones, and the abyssal zone. According to the National Biodiversity Assessment, offshore benthic habitat types include six broad ecosystem groups: rocky shelf, rocky shelf edge, seamounts and unconsolidated shelf, unconsolidated shelf edge and deep-sea sediments (Sink *et al*. 2012). Concession Area 7C lies within what is mostly classified as sandy inner shelf habitat interspersed with rocky outcrops (Figure 7.4). The sandy inner shelf habitat type has the greatest extent within our EEZ, with muddy, gravel and mixed sediment habitat types constituting smaller areas (Sink *et al.* 2012). These offshore rocky reefs are colonised by a range of epifauna including bryozoans, encrusting and upright sponges, solitary and colonial ascidians, sea anemones and cold-water coral colonies – the latter being slow-growing and taking many years to become established (Biccard *et al*. 2020b). Studies undertaking assessments of prospecting and mining-related impacts on these habitats in this region are relatively new and the time taken for disturbed epifaunal communities inhabiting offshore rocky reefs to recover has not yet been determined (Biccard *et al.* 2020b).

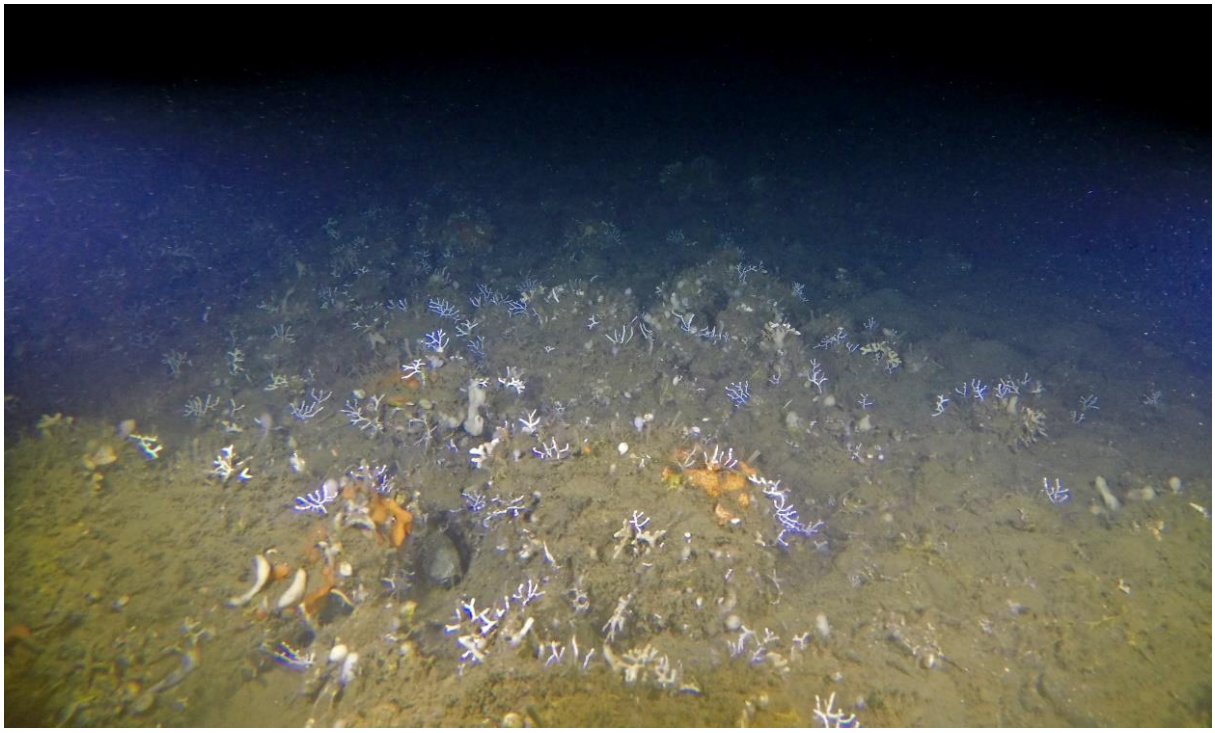


Figure 7.4. A typical hard-bottom inner shelf benthic habitat off the west coast of South Africa consisting of both epifauna and infauna. Source: Anchor Environmental.

These offshore reefs within Concession Area 7C should be visually assessed (by means of drop camera deployments or remotely operated underwater vehicle) during the baseline environmental survey with regular repeat surveys following mining operations in the area — offshore reefs may not be directly impacted (mined) but are at risk of being indirectly impacted by tailings disposal.

7.1.3.3 Pelagic habitat

This habitat type constitutes the largest of all habitats and is loosely defined as the water column of the open ocean. Main physical drivers include temperature, turbidity, dissolved oxygen, nutrient levels and light. In contrast to demersal and benthic biota that are associated with the seabed, pelagic species live and feed in the open water column. Pelagic communities are divided into plankton and fish, and their main predators, seabirds, marine mammals (seals, dolphins and whales) and turtles.

7.1.3.3.1 Planktonic communities

The ecology of the open water pelagic habitat within Concession 7C is typical of the Benguela upwelling region and the Namaqua inshore ecozone. Pulsed inputs of nutrients (nitrates, phosphates and silicates) due to wind driven upwelling result in high primary productivity with phytoplankton communities dominated by dinoflagellates and diatoms. Phytoplankton are consumed by a variety of zooplankton that typically consist of crustacean copepods, euphausiids, mysids and a myriad of eggs and larvae from almost all marine phyla. For example, ichthyoplankton in the southern Benguela are composed mainly of small pelagic anchovy and sardine fish eggs and larvae, with some hakes and

mackerel (Shannon and Pillar 1986). Zooplankton are in turn the food source for large numbers of small pelagic fish, particularly sardine *Sardinops sagax*, anchovy *Engraulis encrasicolus,* red eye round herring *Etrumeus whiteheadi* and maasbanker, *Trachurus capensis*. These small pelagic fish exert a controlling influence on the abundance of both their zooplankton prey and their predators that include commercially important fish species such as snoek *Thyristes atun*, yellowtail *Seriola lalandi* and hake *Merluccius* sp. (Cury *et al.* 2000; Shannon *et al.* 2020).

7.1.3.3.2 Seabirds

Fourteen species of seabirds breed in southern Africa; Cape Gannet, African Penguin, four species of Cormorant, White Pelican, three Gull and four Tern species (Table 7-1) Species listed as endangered on the IUCN red data list include the African penguin, Cape cormorant and the bank cormorant. Breeding areas are distributed around the coast with islands being particularly important. The number of successfully breeding birds at each breeding site varies with the abundance of food. Most of these breeding seabird species forage for small pelagic fish at sea with most birds being found relatively close inshore (within 30 km of the coast). Of the diving birds that occur along the coast, only *Morus capensis*, the Cape gannet, regularly feeds from the inshore environment as far as 100 km offshore and African penguins have also been recorded as far as 60 km offshore. Most of the species listed here are likely to be encountered in concession 7C (the inner margin is located only 5 km offshore). Note that inshore species such as the African Black Oyster Catcher (Swart Tobie) *Haematopus moquini*, that are not likely to be encountered as far offshore as Concession area 7C, are not listed in the table below.

Table 7-1. Breeding seabirds present on the west coast of South Africa (adapted from Pulfrich 2021).

Common name	Species name	Global IUCN Status
African Penguin	*Spheniscus demersus*	Endangered
Great Cormorant	*Phalacrocorax carbo*	Least Concern
Cape Cormorant	*Phalacrocorax capensis*	Endangered
Bank Cormorant	*Phalacrocorax neglectus*	Endangered
Crowned Cormorant	*Phalacrocorax coronatus*	Near Threatened
White Pelican	*Pelecanus onocrotalus*	Least Concern
Cape Gannet	*Morus capensis*	Vulnerable
Kelp Gull	*Larus dominicanus*	Least Concern
Greyheaded Gull	*Larus cirrocephalus*	Least Concern
Hartlaub's Gull	*Larus hartlaubii*	Least Concern
Caspian Tern	*Hydroprogne caspia*	Least Concern
Swift Tern	*Sterna bergii*	Least Concern
Roseate Tern	*Sterna dougallii*	Least Concern
Damara Tern	*Sterna balaenarum*	Near Threatened

Pelagic seabirds such as albatross, petrels and shearwaters are prevalent in offshore areas such as 7C. Species listed as endangered include the black-browed albatross and yellow-nosed albatross. A large

number of these seabirds are supported by the small pelagic fish stocks of the Benguela system. The area between Cape Point and the Orange River is said to support 38% and 33% of the overall population of pelagic seabirds in winter and summer, respectively (Baker and Arnott 2021). Pelagic seabirds classified as being common in the southern Benguela are listed (Table 7-2). Most of the species in the region reach highest densities offshore of the shelf break (200–500 m depth) (Baker and Arnott 2021), mostly offshore of concession 7C.

Table 7-2. Pelagic seabirds common to the southern Benguela region (Crawford *et al.* 1991).

Common name	Species name	Global IUCN Status
Shy albatross	*Thalassarche cauta*	Near Threatened
Black browed albatross	*Thalassarche melanophrys*	Endangered
Yellow nosed albatross	*Thalassarche chlororhynchos*	Endangered
Giant petrel sp.	*Macronectes halli/giganteus*	Near Threatened
Pintado petrel	*Daption capense*	Least concern
Greatwinged petrel	*Pterodroma macroptera*	Least concern
Soft plumaged petrel	*Pterodroma mollis*	Least concern
Prion spp.	*Pachyptila spp.*	Least concern
White chinned petrel	*Procellaria aequinoctialis*	Vulnerable
Cory's shearwater	*Calonectris diomedea*	Least concern
Great shearwater	*Puffinus gravis*	Least concern
Sooty shearwater	*Puffinus griseus*	Near Threatened
European Storm petrel	*Hydrobates pelagicus*	Least concern
Leach's storm petrel	*Oceanodroma leucorhoa*	Least concern
Wilson's storm petrel	*Oceanites oceanicus*	Least concern
Blackbellied storm petrel	*Fregetta tropica*	Least concern
Skua spp.	*Catharacta/Stercorarius spp.*	Least concern
Sabine's gull	*Larus sabini*	Least concern

7.1.3.3.3 Marine mammals

The marine mammal fauna occurring off the southern African coast includes several species of baleen whales, toothed whales, beaked whales, dolphins and one resident seal species. Based on the available literature thirty-six marine mammals that may occur in the proposed survey area have been identified (Table 7-3); each of these have been placed into marine mammal hearing groups as per Southall *et al.* (2019).

Of the species listed, the blue whale is considered 'Critically endangered', fin and sei whales are 'Endangered' and two (humpback and sperm whale) are considered vulnerable (IUCN Red Data list Categories). Current information on the distribution, population sizes and trends of most cetacean species occurring on the west coast of southern Africa is lacking (Pulfrich 2021). The most abundant baleen whales in the Benguela are humpback whales and southern right whales. During the last decade, the prevalence of both species on the West Coast of South Africa outside of the usual June-November whale season has increased with feeding behaviour observed in upwelling zones off Kommetjie, Saldanha and St Helena Bay (Barense *et al.* 2011; Mate *et al.* 2011). Increasing numbers

of summer records of both species from the southern half of Namibia suggest that animals may also be feeding in the Lüderitz upwelling cell (NDP unpublished. data) and will therefore occur in or pass through the area of interest (Pulfrich 2021).

Table 7-3. Marine mammals that may occur within the proposed survey area. Each species listed has been placed into a marine mammal hearing group as defined by Southall *et al.* 2019. The relative abundance and likelihood of occurrence within the proposed survey area during the survey period in late summer is indicated for each species. Conservation status from the IUCN (2021) red data list is indicated.

Marine Mammal hearing group (Southall *et al.* 2019)	Species	Shelf/Offshore	Likely encounter frequency in 7C and seasonality in parentheses	IUCN Conservation status
Low frequency cetaceans (Baleen whales) Generalised hearing range: 7 Hz to 35 kHz	*Balaenoptera bonaerensis* (Antarctic minke whale)	Shelf and offshore	Monthly (winter)	Least concern
	B. acutorostrata (Dwarf minke whale)	Shelf and offshore	Occasional (year-round)	Least concern
	B. physalus (Fin whale)	Shelf and offshore	Occasional (rarely in summer)	Endangered
	B. musculus (Blue whale)	Offshore	Unlikely (seasonality unknown)	Critically Endangered
	B. borealis (Sei whale)	Shelf and offshore	Occasional (winter)	Endangered
	B. brydei (offshore Bryde's whale)	Shelf and offshore	Occasional (summer)	Not assessed
	B. brydei (subspp) (inshore Bryde's whale)	Shelf and offshore	Occasional (year-round)	Vulnerable
	Eubalaena australis (Southern right whale)	Shelf	Daily (year-round, higher in early spring & summer)	Least concern
	Megaptera novaeanglia (Humpback whale)	Shelf and offshore	Daily (year-round, higher in summer)	Vulnerable
High frequency cetaceans (Dolphins, toothed whales, beaked whales) Generalised hearing range: 150 Hz to 160 kHz	*Lagenorhynchus obscurus* (Dusky dolphin)	Shelf (0-800 m)	Daily (year-round)	Data deficient
	Cephalorhynchus *heavisidii* (Heaviside's dolphin)	Shelf (0-200 m)	Daily (year-round)	Near threatened
	Tursiops truncates (Common bottlenose dolphin)	Shelf and offshore	Monthly (year-round)	Least concern
	Delphinus delphis (Common short beaked dolphin)	Shelf and offshore	Monthly (year-round)	Least concern
	Lissodelphis peronii (Southern right whale dolphin)	Shelf and offshore	Occasional (year-round)	Least concern
	Stenella coeruleoalba (striped dolphin)	Offshore	Unlikely (unknown)	Least concern
	S. attenuate (Pantropical spotted dolphin)	Shelf edge and offshore	Unlikely (year-round)	Least concern
	Globicephala melas (Long-finned pilot whale)	Shelf edge and offshore	Monthly (year-round)	Least concern
	G. macrorhynchus (Short-finned pilot whale)	Unknown	Unlikely (unknown)	Least concern
	Steno bredanensis (Rough-toothed dolphin)	Unknown	Unlikely (unknown)	Least concern
	Orcinus orca (Killer whale)	Shelf and offshore	Occasional (year-round)	Data deficient
	Pseudorca crassidens (False killer whale)	Shelf and offshore	Monthly (year-round)	Least concern
	Feresa attenuate (Pygmy killer whale)	Offshore	Occasional (unknown)	Least concern
	Grampus griseus (Risso's dolphin)	Shelf edge and offshore	Occasional (unknown)	Least concern

Marine Mammal hearing group (Southall *et al.* 2019)	Species	Shelf/Offshore	Likely encounter frequency in 7C and seasonality in parentheses	IUCN Conservation status
	Kogia breviceps (Pygmy sperm whale)	Shelf edge and offshore	Occasional (year-round)	Data deficient
	K. sima (Dwarf sperm whale)	Shelf edge	Unlikely (unknown)	Data deficient
	Physeter macrocephalus (Sperm whale)	Shelf edge and offshore	Occasional (year-round)	Vulnerable
	Ziphius cavirostris (Cuvier's beaked whale)	Offshore	Occasional (year-round)	Data deficient
	Beradius arnouxii (Arnoux's beaked whale)	Offshore	Occasional (year-round)	Data deficient
	Hyperoodon planifrons (Southern bottlenose beaked whale)	Offshore	Occasional (year-round)	Least concern
	Mesoplodon layardii (Layard's beaked whale)	Offshore	Occasional (year-round)	Data deficient
	M. mirus (True's beaked whale)	Offshore	Unlikely (year-round)	Data deficient
	M. grayi (Gray's beaked whale)	Offshore	Occasional (year-round)	Data deficient
	M. densirostris (Blainville's beaked whale)	Offshore	Unlikely (year-round)	Data deficient
Phocid carnivores in water (PCW)	*Mirounga leonine* (Southern elephant seal)	Shelf and offshore	Unlikely (unknown)	Least concern
	Hydrurga leptonyx (Leopard seal)	Shelf and offshore	Unlikely (unknown)	Least concern
Other marine carnivores in water (OCW)	*Arctocephalus pusillus (Cape fur seal)*	Shelf	Daily (year-round)	Least concern

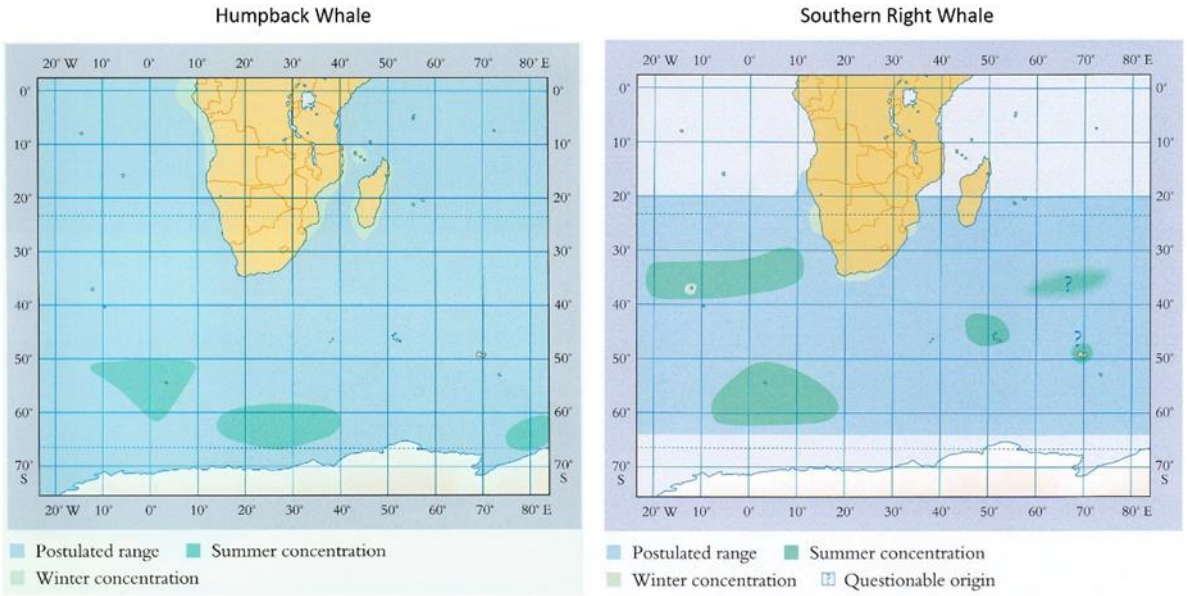


Figure 7.5 **Migration routes are inferred from the seasonal distribution of humpback (left) and southern right (right) whales off the coast of southern Africa. Source: Best (2007).**

7.2 Socio-economic and cultural character

To assess the potential socio-economic impacts of the proposed project it is important to understand the socio-economic context in which the proposed project is to be developed and its potential area of impact. Depending on the scale of the potential socio-economic impacts, it may extend beyond the boundaries of the project. Here, the focus will be placed on the regional, local and project area. The proposed prospecting/survey activity falls offshore of the regional Namaqua District Municipality (NDM) and local Kamiesberg Municipality (Figure 5.4). This socio-economic impact statement will thus consider this region, focussing on the potential impact of the project site.

7.3 Regional study area

7.3.1 Namakwa District Municipality: Demographic profile and general employment trends

The Namakwa District Municipality (NDM) is in the north-western edge of South Africa in the Northern Cape Province. It is comprised of six local municipalities namely, Nama Khoi, Hantam, Khai-Ma, Kamiesberg, Karoo Hoogland and Richtersveld. The NDM is the largest district in the province, making up over a third of its geographical area. It is approximately 126 836 km^2 and has a total population of 139 370 inhabitants and 41 613 households (Table 7-4). Municipal data also show that there are 14 145 households headed by women and 27 child-headed households (NDM 2021). Despite being the largest District in the province, it has the smallest population size which is due to the arid environment of this municipality. Population groups include Coloured (83.16%), White (8.96%), Black African (7.32%), and Asian (0.65%) communities with the majority speaking Afrikaans(93.9%). Other languages include Setswana (1.71%), IsiXhosa (1.55%), English (1.22%) and other indigenous languages (1.62%).

According to the 2011 Census data, the majority of the population (66.1%) were in the working age group (15-64 years), followed by the young (25.8%, 0-14 years), and the elderly (8.1%, 65+ years) (StatsSA 2011). Dependency ratios give an indication of the social and economic demands placed on working people to support their non-working family/community members and includes the population who are too young to work (0-14 years old), and those who are most likely too old to work (65+). A higher dependency ratio also means greater pressure on social systems and the delivery of basic services. The NDM population dependency ratio was 47% in 2011, which is lower than the current national average of 52% (World Bank 2021). The average level of formal education in the NDM is relatively low, with a functional literacy rate of 81.1% (higher than the average of the Northern Cape's 79.1% and lower than the national level of 84.8%) (COGTA 2020). Approximately 6.6% of the individuals aged 20 and older have had no formal schooling, whilst 67.2% have attended school, but ended their education early (mostly during secondary school), 18.8% have attained a matric certificate as highest level of education and 7.4% attained a tertiary qualification.

The average household income of the NDM falls into several ranges, with 16.7% of households earning between R0 and R10 000 p.a., the majority (58.6%) of households earning between R10 000 and R75 000p.a., and 24.9% earning more than R75 000 p.a. Average household size has increased slightly in the NDM between 2010 and 2020, (NDM 2022). There were 31 400 people employed in the NDM formal sector in 2018 and 4 800 in the informal sector, which constituted 11.2% of the total

employment in the Northern Cape (COGTA 2020). The total number of informal jobs had increased from 3 420 in 2008. NDM population data for the period 2016 to 2018, indicates that 68% of the total population during this time were of working age, i.e., between the ages of 15 and 64 and that approximately 53% of this age group were economically active (approximately 48 000 people) (COGTA 2020, Municipalities 2022). The number of people in poverty in the NDM increased by 24,5%, from 48 500 in 2010 to 60 800 in 2020, (NDM 2022). In 2019, the unemployment rate in the NDM was 22.3%, i.e., 12 055 people of working age being unemployed, which accounted for 9% of the total number of unemployed people in the Northern Cape. Conversely, the number of employed individuals were 42 284 (NCPG 2021). The region also saw an increased level of income inequality, mostly within the Coloured population. Despite this, , the Human Development Index (HDI), which is a course indicator of average quality of life, determined by combining statistics such as schooling, average life expectancy, and standard of living, suggests an average improvement in quality of life for the people in the NDM (NCPG 2021).

The NDM contributed 10.7% of the total GDP of the Northern Cape in 2019. The largest employment industries within the NDM are community services and trade, which employed 28.6% and 18.2% of the employed populous in 2019, respectively. The most important sectors in the NDM from a Gross Value Added (GVA) perspective include the mining sector, contributing R3.4 billion (35.6%) of the districts total GVA in 2018, the community services sector (16.1%) and the trade sector (11.8%) (COGTA 2020). Tourism spending is also important, with 7% of local GDP in 2018 resulting from tourism. It is important to consider that the Covid-19 pandemic has likely had a large negative impact on the income derived from tourism in the region. Finally, agriculture is also an important, growing sector in the region, with livestock farming being prevalent in dryer regions, and high-value crops being prioritised in proximity to the Orange River (COGT 2020).

Table 7-4 Demographic profile summary of the Namakwa District Municipality, Hondeklipbaai, and Koingnaas (StatsSA 2011, COGTA 2020, NCPG 2021)

Indicator	Namakwa District	Kamiesberg Local Municipality	Hondeklipbaai	Koingnaas
Population Total	141 000	9 605	543	105
Household Total	41 100	3 319	189	61
Area (km²)	126 838	11 742	1.09	0.66
Population group				
Coloured (%)	83.06	85.6	80.51	63.8
Black African (%)	7.32	5.3	8.27	0
White (%)	8.96	8.1	8.82	31.4
Indian or Asian (%)	0.65	0.5	1.47	1
Other (%)	0.01	0.5	0.92	3.8
Gender distribution				
Male (%)	49.96	50.4	47.88	53.8
Female (%)	50.04	49.6	52.12	46.2

Indicator	Namakwa District	Kamiesberg Local Municipality	Hondeklipbaai	Koingnaas
First language				
Afrikaans (%)	93.9	96.4	96.86	99
Setswana (%)	1.71	0	N.A	0
IsiXhosa (%)	1.55	1.4	N.A	0
English (%)	1.22	0.2	1.11	1
Sign Language	N.A	0	1.11	0
Dependency ratio (%)	47.1	57.9	48.4	19.3

7.4 Local study area

7.4.1 Kamiesberg Municipality: Demographic profile and general employment trends

The Kamiesberg Local Municipality (KLM) is situated on the south-west coast of the Northern Cape and borders the Western Cape Province to the south, the Nama Khoi Municipality in the north, the Khâi-Ma Municipality to the north-east, the Hantam Municipality to the south-east, and the Atlantic Ocean to the west. The KLM consists of three main geographical regions, the sandy coastal lowlands, the mountainous central Kamiesberg escarpment, and the eastern plateau known as Bushmanland (KM 2022).

The municipality consist of 16 small towns, with only one coastal settlement, Hondeklipbaai, and several small inland towns, with the business center being found in Springbok (KM 2022). Agriculture within the region primarily consists of livestock farming, with the rearing of livestock (sheep and goat) and poultry, which consist of 56.9% and 25.4% of the agricultural households, respectively (StatsSA 2011). There are no perennial rivers in the municipality, therefore, water is supplied entirely from subterranean sources, which is either abstracted from windmills or from natural springs (KM 2022). The arid conditions and constrained water supply make other forms of farming largely unviable. The large expanses required for livestock farming makes managing animal populations challenging, with significant losses to profit margins occurring due to predation from jackals and eagles (KLM 2010). Animal theft is also an issue influencing the viability of livestock farming.

The KLM had a total population of 10 187, as of 2011, with 63.3% (i.e., 6448 individuals) being of working age (15-65). Approximately 34.2% (i.e., 2 204 people) were employed, 981 unemployed, 723 classified as discouraged work-seekers, and 2 535 were economically inactive. Of the employed population, 78% works in the formal sector, and 13% in the informal sector The KLM had an average dependency ratio of 57.8% in 2011, which is due to a higher proportion of children compared to working adults (StatsSA 2011).

The KLM supports high floral diversity, with one third of the total global succulent flora species being found here, of which nearly 40% are endemic (KM 2018). The natural flower season between August and October constitutes a major part of the tourism industry which in turn is a large contributor to the region's economy. The coastal town of Hondeklipbaai is home to a small fishing community and a popular holiday destination, thereby also contributing to the tourism and economy of the region.

The leading employing industries in the KLM according to the 2011 census were mining and quarrying (21.5%), General Government jobs (19.4%), community, social, and personal services (18.1%), wholesale and retail, trade, catering, and accommodation (14.3%), and agriculture, forestry, and fisheries (10%). Employment type is dependent upon and varies according to location, for example agriculture being based primarily in rural areas, and fishing and tourism in coastal areas such as Hondeklipbaai Industry, government and retail, for example, are based in the larger towns (KM 2018).

The region has seen an economic decline due to a decrease in the land-based mining industry which also led to the dwindling of the population in what were previously mining towns largely associated with diamond mining. Industries that seem to have greater resilience include retail and accommodation, as part of the tourist industry, including coastal tourism in Hondeklipbaai, and tourism associated with the seasonal flowers (KLM 2010). The livestock-agriculture sector has also shown some resilience. However, this is constrained by the availability of water, which limits its maximum growth potential. It has been speculated that greater utilisation of the region's coastal and marine resources, through fishing and mariculture, could represent a new economic avenue for the KLM to explore to help offset the loss of jobs associated with the ceasing of mining activities (KLM 2010).

The KLM contributed 7.2 % to the total GDPR of the NDM in 2020 (~R764 million) and has experienced a 1.1% annual economic decline from 2010 to 2020, which is the lowest in the NDM (NDM 2022). The economic state of the municipal area is important as it affects the ability of households to pay for services such as water, electricity, sanitation and refuse removal.

Despite recent interest in offshore commodities, such as diamonds, prospecting is unlikely to represent a significant economic boon to the municipality, as the associated vessels will be based at Saldanha Bay, with vessels' crews not being employed from local communities in the KLM. Additionally, it is highly unlikely that the crews will embark in Hondeklipbaai, therefore they will not contribute to the tourism and retail markets in the area.

Economic growth trends are vital for predicting the direction of spatial expansion, guiding investment, and job creation in certain industries. With the negative economic growth trends present in the KLM, investment should, most likely, be focussed on industries which are not dependent on the dwindling mining sector, such as tourism, agriculture, fishing, mariculture, and associated industries, with the goal of creating employment opportunities for local communities (KM 2018).

7.5 Project site

7.5.1 Hondeklipbaai: Demographic profile , economy, and general employment trends

Hondeklipbaai (30°18'59.34"S, 17°16'40.59"E) is a small West Coast fishing village and holiday destination situated about 95 km south-west of Springbok. It supports approximately 543 residents from 189 households (as per the 2011 census). The town is the only coastal town in the KLM and is currently capable of sustaining ocean-tourism and other sea-based industries. The primary first language in Hondeklipbaai is Afrikaans (96.9%), with some English, IsiNdebele, IsiXhosa, sign language, and Tshivenda speaking individuals. The population has a slightly higher proportion of females (52.1%) when compared to males (47.9%) (StatsSA 2011). Most of the population is of a Coloured descent

(80.5%), followed by White (8.8%), Black African (8.3%), Indian/Asian, and other (0.9%). The average level of formal education in Hondeklipbaai is relatively low with 20.5% having matriculated, 4.9% having a tertiary education, 1.3% having no formal schooling and the remaining (73.3%) having some form of schooling, although the majority ended their school education somewhere during secondary school. It is important to note that, since the region has a significant portion of agricultural and fishing activities, many people have likely received skills training in these disciplines.

Annual household income falls into a several brackets, i.e., earning R0–R9 600 (34.3% of the population), R9601–R76 400 (53.2% of the population), and more than R76 401 (12.5% of the population). About 26% of the households in the town were recorded as having no income during the 2011 census. In total, 67.4% of people fall within the working age group (15–64 years), 24.7% within the young age group (0–14 years), and 7.9% within the elderly age group (65+ years). High dependency ratios are commonly observed in developing countries and have been found to show significant relationship with economic growth, poverty, and employment (Vijayakumar 2013). Hondeklipbaai, on average, had a dependency ratio of 48.4% in 2011, which is much lower than the KLM (57.9%), and comparable to the NDM (47.1%). This can be explained by a combination of lower birth rate and potentially lower life expectancy in Hondeklipbaai, when compared to the local municipal area. However, the small population numbers in the town could easily lead to this result being skewed. The relatively low dependency ratio seen in Hondeklipbaai, when compared to the KLM, shows that the working population do not have to support as many dependents.

The Hondeklipbaai local economy has been undergoing a transition since the closing of the Trans Hex diamond mine in 2003 as this was the largest source of employment in the town (Mahomed 2006). Since then, other industries, such as tourism and fisheries, have become more important. Hondeklipbaai is located within the Benguela Current Large Marine Ecosystem (BCLME), which is characterised by nutrient-rich waters and high productivity, which is supported through coastal upwelling systems associated with the dominant offshore winds in the region (NCSDF 2011). The town has a small, well established, fishing community, several of whom work in the West Coast Rock Lobster fishing sector. However, because of overfishing, the west coast rock lobster stock is collapsed leading to decreased catch rates and boats tend to concentrate in few areas where there is still availability (DFFE 2020).

Abalone (*Haliotis midae*) ranching occurs along the coastline near Hondeklipbaai and parallel to Concession Area 7C. Activities take place in water predominantly shallower than 20 m. This ranching operation is still in the development phase and local socio-economic benefits from abalone ranching are expected to increase in the future.

The tourism sector in Hondeklipbaai primarily consists of guesthouses and campsites, which cater to tourists who wish to visit the sea. Local shops cater to locals and tourists alike. Finally, the Hondeklip rock, the namesake of the bay, and two local shipwrecks (the Jahleel and the Aristea) are local tourist attractions.

7.5.2 Koingnaas: Demographic profile, economy, and general employment trends

Koingnaas (30°11'49.81"S, 17°16'57.02"E) is a very small town situated approximately 4.6 km inland of the Atlantic coastline. The town was originally established as a mining town, but since the

termination of the local De Beers mining activities in 2008, the population had decreased from its peak of 1000 individuals in 2008. The subsequent purchase of the Koingnaas Mine by West Coast Resources (owned by Trans Hex) likely led to a resurgence of the town from 2011. However, the termination of mining activities in 2019, due to low profitability, has resulted in a further decline in the population. The most recent census data is from 2011 and likely not a true representation of the current demographic profile of the local community. In 2011, the town had a total population of 105 individuals and 61 total households (StatsSA 2011). Most of the residents were classified as Coloureds (63.8%), followed by Whites (31.4%), Indians/ Asians (1.0%), and other (3.8%). The population comprised of more males (53.8%), than females (46.2%). Most of the population (83.8%) was classified as being of working age (15–64), 11.4% as youth (0–14), and 4.8% as elderly (65+ years). The entire adult population had received some formal education, i.e., 25.8% had matriculated, 13.5 % had a tertiary education, and the remaining 60.7% had some formal education, with the majority having completed primary school and having some secondary school.

Average annual household income fell into several brackets: 16.4% of the population earning R0–R19 000, 65.6% earned between R19 601 and R153 800, and the largest group (32.8% of the total) earned between R76 401 and R153 800. Finally, 18.1% of households earn more than R153 800 p.a. Koingnaas recorded a very low dependency ratio of 19.3% in 2011, which indicates that there were very few people in the town for the working population to support. The population data supports the town's identity as primarily a mining town, through the relatively high level of formal education and annual income (when compared to Hondeklipbaai).

Employment opportunities in Koingnaas varied from residual mining opportunities, environmental rehabilitation work related to the environmental degradation associated with the mining, and shops/ services for the local community. The old coastal diamond diving village of Noup (approximately 10.4 km north-west of Koingnaas) had been converted to a tourist destination but it closed in 2022, while just 5.7 km north of Noup, there is a campsite. Since Koingnaas is situated inland, opportunities such as coastal tourism, fishing and mariculture is limited, when compared to Hondeklipbaai.

7.6 Heritage aspects

The underwater cultural heritage of South Africa is rich in historical shipwrecks, shell middens and tidal fish traps reflecting a long history of human exploitation of marine resources. Evidence related to pre-colonial submerged archaeological sites is scarce, although based on the terrestrial archaeology of the West Coast and similar offshore sites offshore globally, there is potential for pre-colonial submerged archaeological sites around the West Coast. South Africa's maritime heritage remains mostly unexplored, although it is known to have a diverse underwater cultural heritage.

7.6.1 Maritime History of the South African Coast

The West Coast's maritime history dates back to Dutch settlers that exploited the West Coast's rich marine resources, including sealing and fishing (Ingpen 1979), guano resources and copper deposits This led to the extensive use of Alexander Bay, Robbe Bay (now Port Nolloth) and Hondeklip Bay, and the development of coastal shipping services at these Bays. (The Nautical Magazine and Naval

Chronicle 1855: 297-303; Ingpen 1979 With the exception of Saldanha Bay, the West Coast lacks good harbours due to dangerous currents, coastal fogs and a rocky shoreline. The West Coast has therefore claimed many vessels over the years. At least 2 500 ships have been wrecked, abandoned or sunk since the 1500s in South African waters. More than 1 900 of these are more than 60 years old and are protected by the National Heritage Resources Act (NHRA) as archaeological resources. It is believed that there are far more shipwrecks present in South African waters especially wrecks that pre-date the European exploration and trade. These sites support important information in terms of the cultural, political, economic and social standing associated with the historic world. The potential therefore exists for currently unknown and/or unrecorded maritime heritage sites to be encountered within the concession area in the course of prospecting activities.

Maritime Heritage of the West Coast and Concession Area 7C

At least 89 shipwrecks have been reported between the Orange and Berg Rivers (As per the SAHRA Maritime and Underwater Cultural Heritage database (http://www.sahra.org.za/sahris). Although 13 vessels have been recorded in the immediate vicinity of Hondeklip Bay (5 km east of the concession area), these vessels were all lost in or around the bay and are extremely unlikely to be within Concession Area 7C (Figure 7.6).

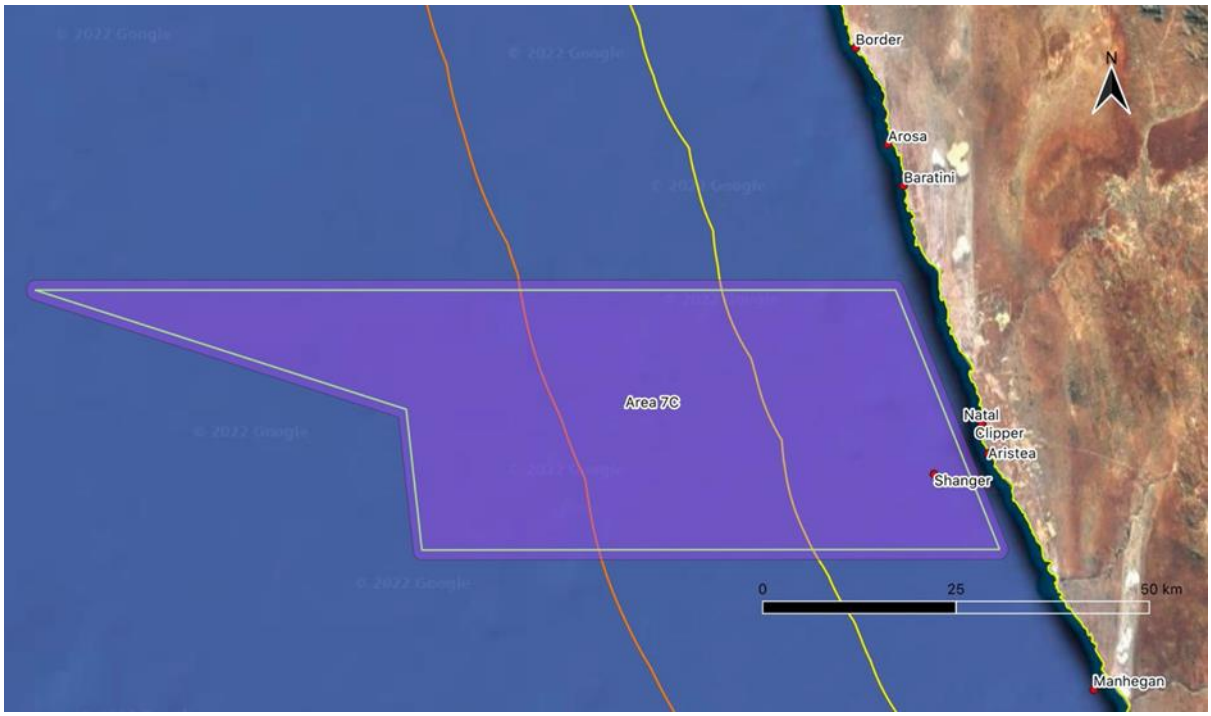


Figure 7.6 Known historical wrecks around Concession Area 7C (Source: Source: Google Earth).

Only one known maritime casualty, *The Shanger*, appears to possibly be located within the concession area, although very limited information on its demise exists. *The Shanger* was a 19th century sailing barque of 288 tons en route to Port Nolloth from London, but unfortunately caught alight, whereafter it was abandoned offshore and is believed to have foundered.

Due to limited records on its loss, the position as depicted in Figure 7.6 is approximate and it cannot be assumed that the wreck lies within the concession area. However, for the purposes of this impact assessment, the precautionary principle has been applied and the wreck has been assumed to lie within Concession Area 7C.

Furthermore, it is possible that remnants of unknown and unrecorded shipwrecks could still be present within the concession area. Historical records are full of examples of shipwrecks that were lost at sea and could therefore lie anywhere between their points of departure and arrival. For example, the *Bom Jesus* was unexpectedly discovered during terrestrial diamond mining activities in Oranjemund, Namibia (see Alves 2011). When such surveys are undertaken, and any shipwrecks or shipwreck debris is noted, images and coordinates for these should be shared with the heritage practitioner and the Maritime and Underwater Cultural Heritage (MUCH) Unit at the South African Heritage Resources Agency (SAHRA).

7.6.2 Submerged prehistory

In addition to shipwrecks, a much larger part of South Africa's cultural heritage encompasses pre-colonial history. Historically, large parts (as much as 80 000 km^2 in extent) of the continental shelf were exposed as dry land (Fisher et al, 2010). The figure below (Figure 7.7) illustrates the possible extent of continental shelf exposure during the second to last glaciation (MIS 6).

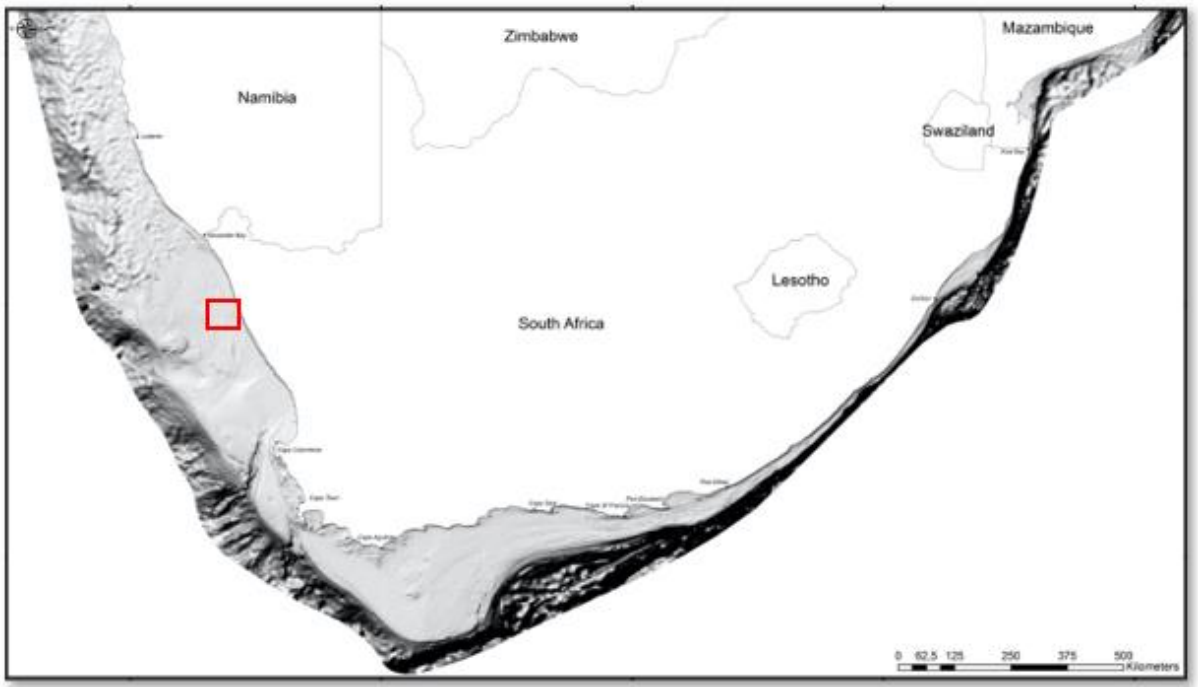


Figure 7.7. Shaded relief map showing the entire extent of the South African continental shelf. The approximate location of Concession Area 7C is marked by the red box (After De Wet 2012:106).

The exposed continental shelf was populated by terrestrial fauna, flora and our human ancestors. As such, much of the archaeological record of the later Earlier, Middle and early Late Stone Age is now submerged in water (Van Andel, 1989). No studies of the submerged prehistory of the West Coast have been conducted to date, although the archaeological evidence for a hominin presence along the coast is abundant, especially from the early, middle and later stone ages. These include shell middens, fossilised human footprints and hand tools.

Any areas of South Africa's current seabed shallower than 120 m thus has the potential to have been used by our ancestors and to preserve the archaeological evidence of that use. Indications of this include Diepkloof rock shelter inland of Elands Bay and south-east of the concession area, which contains evidence of almost 85 000 years of continuous human occupation; Hoedjiespunt in Saldanha Bay where hominid teeth, cranium fragments, postcranial bones which could date back to between 130 000 and 180 000 years; fossilized human footprints nearby Churchaven on the Langebaan lagoon which date back to ~117 000 years ago when sea levels would have started to drop; and coastal shell middens which indicate the earliest evidence in the world for coastal exploitation. Ancient river courses would have flowed across the exposed continental shelf and would have been an important focus for hominin activity. Although no geophysical data are yet available for Concession Area 7C, seabed sediment mapping indicates numerous river channels on the continental shelf (O'Shea 1971; Hattingh, 2015:5).

The continental shelf in this region of the West Coast is narrow and water depth increases quickly away from the coast. The -120 m seabed contour is approximately 6 km from the coast here which means that only a very small portion of Concession Area 7C falls within this range with most of the concession area being in waters substantially deeper than this (Figure 7.8).

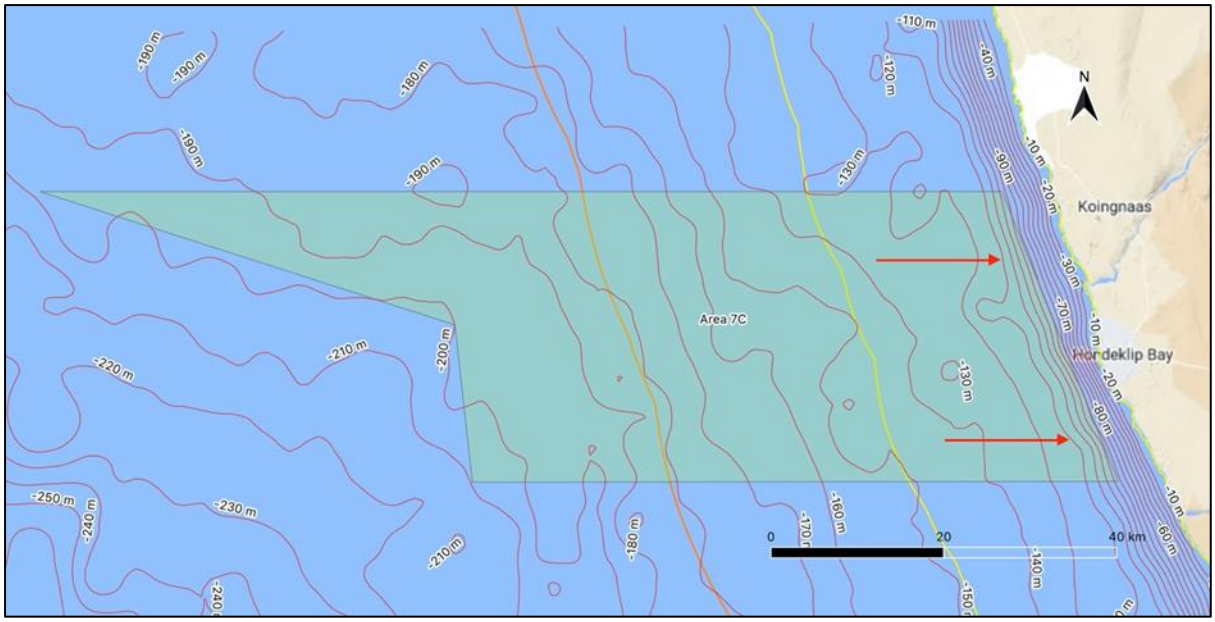


Figure 7.8. **Seabed bathymetry of Concession Area 7C showing the position of the -120 m contour (red arrows) close to the eastern, inshore boundary of the concession area. Below this contour there is little or no potential for submerged pre-colonial archaeological remains (Source: Google Maps).**

Seabed Geology and Palaeontology

The seabed geology of the continental shelf within Concession Area 7C shows successively younger formations seawards from the coast. Cretaceous and Paleogene units comprise the main bulk of the bedrock geology of the area and are succeeded by cappings of Miocene and Pliocene units (De Wet, 2013) (Figure 7.9). The sediment distribution is sparse and mostly affected by the topography of the bedrock, with mini-basins of sediments interspersed by bedrock high outcrops. The southern portion is expected to comprise minor outliers of basal Table Mountain Group conglomerates, shales and sandstones. In the north, older crustal basement gneisses are present. The oldest preserved deposits are found beneath the latest Quaternary basal gravels, in deeper, local bedrock depressions and palaeochannels in the Precambrian bedrock. Pether (2021) suggests that there are several permutations for what type of seabed deposits might be preserved, and these largely depend on the space (depth) within the depressions and position on the shelf. These may include earlier-Quaternary marine conglomerates and sandstones as remnants that escaped erosion during the latest transgression from the Last Ice Age (Last Glacial Maximum) low sea level. For the most part, however, the inner-shelf bedrock is overlain only by the Last Transgression Sequence basal gravel (and the shelf upward-fining sediments.

Millions of years of upwelling, sea level oscillations, ice ages, erosion and interglacial deepening led to the production of a wide range of multiphase phosphorite nodules, phosphatic shell casts of various ages and preservation of bones and teeth of sharks and other fishes, the skulls of extinct whale species and the occasional remains of land animals. The specimens and fossils are regularly discovered during trawling, scientific sampling and dredging, prospecting and mining. These specimens are often donated to scientific institutions and provide an invaluable contribution to the palaeontological knowledge and potential of the continental shelf. The marine shell fossils are predominantly species typical of that expected on the West Coast Shelf, although extralimital species are also common. An example includes the cold-water “Venus shell” clam, *Tawera philomela*, which reached the Cape coast from the mid-Atlantic islands of Tristan da Cunha and Gough. It is thought to have thrived here and then became extinct locally during the last deglaciation (Pether, 1993). Indeed, extra-limitals have been found during diamond sampling/mining off northern Namaqualand and can be expected to be to be found in Concession Area 7C.

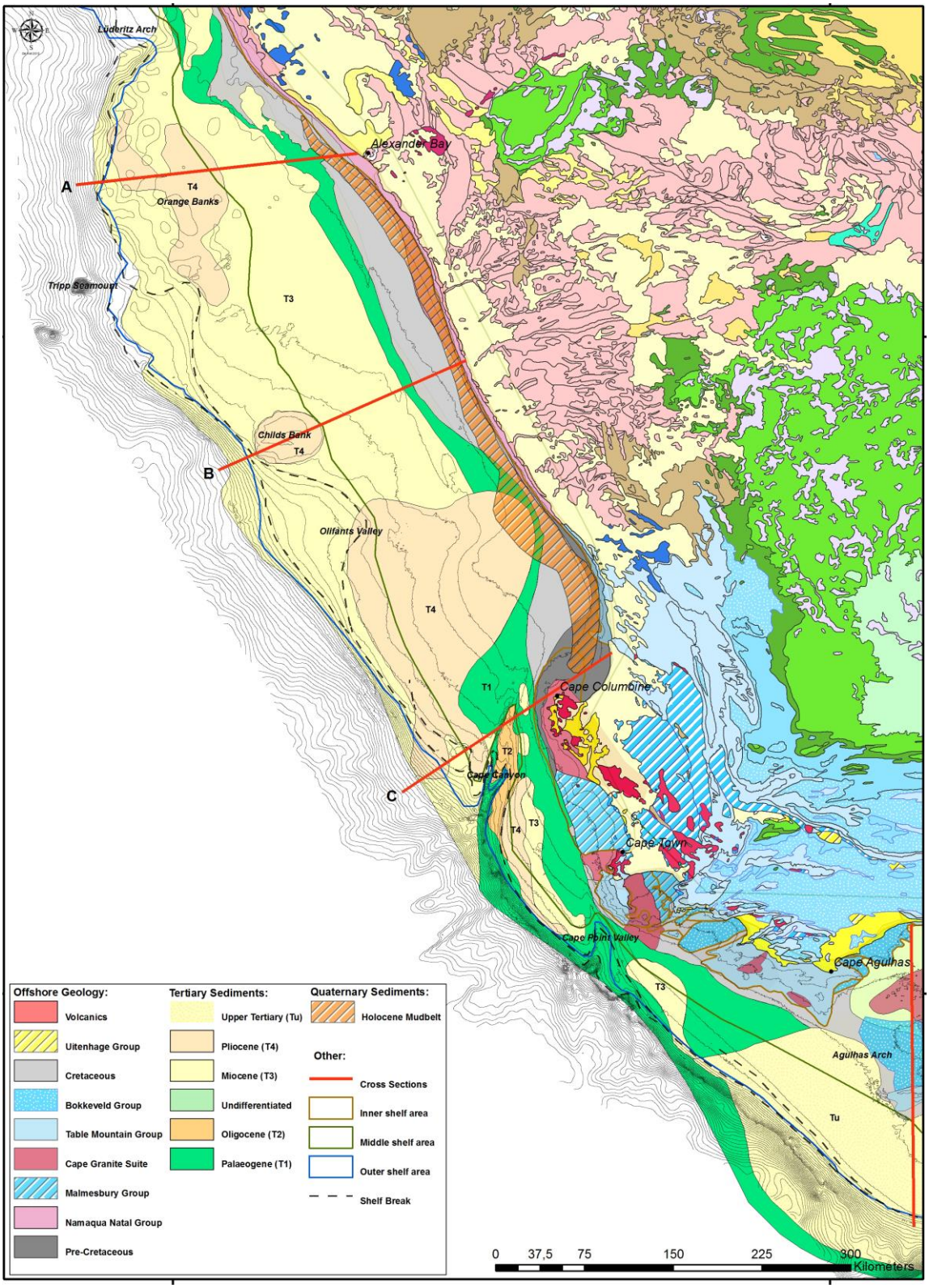


Figure 7.9. **The surface geology of the West Coast continental margin. The approximate position of Concession Area 7C is marked by the dark blue box (After De Wet 2013).**

7.7 Description of the current user groups of the sea area

The main users of the sea space in Concession 7C are the commercial shipping, mining, oil and gas, marine research and fishing industries. The potential spatial overlap of commercial fisheries with the Concession Area 7C was investigated based on the most recently available published reports, specifically Norman *et al*. 2018, the Fishing Rights Register (2018), available commercial linefish catch and return data (DFFE 2011), and other EIA reports for the region (SLR 2021a, b). Current fisheries data (up to January 2022) were requested from the Department of Forestry, Fisheries and the Environment in February 2022, however, they were not made available within the timeframe of this Basic Assessment Process despite the granting of an extension by the DMRE. Data indicates that the Traditional Linefish fishery based out of Hondeklipbaai is the only fishery that partially overlaps with the concession area and is discussed below. As the tuna pole and line and west coast rock lobster fisheries operate in proximity to the concession areas, these were also assessed and discussed below.

7.7.1 Traditional (Commercial, recreational and small scale) Linefish

Commercial, recreational and subsistence linefishers target up to 200 different fish species with the dominant species along the west coast being snoek and hottentot seabream, both from boats and the shore. Due to this multispecies nature of the line fisheries, there is considerable overlap in catches between the three types of line fishers, and some overlap with other sectors such as inshore net fish and demersal trawling, and this complicates management.

Linefishers operate in shallow water (generally <100 m depth) and would potentially be negatively impacted by coastal and nearshore seismic exploration and prospecting operations (particularly recreational, small scale and subsistence shore fishing). Concession Area 7C is, however, relatively far offshore in water that is mostly deeper than 100m. The area is located offshore of Hondeklipbaai, which has a small traditional linefishing community. A spatial analysis of the reported commercial linefish catch data shows a small overlap with Concession Area 7C, with a reported annual catch of approximately 0.0031 tonnes, which equates to 0.00003% of the national catch (Figure 7.10). The zonal management of the commercial traditional linefish sector also allows Zone A right holders to fish throughout the Northern and Western Cape. This fact, combined with the low intensity potential impacts, small spatial scale and short duration of the proposed prospecting activities means that negligible impacts on the traditional linefish sector as a whole are anticipated. Small scale linefishing activity by local Hondeklipbaai fishers that may take place on the inshore edge of the 7C concession is, however, likely very important at the individual vessel, right holder or fisher level and mitigation measures to minimise potential negative impacts on local fishers must be implemented.

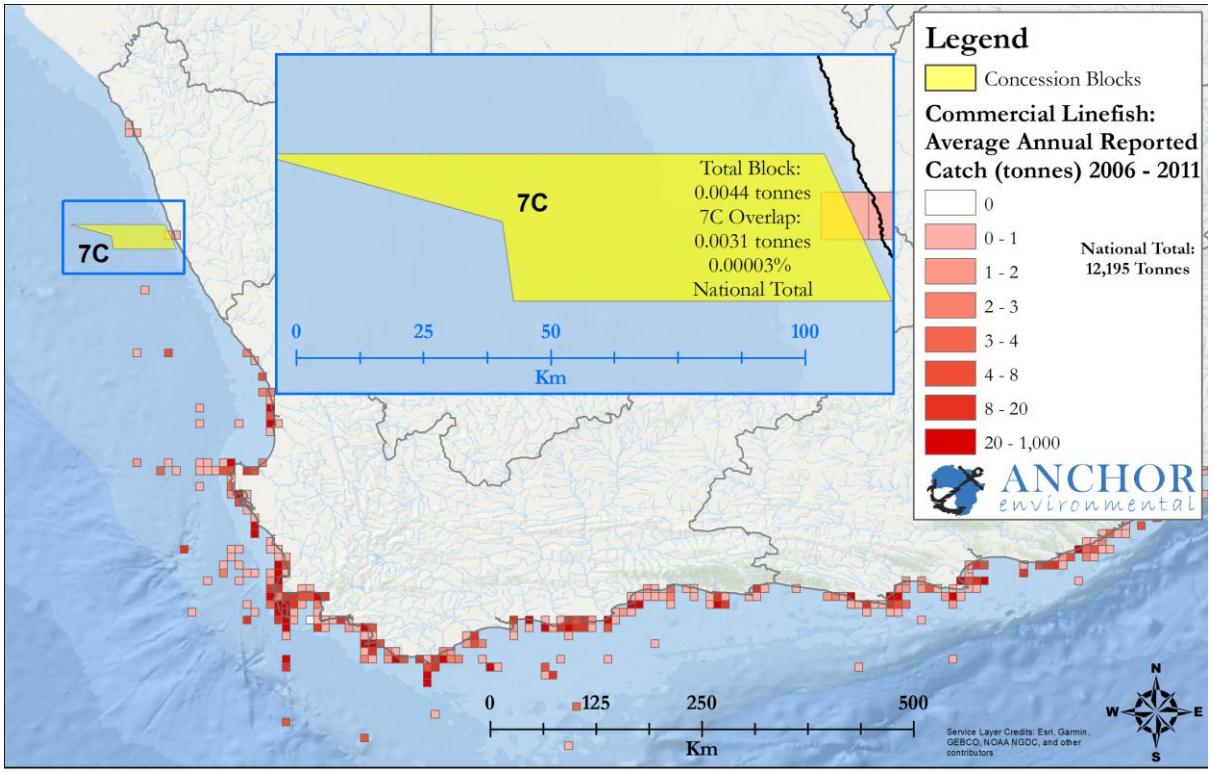


Figure 7.10. **Reported annual commercial linefishing catch the calculated proportion of the average national total catch made within Concession Area 7C (Data source: DFFE).**

7.7.2 Tuna pole and line

The South African tuna pole and line (TPL) sector targets longfin tuna (*T. alalunga*), yellowfin tuna (*T. albacares*, bigeye tuna (*T. obesus*) and skipjack tuna (*Katsuwonus pelamis*) seasonally between November and May. Due to the seasonality of the TPL fishery, fishers also have access to snoek *Thyrsites atun* and yellowtail *Seriola lalandi* that are also important targets of the traditional linefishery. Furthermore, a significant amount of snoek-directed activity by the tuna pole fleet occurs inshore of the 100 m depth contour (SLR 2021). Snoek fishing activity within the area is seasonal with all fishing reported within the period April to May inclusive (SLR 2021).

The commercial tuna pole fishing operates predominantly out of Cape Town and Hout Bay harbours and most fishing effort takes place within 100 nautical miles of these ports (particularly in the Cape Canyon area). Some effort does take place further up the west coast, although this is mostly far to the south of Concession Area 7C.

On average, a small amount of effort (10-50 days) occurs to the south-west of the 7C concession and there is no visible overlap with the fishing grounds (Figure 7.11). The TPL fleet also targets snoek inshore of the 100 m depth contour (SLR 2021), which may be more likely to occur within 7C than tuna. Snoek utilizes extensive offshore (150-400m depth) breeding grounds between the Agulhas Bank and central Namibia with generally random longshore movement (Griffiths 2002, Kerwath and Wilke 2012). Snoek is targeted by the traditional linefish and TPL sectors throughout this extensive range usually during inshore movements between offshore spawning and inshore feeding grounds (Griffiths 2002). Due to the minimal overlap between Concession Area 7C and the TPL fishing effort,

coupled with the short-term nature of the prospecting activities and small spatial and temporal overlap with snoek fishing activity, impacts on the TPL fleet due are expected to be insignificant.

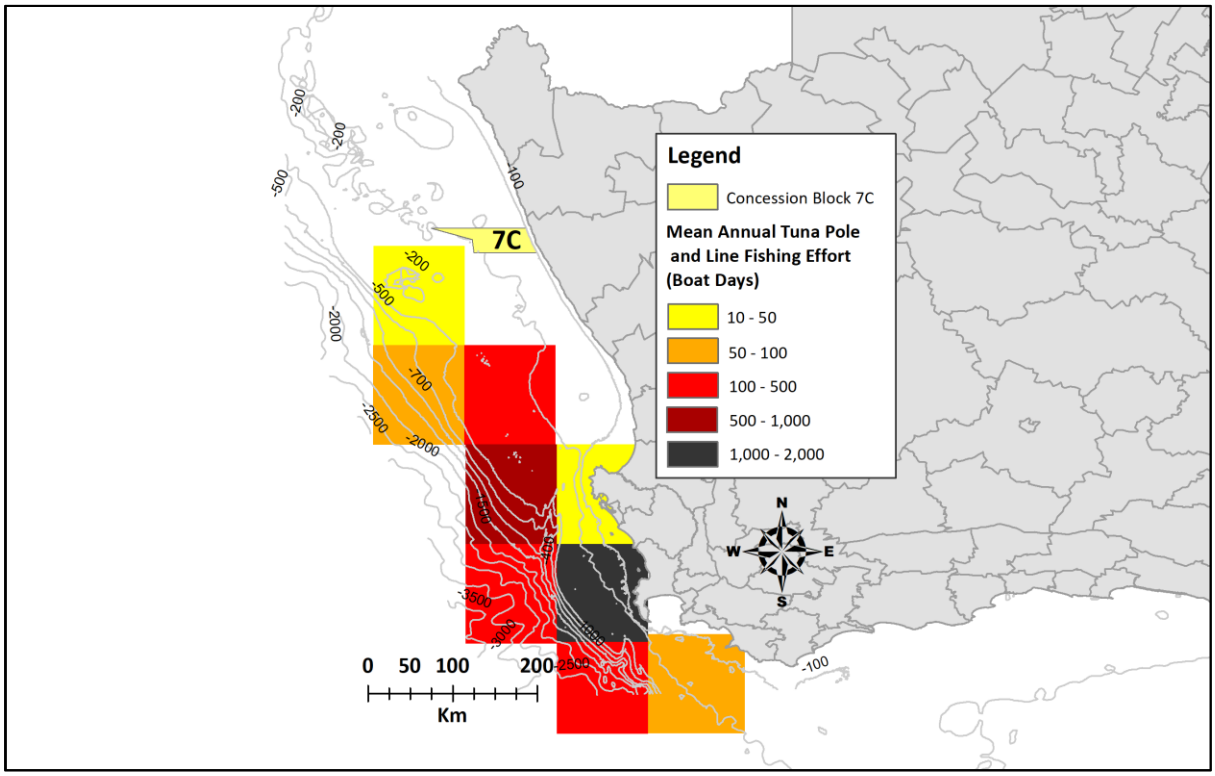


Figure 7.11. Mean annual tuna pole and linefishing effort (boat days) in relation to Concession Area 7C (Source: Norman et al. 2018).

7.7.3 West coast rock lobster

Commercial West Coast Rock Lobster, *Jasus lalandi*, fishing (WCRL) was historically concentrated along the South African West coast from the Namibian border to just east of Cape Point. Commercial WCRL fishing is now split into two sectors: a nearshore component that uses hoop nets deployed from small vessels and an offshore component that uses traps deployed from larger deck boats with greater than 1.5 tonne allocations. The offshore sector is not restricted to a particular fishing zone or area but is allowed to fish according to an agreed inter-area schedule. In the nearshore sector, right-holders may only use hoop nets and may not move between areas. Recreational permit holders may harvest four rock lobsters per day during season using hoop nets and poles, or by diving without the use of scuba.

West Coast Rock Lobster is a nearshore, west coast species and any mining or prospecting activities that negatively impact the kelp bed and reef habitat required by this crustacean will further impact this depleted stock. Similar to line fishing, west coast rock lobster fishing constitutes an important economic activity for residents of Hondeklipbaai, where few other livelihood options exist. A map of allocated TAC by commercial right holder residential address shows that approximately 0.83% (2.5 tonnes) of the national near shore allocation (~300 tonnes) is held by right holders who reside in Hondeklipbaai (Figure 7.12). In addition to the commercial right holders, there are interim fishing rights given to people who were unable to receive a commercial fishing right and were involved in the

industry for long periods of time, as well as people who will become right holders as part of a fishing community under the Small-Scale Fisheries policy. The total TAC for interim fishing rights holders nationally is a significant amount, totaling 554.4 tonnes, of which 305.7 tonnes is allocated to nearshore interim relief right holders and small-scale fishing right holders. Of this allocation, 39 tonnes are allocated to small scale fishers in the Northern Cape specifically. Information as to the exact distribution of these small-scale and interim relief lobster fishing rights is presently unavailable, hence it is not possible to quantify the full extent of lobster fishing in the Hondeklipbaai area. The total TAC allocation for all right holders in the vicinity of Hondeklipbaai is potentially higher than the commercial nearshore allocation shown in (Figure 7.12), further emphasizing the importance of the fishery for people living in the area.

It is frequently the same fishers who target line fish and west coast rock lobster and as recommended above mutually acceptable mitigation measure to minimise potential impacts of the proposed prospecting on local fishers must be effectively implemented. It must, however, be noted that the prospecting activity will take place relatively far offshore (5 km) in sandy inner shelf habitat, as opposed to the inshore rocky-reef habitat that the lobster prefer. It is therefore highly unlikely that the proposed prospecting will have any significant impact on this fishery, and it is screened out of the assessment at commercial, small-scale, and interim relief levels.

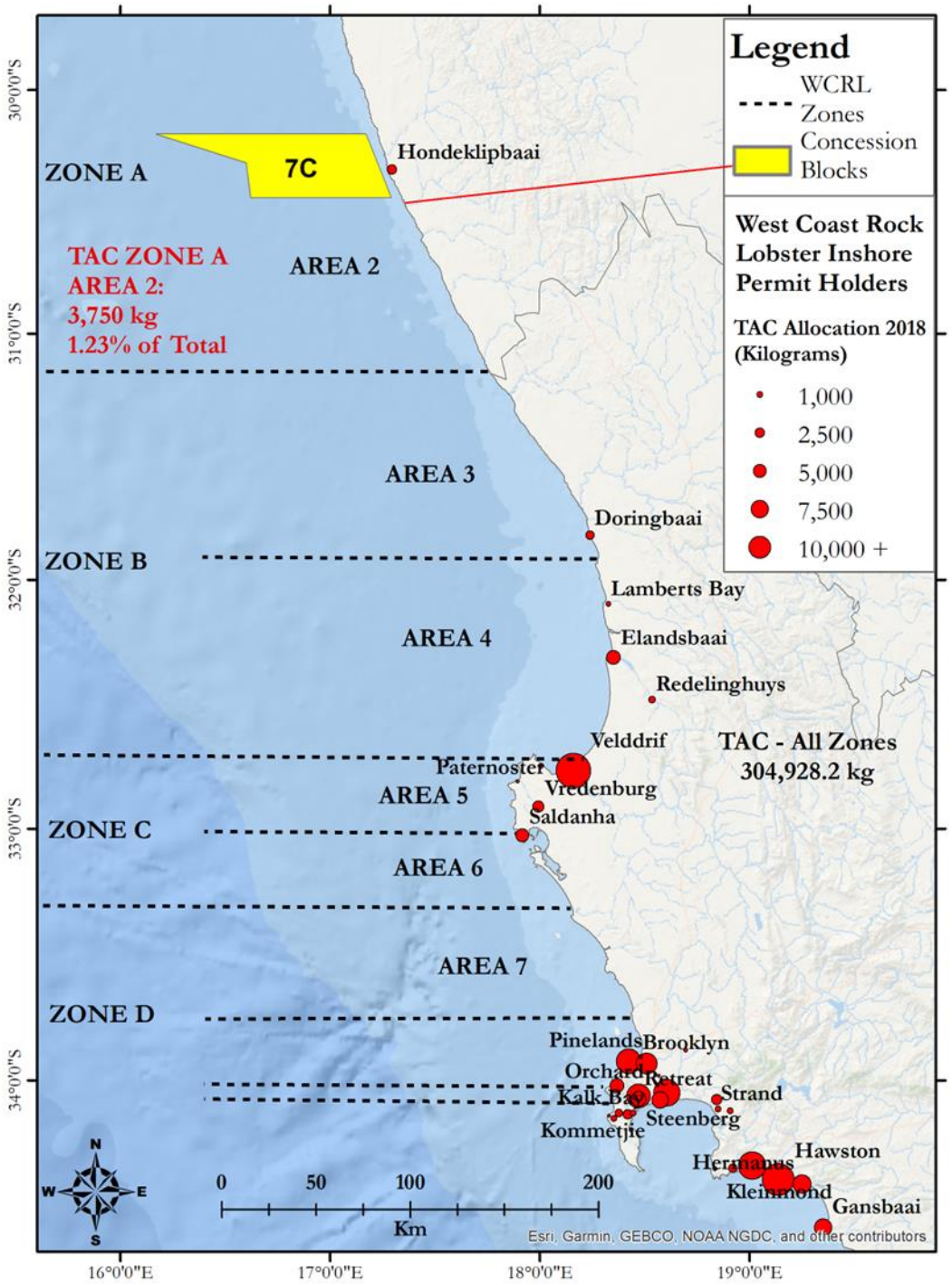


Figure 7.12 **Map showing the proportion of the spatial distribution of quota in the west coast rock lobster nearshore sector by right holders given residential address (Source: DFFE, Fishing Right Register for all Commercial Fishing Sectors 2017).**

7.7.4 Demersal longline and demersal trawl (hake directed)

The demersal longline and demersal trawl (targeting mostly hake) commercial fishing sectors that are active along the west coast all operate far offshore of the 7C Concession Area (Figure 7.13) and were therefore SCOPED OUT.

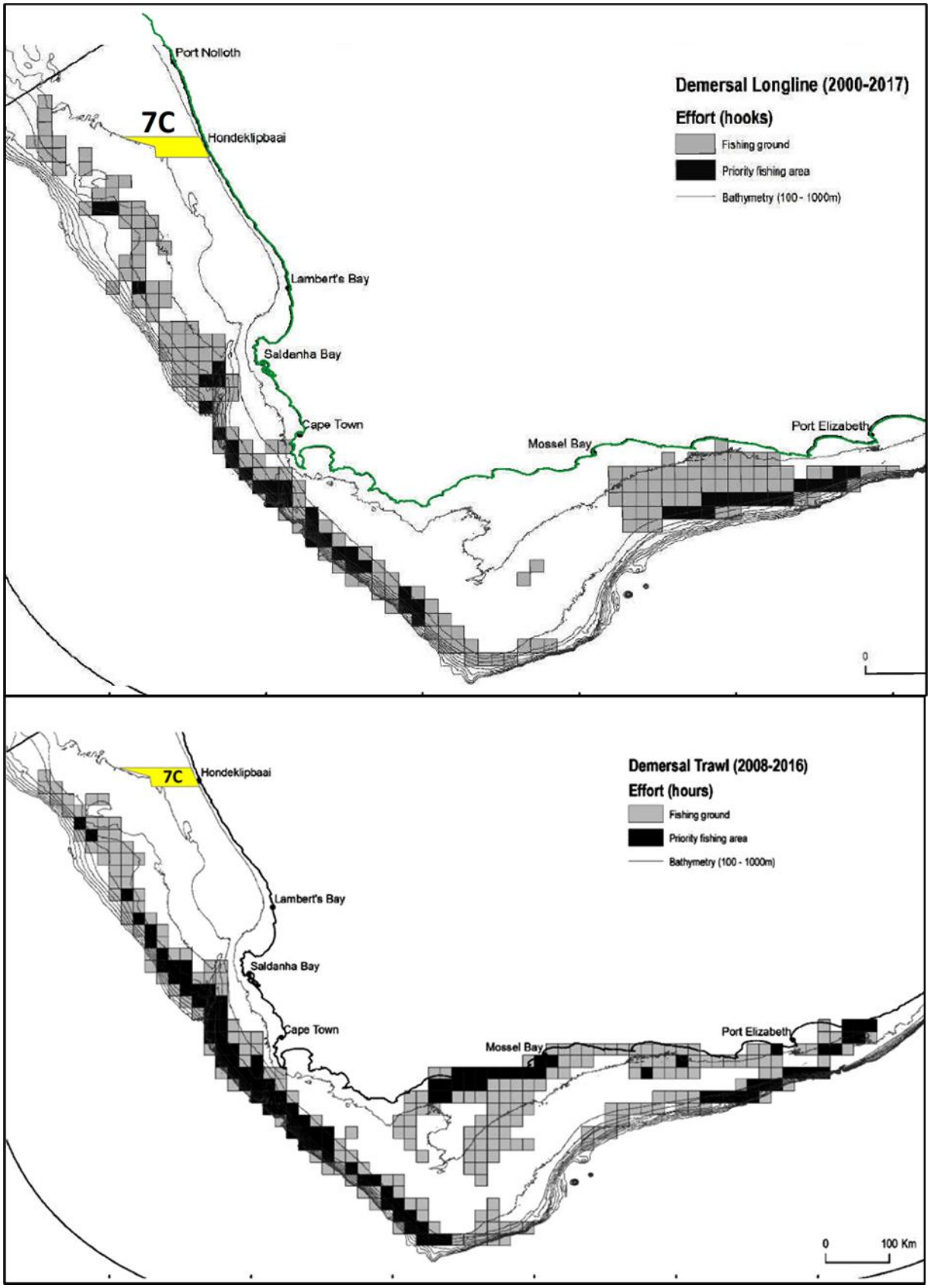


Figure 7.13 **Distribution of demersal longline (top) and trawl (bottom) fishing effort in relation Concession Area 7C. (Source: Norman et al. 2018).**

7.7.5 Small Pelagic Purse Seine

The South African small pelagic fishery targets sardines *Sardinops sagax,* anchovy *Engraulis encrasicolus* and, to a lesser extent, red eye *Eutremeus whiteheadi*. Sardines are usually frozen or canned for human consumption, used as pet food and bait whereas anchovy, juvenile horse mackerel and redeye round herring (*Etrumeus whiteheadi*) are reduced to fishmeal, fish oil and fish paste in factories situated predominantly in St Helena bay on the West Coast. The small pelagic purse-seine fishery operates between the Orange River and East London mostly in nearshore waters (within 10 km of the coast) and in the late summer mainly during the months of February to July (SAPFIA pers. comm). Data suggests that the 7C Concession Area does not overlap with identified priority fishing areas for anchovy or with the sardine directed fishing ground and was therefore SCOPED OUT.

7.7.6 Other small-scale fisheries, abalone ranching and harvesting activities

Small scale fishers, including interim relief west coast rock lobster and line fish right holders operates inshore, in waters of 15-30 m which is shallower than most of the concession area (DEFF 2020, Norman *et al.* 2018). They may, on rare occasions, fish within the inshore areas of concession 7C and there is therefore a very low probability of direct interaction between small scale fishers and prospecting activities. Due to the very low probability of interaction with small scale fishers, the low intensity, small spatial scale, and the very short duration, the proposed prospecting activities are expected to have no impact on small scale and interim relief fishers and this impact was therefore SCOPED OUT.

The gill net fishery that targets mullet (*Chelon richardsonii*) in near shore waters (<50m depth) in some west-coast areas is most likely not present in 7C due to the absence of any net fishing rights holders within Hondeklipbaai (DFFE 2018). It must be noted that, when the small-scale fisheries policy is implemented, it is likely that rights gill net rights will be given to people living in the town as part of their basket of resources (DAFF 2012) but the nearshore nature of this fishery means that offshore prospecting activities in concession 7C will have negligible potential impacts. This fishery was therefore SCOPED OUT of the assessment.

Kelp harvesting and processing is relatively large industry along the West Coast of South Africa. As kelp grows in the intertidal zone and shallow water down to about 20 m depth, prospecting activities in Concession area 7C will not interfere with or impact upon kelp harvesting as this concession area starts at 70 m depth and is located at least 5 km west (out to sea) of where kelp harvesting occurs. Kelp harvesting was therefore SCOPED OUT of the assessment.

Abalone (*Haliotis midae)* ranching occurs parallel to Concession Area 7C, along the coastline near Hondeklipbaai. Activities take place in kelp beds in water predominantly shallower than 20 m. Abalone ranching activities are therefore not expected to be impacted by the offshore prospecting activities and was therefore SCOPED OUT of the assessment.

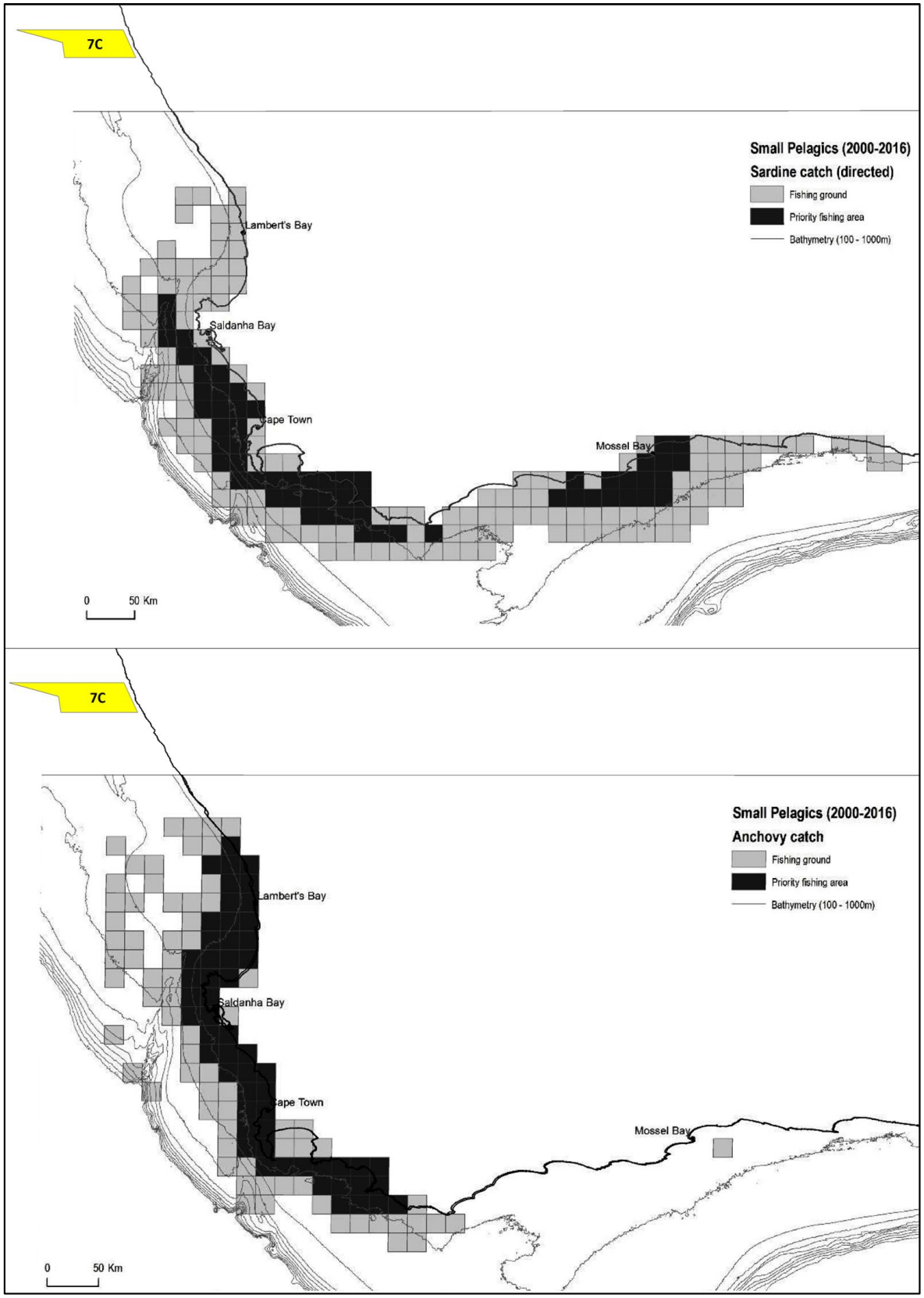


Figure 7.14 Spatial distribution of anchovy (top) and sardine (bottom) purse seine catch (2000-2016) with identified priority fishing areas (Source: Norman *et al.* 2018).

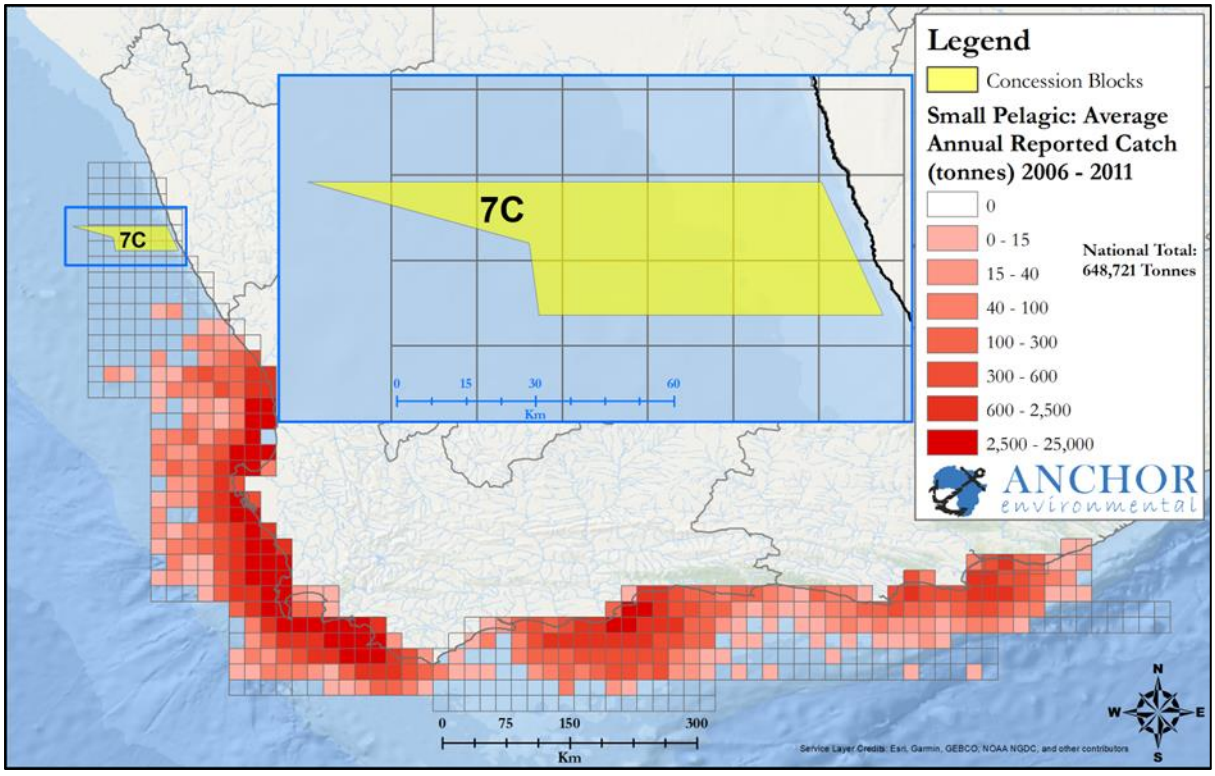


Figure 7.15 **The spatial distribution of the average annual reported small pelagic catch 2006-2011 (tonnes) with respect to Concession Area 7C (Data source: DFFE).**

7.7.7 Shipping

The wave exposed and linear nature of the coast and lack of nearby ports suitable for large vessels means that most merchant shipping traffic would travel on the outer edge of the continental shelf, which is offshore of the outer edge of Concession Area 7C (Figure 7.16). The inshore traffic of the continental shelf along the West Coast is largely comprised of fishing and mining vessels. However, there is unlikely to be much interaction between the vessel (s) involved with prospecting in the concession area and other vessels.

7.7.8 Oil and gas and other prospecting/ mining activities

Several oil and gas and prospecting and mining activities occur on the west coast of South Africa. As these all occur within their own concession area, no overlap with prospecting activities in Concession Area 7C is expected.

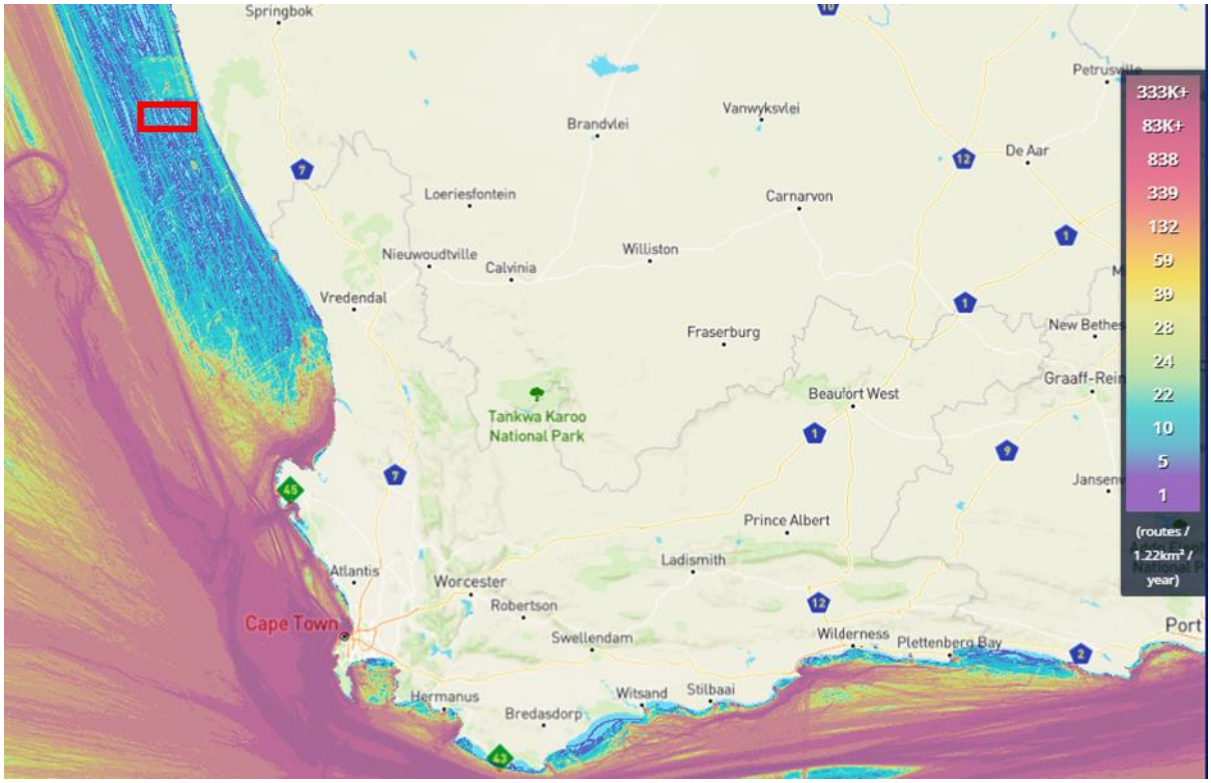


Figure 7.16. Commercial shipping traffic in relation to Concession Area 7C. The red block indicates the approximate location of the 7C concession area (Source: www.marinetraffic.com, accessed 16 July 2021).

7.7.9 Marine research

Marine research activities that may interact with the proposed prospecting in Concession Area 7C include the annual demersal biomass survey conducted in January or February and the bi-annual small pelagic acoustic surveys conducted in May/June and November by the Department of Forestry, Fisheries and the Environment (DFFE). Despite the low probability of an interaction, should the planned prospecting and fisheries survey vessels happen to coincide within the Concession Area 7C, this could be easily managed through consultation with the research managers at DFFE to ensure that the survey vessels to not hinder each other. Implementation of this simple mitigation would result in NO impacts of prospecting on the research activities (i.e., screened out of impact assessment).

7.8 Description of specific environmental features and infrastructure on the site

7.8.1 Sensitivity and significance of the system: Ecosystem threat status

The 2018 SANBI National Biodiversity Assessment (NBA) assesses the threat status and sensitivity of different habitat types based on biodiversity (richness, uniqueness, spatial extent of the habitat type) and exposure levels to natural disturbance or environmental perturbations. Ecosystem types are categorised as “Critically Endangered”, “Endangered”, “Vulnerable”, “Near Threatened” or “Least Concern”, based on the proportion of the original extent of each ecosystem type that remains in good ecological condition relative to a series of biodiversity thresholds (Harris *et al.* 2018). Critically

Endangered, Endangered and Vulnerable ecosystems are collectively referred to as threatened ecosystems (SANBI 2016). Critically Endangered, Endangered and Vulnerable ecosystems are collectively referred to as threatened ecosystems (SANBI 2016). According to the latest available data from the 2018 NBA, the entire area covered by Concession Area 7C is classified as "Least Concern" (Figure 7.17). It has also not been identified as part of a National Marine Protected Area (MPA).

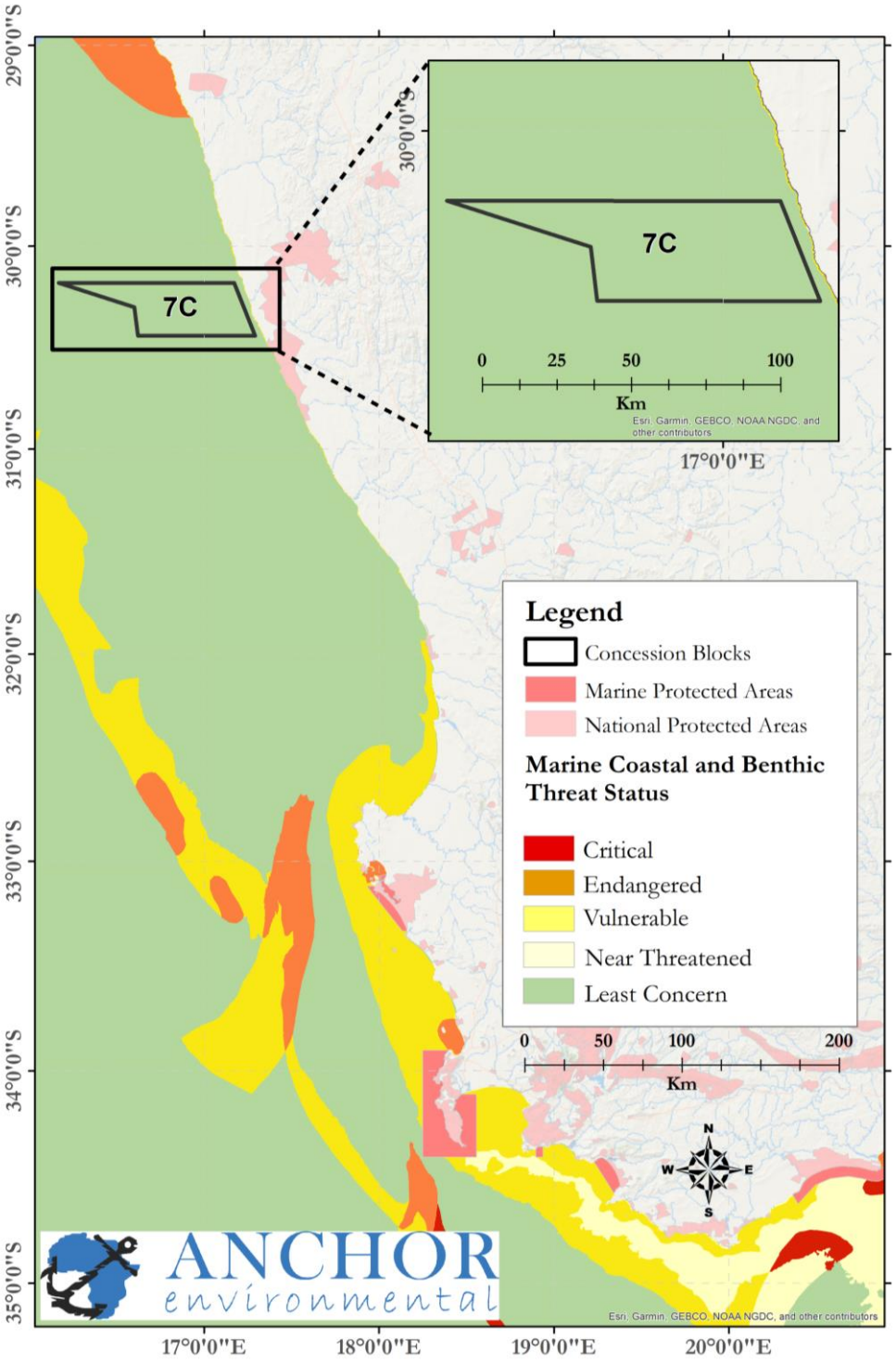


Figure 7.17. SANBI Ecosystem Threat Status and location of Concession Area 7C. Source: https://bgis.sanbi.org/

The proposed area falls within the Benguela Upwelling System Ecological and Biologically Significant Area (EBSA) (Figure 7.18). EBSAs are defined by the Convention on Biological Diversity (CBD) as "geographically or oceanographically discrete areas that provide important services to one or more species/populations of an ecosystem or to the ecosystem as a whole, compared to other surrounding areas or areas of similar ecological characteristics, or otherwise meet the [EBSA] criteria".

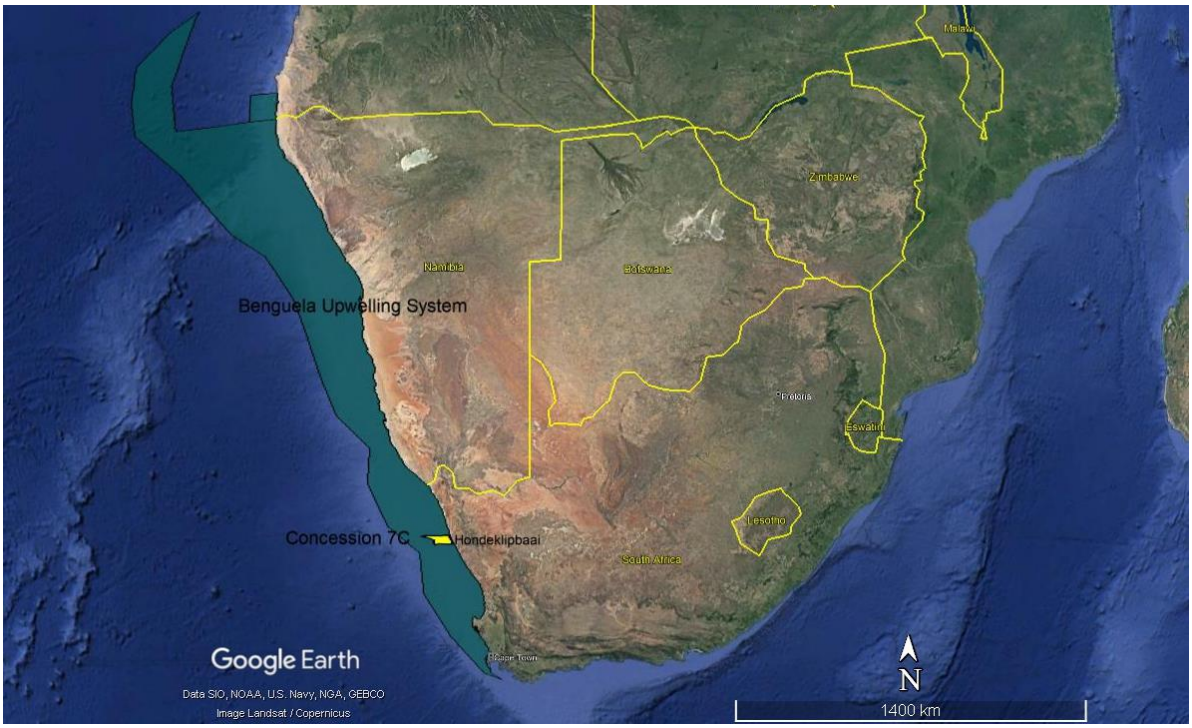


Figure 7.18. The location of Concession Area 7C (yellow) within the Benguela Upwelling System (light green). Source: https://www.benguelacc.org/.

The Benguela Upwelling System (BUS) is one of the four major eastern boundary upwelling systems in the world (Bakun 1996). The BUS EBSA runs along the southwestern African coast, starting from Cape Point in the south and ending to the Angola-Namibia border in the north (UNEP 2014). This system is globally recognized as unique due to being the only cold-water upwelling system that is bordered by warm-water systems in the north (Angola current) and in the south (Agulhas current) (Shillington *et al.* 2007). Furthermore, it is strongly characterized by its high primary production output (>1 000 mg C/m^2/day), which in turn supports abundant pelagic and demersal fish as well as encompassing key spawning and nursey areas for sardine, anchovy and horse mackerel (Hutchings *et al.* 2009). Such productive environments like the BUS can sustain numerous top predator populations such as seabirds (of which many breed in the region), several cetacean species and other marine mammals (Best *et al.* 1997; Best 2007; Crawford 2007; Kemper *et al.* 2007). The BUS is relevant in terms of the following EBSA criteria: 'Uniqueness or rarity'; 'Special importance for life-history stages of species'; 'Importance for threatened, endangered or declining species and/or habitats' and 'Biological productivity'. The BUS EBSA is approximately 49,676,698 ha (almost 50 million ha) in size while the total area of 7C is 200 246ha (0.40% of the entire EBSA). Furthermore, the area of the seafloor that may be impacted in 7C is 0.75 ha, which is 1.51 x 10^{-8}% or 0.000000015% of the entire EBSA). Numerous anthropogenic

activities take place within the BUS EBSA that encompasses the entire South African west coast. The proportion of the EBSA represented by 7C is extremely small and it is anticipated that the impacts of the proposed exploration and prospecting activities on species and ecological processes the BUS EBSA aims to protect are virtually negligible. Potential Impacts on the BUS EBSA are therefore not assessed (SCOPED OUT).

Approximately 4.15% of the concession area overlaps with the proposed Namaqua Coastal EBSA (i.e., 2.33% of the EBSA; Figure 7.19) which has been shown to be highly relevant in terms of the following EBSA criteria: "productivity", "importance for threatened, endangered or declining species and/or habitats", and "naturalness" (van Niekerk and Turpie 2012). The associated pelagic environment within the EBSA is characterized by upwelling, giving rise to very cold waters with very high productivity/chlorophyll levels (Lagabrielle 2009, Roberson et al., 2017). The EBSA was chosen largely due to the lack of anthropogenic pressure within the relatively isolated stretch of coastline, with Sink *et al.* (2012) stating that the area between the Brak and Sout Riviers is the only stretch of coastline in the Northern Cape that remains in somewhat pristine condition. Furthermore, the EBSA has two endangered ecosystem types (Cool Temperate Arid Predominantly Closed Estuary and Southern Benguela Reflective Sandy Shore), and five vulnerable ecosystem types: Namaqua Exposed Rocky Shore, Namaqua Kelp Forest, Namaqua Mixed Shore, Namaqua Very Exposed Rocky Shore and Southern Benguela Intermediate Sandy Shore (Nelson Mandela University N.D, Majiedt *et al*. 2013).

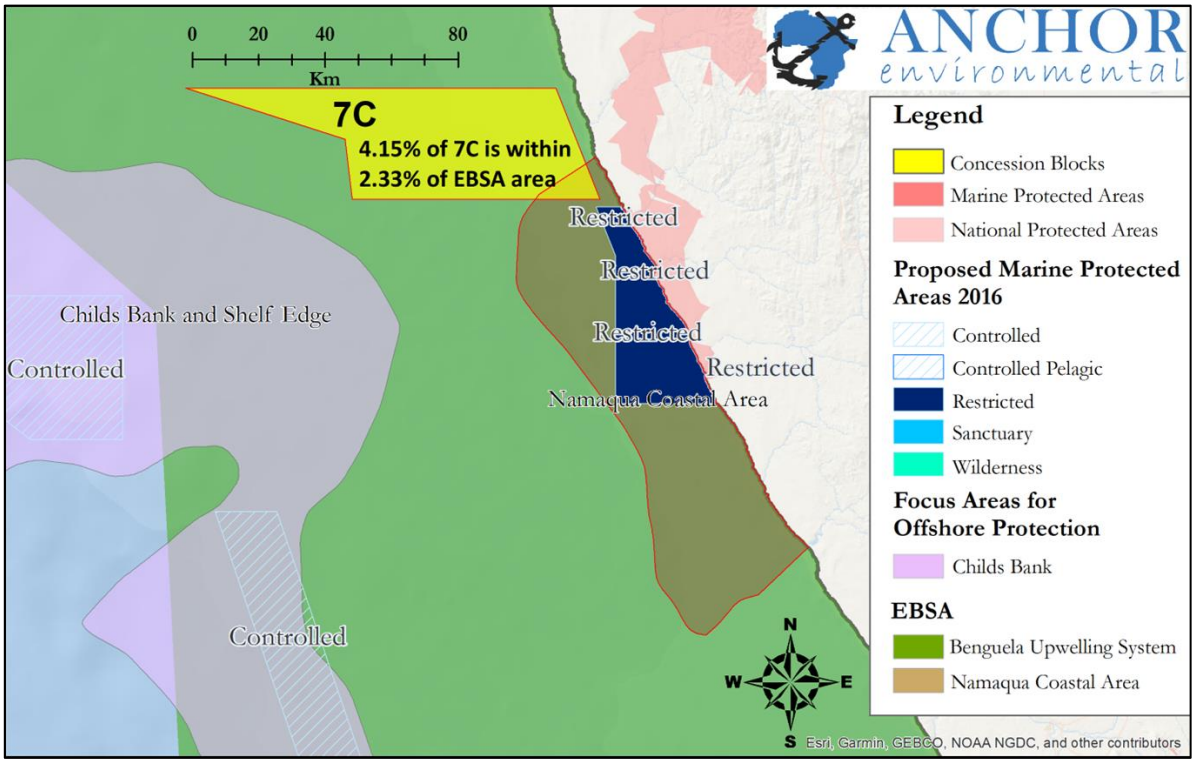


Figure 7.19. Marine Protected Areas (dark blue), proposed Ecological and Biologically Significant Areas (EBSA's) and the location of Concession Area 7C. Source: https://bgis.sanbi.org/.

Since the EBSAs original description, an offshore extension of 7–20 km has been proposed so that the EBSA now extends 36 km offshore at its widest point. The alongshore extent remains the same as

before between the Spoeg and Sout estuaries. The extension was based on better alignment with the features comprising the EBSA, and their condition and threat status, based on the best available information (e.g., Holness et al., 2014; Majiedt et al., 2013; Sink et al., 2012, 2019). This is in addition to the conservation and environmental concerns associated with conducting activities in an area which has been identified as having the qualities mentioned above (Nelson Mandela University N.D.).

It should further be noted that 48 418 ha (24.2%) of the concession area is situated in an area classified as being a Critical Biodiversity Area (CBA) which is still considered to be in a natural state (Harris *et al.* 2022;Figure 7.20). According to the 2022 Marine Spatial Planning Report, non-destructive prospecting (which excludes bulk sampling, but includes acoustic sampling, coring and grab sampling) within CBAs or Ecological Support Areas are considered to be of restricted compatibility with the objectives of the EBSA and CBA and permissible should the impacts on the objectives be appropriately low (Harris *et al*. 2022). Should the non-destructive forms of prospecting indicate the presence of sufficient mineral resources, then future mining might be possible should suitable mitigations and like-for-like offsets be put in place (Harris *et al*. 2022). Should these mitigation measures not be achievable, the recommendation is that the activity remains prohibited in the CBA (Harris *et al*. 2022). Destructive prospecting (which would include drilling) is, however, not compatible with these management objectives and should not occur in the CBA according to the 2022 Marine Spatial Planning Report. A further 1841.5 ha (0.91%) of Concession Area 7C is located within an Ecological Support Area (ESA).

Figure 7.20. Concession Area 7C with respect to Critical Biodiversity Areas and the Namaqua Coastal Area EBSA (Harris *et al*. 2022).

7.9 Environmental and current land use maps

See Section 7.7 and Section 7.8 in addition to the section above.

8 IMPACT ASSESSMENT

8.1 Impacts and risks identified

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

The National Web based Environmental Screening Tool (Appendix 2), SANBI BGIS database and the 2022 National Coastal and Marine Spatial Biodiversity Plan (Harris et al. 2022), amongst others, were consulted to review the potential impacts and risks of prospecting on the environment. The Screening Tool was used in accordance with NEMA and the EIA Regulations and generates a report summarising the most important Environmental Themes that needs to be considered for assessment (e.g., marine ecology, socio-economic, visual, etc.) and their Environmental Sensitivity (very high, high, medium or low) relating to the developmental footprint. Although the current concession area does not coincide with any environmental sensitivities for any of the themes according to the Screening Tool, it did identify the following list of specialist assessments that need to be considered for inclusion in the assessment report:

1. Agricultural Impact Assessment;
2. Archaeological and Cultural Heritage Impact Assessment;
3. Palaeontology Impact Assessment;
4. Terrestrial Biodiversity Impact Assessment;
5. Aquatic Biodiversity Impact Assessment;
6. Noise Impact Assessment;
7. Radioactivity Impact Assessment;
8. Plant Species Assessment; and
9. Animal Species Assessment.

Furthermore, Concession Area 7C partially overlaps with the proposed Namaqua Coastal EBSA, a CBA and ESA, although it falls outside of any MPAs and has a threat status of “Least Concern” according to the SANBI Ecosystem Threat Status (Figure 7.17; Figure 7.18; Figure 7.19; Figure 7.20). Despite being a proposed EBSA at the time of the writing of this report, impacts should be considered as if this EBSA has been formally ratified, as the final Conference of the Parties (COP) decision will be made in December of 2022, which will probably result in the EBSA being formalised by the time the prospecting takes place. According to the 2022 Marine Spatial Planning Report, non-destructive prospecting (which excludes bulk sampling, but includes acoustic sampling, coring, and grab sampling) within CBAs or Ecological Support Areas are considered to be of restricted compatibility with the objectives of the EBSA and CBA and permissible should the impacts on the objectives be appropriately low (Harris *et al*. 2022). Should the non-destructive forms of prospecting indicate the presence of sufficient mineral resources, then future mining might be possible should suitable mitigations and like-for-like offsets be put in place (Harris *et al*. 2022). Should these mitigation measures not be achievable, the recommendation is that the activity remains prohibited (Harris *et al*. 2022). Destructive prospecting (which would include drilling) is, however, not compatible with these management objectives and should not occur in the CBA according to the 2022 Marine Spatial Planning Report.

Based on the EAPs assessment, and information as presented above (also refer to Section 7), it was determined that specialist impact assessments would be required for the following themes: (1) Plant and Animal Species Impact Assessment in the form of a Marine Ecology and Fisheries Impact Assessment; (2) Archaeological, Maritime and Cultural Heritage Impact Assessment; and 3) Palaeontological Assessment. In addition to these, the EAP commissioned a study to consider the potential impacts of prospecting on the Socio-Economic Conditions of the area. Results from these assessments are provided in the respective studies that were commissioned (Appendix 3–5). Specialists' CV are also attached as appendices (Appendix 6).

Based on the EAPs assessment and the Screening Tool's Environmental Sensitivity results (i.e., no intersection of concession area and environmental sensitivities for any of the themes), the following impacts were reviewed by the EAP in the form of a Compliance Statement, rather than being subjected to a comprehensive specialist impact assessment. Noise, Radioactivity, interference with commercial shipping traffic, visual integrity pacts and impacts on and Scientific Research. Since the proposed activity will occur in the ocean offshore and not on land, the following themes were considered unlikely to be impacted by the prospecting activities and were therefore not assessed and scoped out, i.e., Agriculture, Terrestrial Biodiversity and Aquatic Biodiversity (terrestrial freshwater).

The no-go option and cumulative impacts were also considered. Assessment tables for each impact assessed are presented below along with a summary of the key findings. Potential impacts were assessed in terms of their nature, extent, duration, intensity, probability of occurrence, potential for mitigation, cumulative effects and overall significance. A description of the impact assessment methodology used in this study is presented in Section 8.11.

8.2 Specialist studies

8.2.1 Marine Ecology and Fisheries Specialist Impact Assessment

Potential impacts to the marine environment as a result of exploration and prospecting are identified based on available literature, previous EIA and monitoring reports (Lane and Carter 1999; Penney *et al.* 2007; Pulfrich 2016, 2017, 2021; Biccard *et al.* 2018; Baker and Arnott 2021) and the specialist's own knowledge. It is assumed that a vessel with dynamic positioning will be used for all survey and sampling activities and potential impacts of anchoring on the seabed are therefore not assessed. Should this not be the case the potential impacts of anchoring must be assessed, and appropriate mitigation included in a revised EMPr. Identified potential impacts include:

- Underwater noise disturbance to marine fauna;
- Marine megafauna collisions with survey vessels;
- Direct impact of seabed excavation and tailings disposal during drill sampling on benthic habitats e.g. soft sediments and/or reefs and associated infaunal and epifaunal communities;
- Impact on surrounding benthos and water column via fine sediment plume;
- Waste discharges during vessel operations;
- Impact on the Namaqua Coastal Area EBSA and CBA; and

- Impacts on fisheries (and livelihoods of those who depend on these fisheries) due to exclusion zones around survey vessels and direct potential impacts on target species and supporting ecosystems.

No impacts are expected on the Demersal Longline and Demersal Trawl Fisheries (targeting mostly hake), Marine Research Surveys, the West Coast Rock Lobster Fisheries (including commercial and interim relief nearshore), Kelp Harvesting or Abalone Aquaculture and Ranching and these were therefore screened out of the impact assessment.

8.2.1.1 Underwater noise disturbance to marine fauna

The extent to which intense underwater sound might cause an adverse impact on a species is dependent upon the incident sound level, sound frequency, duration of exposure and/or repetition rate of the sound wave (Hastings and Popper, 2005). Studies are primarily based on evidence from high level sources of underwater noise such as blasting or impact piling, as these sources are likely to have the greatest environmental impact.

Sounds generated by vessels in addition to the noise from acoustic surveys have been related to negative impacts on marine animals (Koper and Plön 2012). These negative impacts include direct effects, such as physical injury (i.e. auditory and non-auditory), stress, perceptual interference, behavioural changes, and chronic responses, and indirect effects on predator species as a consequence of a change in prey distribution or abundance due to direct effects of sound on the prey (NRC 2003; Koper and Plön 2012). The impacts associated with acoustic surveys are not yet fully understood and further research is currently underway.

During prospecting, sounds and vibrations emanating from sampling tools only last a few days but can be intense. Exposure to intense sounds for even short periods of time can lead to permanent hearing damage. However, the potential effects of diamond prospecting and mining in southern Namibia on marine mammals have been reported to be minimal Findlay (1996). The proposed sampling via coring and drilling is also not expected to create significant underwater noise as the sound is largely restricted to the seabed material (sand/rock) and environmentally significant sound propagation in the water column is not anticipated.

It should be noted that natural sound sources are also emitted frequently from the ocean to a point where “sea noise” and biological sound sources (baleen whale calls, dolphin echolocation, shrimp snapping etc.) may even overshadow anthropogenic noise (Penney *et al.* 2007; Pulfrich 2017; Au 1993; Richardson *et al.* 1995). Adverse impacts of underwater sound can be broadly summarised into three categories 1) physical traumatic injury and fatality, 2) auditory injury (either permanent threshold shift (PTS) or temporary threshold shift (TTS), and 3) disturbance. These impacts are different for different groups of organisms (invertebrates, fish, marine mammals and sea birds). The current state of knowledge in respect of each of these groups is summarised below.

Impacts of underwater noise disturbance on invertebrates

Although invertebrates mostly do not possess hearing organs, many do have tactile organs that are sensitive to sound pressure (Mason 2017). While there is very little published information available about the effects of seismic noise on marine invertebrates, it has been postulated that benthic invertebrates can only hear seismic survey sounds at very close range. This implies that only surveys conducted in very shallow water will have any detrimental effects on benthic invertebrates. Studies investigating the impacts of airguns (which is more powerful than the acoustic equipment suggested in this study) on zooplankton, found that there were no discernible negative effects on the zooplankton communities (Fields *et al.* 2019 and Richardson *et al.* 2017).

The overall impact of seismic disturbance to marine invertebrates in concession 7C is assessed to be VERY LOW (Table 8-1). The greatest concern to invertebrates is the drilling in the resource development phase, which will entail a high density of samples, vibration, and generation of underwater noise that may negatively impact invertebrates. Essential mitigation includes the minimising the number, or the prohibition of drill samples to reduce the intensity of the impact.

Table 8-1 Impacts of underwater noise disturbance on invertebrates.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	Medium
Essential Mitigation: The absolute minimum number of 3-5 m^2 drill samples must be used during the resource development phase of prospecting								
With Mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Probable	**VERY LOW**	-ve	Medium

Impacts of underwater noise disturbance on fish

Powerful external forces such as sounds may disturb fish and possibly affect their recruitment. The Multibeam Echo Sounder (MBES) (high-frequency range) and the Topas chirp SBP (mid-frequency range) are mostly inaudible to fish. Some species such as those with swim bladders, may suffer serious injury at close range to the sound source, although fish are expected avoid noise levels that can cause injury (Mason 2017). Possible injury or mortality in pelagic species could occur on initiation of a sound source at full power in the immediate vicinity of fish, or where reproductive or feeding behaviour may override a flight response to seismic survey sounds. Underwater noise from drilling is expected to constitute a disturbance to fish that could interfere with life history behaviours, but this is expected to be temporary and limited to a very small spatial area in close proximity to the drilling sites. Popper and Schilt (2008) conclude that as most fish exposed to seismic sounds will in all likelihood be some distance from the source, where the sound level has attenuated considerably; only a very small number of animals in a large population will ever be directly killed or damaged by sounds from seismic sources. The limited extent and short duration of the planned surveys, however, mean that the overall impact of the use of the acoustic survey equipment on fish is assessed to be INSIGNIFICANT and no mitigation is considered (Table 8-2).

Table 8-2. Impacts of underwater noise disturbance on fish.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Medium
Best Practice: • No essential or potential mitigation measures identified								

Impacts of underwater noise disturbance on marine mammals

All marine mammals are susceptible to acoustic trauma from geophysical survey activity although there is little information on the levels of noise that would result in physiological injury and no permanent threshold shifts (PTS) have been recorded (Mason 2017). Information suggests that the animal would need to be near the acoustic equipment to suffer severe physiological injury (Koper and Plön 2012). Such injuries are either temporary (temporary threshold shift – TTS) or permanent (permanent threshold shift – PTS). Injuries are likely to result in a reduction in foraging efficiency, reproductive potential, social cohesion and ability to detect predators (Weilgart 2007). As marine mammals are highly mobile, they are expected to avoid the source of the sound. Observations show that responses to seismic activity varies between species with smaller odontocetes displaying the strongest avoidance response, while the responses of medium and large odontocetes (killer whales and pilot whales) were less marked (Mason 2017). Of the proposed acoustic survey activities, the Topas sub-bottom profiler system (which uses shallow (35-45 kHz) and medium penetration (1-10 kHz) "Chirp" seismic pulses) is thought to present the greatest risk to marine mammals (particularly) dolphins that are known to occur in the area (mainly dusky dolphins *Lagenorhynchus obscurus* (listed as "least concern" on the IUCN red data list) and Heaviside's dolphins *Cephalorhynchus heavisidii* (listed as near threatened on the IUCN red data list).

The prevalence of geophysical survey data acquisition has increased across the globe in recent years, and this has prompted scientists to establish noise exposure criteria to predict the onset of auditory effects in marine mammals in order to avoid or mitigate for such impacts (Southall *et al.* 2019). To date, extensive seismic surveys have been conducted on the continental shelf on the west and south coasts of South Africa (Branch and Branch 2018). The scientific community have voiced their concern over the potential impacts associated with these seismic surveys on various groups of marine fauna. It is known that migrating whales are frequently encountered on the west coast of southern Africa during the summer months (due to feeding activity) and encounters with odontocetes such as dusky dolphins, Heaviside's dolphin and pilot whales are possible throughout the year. Furthermore, humpback calves are vulnerable during the southern migration which takes place during the months of September and October. A noise modelling study, using marine mammal noise exposure criteria from Southall *et al.* (2019), was undertaken in Greenland in 50-250 m water depth for a similar MBES and Chirp sub-bottom profiler geophysical survey system. This study predicted worst case scenario impact ranges for HF and LF cetacean hearing groups of less than 100 m for both PTS and TTS (Barham and Mason 2021).

It is likely that cape fur seals *Arctocephalus pusillis pusillis* will be encountered during seismic exploration and sampling/prospecting activities in Concession Area 7C. Seals are highly mobile animals with a general foraging area covering the continental shelf up to 120 m depth (approximately 220 km offshore). In general, seals display considerable tolerance to underwater noise (Richardson *et al.* 1995). This has been confirmed by a study in Arctic Canada in which ringed seals showed only limited avoidance of seismic operations (Lee *et al.* 2005). In another study, ringed seals were shown to habituate to industrial noise (Blackwell *et al.* 2004). It is likely that seals would only suffer significant injury if they were diving directly below the vessel in close proximity to the seismic source. The likelihood of this occurring is considered very low.

It is recommended that a Marine Mammal and Seabird Observer (MMSO) be on duty during the proposed seismic survey activities and as a precaution, the mitigation measures listed below are followed. A passive acoustic monitoring (PAM) system should also be used during survey activity to detect cetaceans that could be at risk. It is also recommended that the timing of seismic survey activity in concession 7C should be confined to seasons when cetaceans are scarce, as far as possible, feasible and reasonable, and as per the recommendations from an MMSO and specialist to ensure minimal disturbance (Gründlingh *et al.* 2006). Implementation of these mitigation measures should ensure that PTS and TTS impacts arising from the proposed seismic survey activities in concession 7C would be unlikely.

Based on the above, impacts to marine mammals was assessed to be of MEDIUM risk and with the implementation of mitigation, this is reduced to VERY LOW risk (Table 8-3) – mitigation measures are expected to reduce the intensity of the impact from high to medium.

Table 8-3. Impacts of underwater noise disturbance on marine mammals

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	High 3	Short-term 1	Medium 6	Probable	**MEDIUM**	-ve	Medium

Essential mitigation measures:

- A designated onboard Marine Mammal and Seabird Observer (MMSO) to ensure compliance with mitigation measures during geophysical surveying.
- MMSO to conduct pre-survey visual scans of at least 30 minutes for the presence of cetaceans around the survey vessel prior to the initiation of any acoustic impulses
- "Soft starts" should be carried out for equipment with source levels greater than 210 dB re 1 µPa at 1 m over a period of 20 minutes to give adequate time for marine mammals to leave the vicinity. Where this is not possible, the equipment should be turned on and off over a 20-minute period to act as a warning signal and allow cetaceans to move away from the sound source.
- Terminate the survey if any marine mammals show affected behaviour within 500 m of the survey vessel or equipment until the mammal has vacated the area.
- Avoid planning geophysical surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations.
- Passive Acoustic Monitoring (PAM) must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility.

With mitigation	Regional 2	Medium 2	Short term 1	Low 5	Improbable	**VERY LOW**	-ve	Medium

Impacts of underwater noise disturbance on seabirds

Impacts of sound pulses to marine birds (diving or resting on water surface) include physiological injury, behavioural avoidance of acoustic survey areas and indirect impacts due to effects on prey. The African penguin *Spheniscus demersus* and other diving birds, although susceptible to this impact, are likely to avoid the approaching sound source (Mason 2017). This is supported by the findings of Pichegru *et al.* (2016) who have shown that feeding areas within 50 km of seismic surveys are completely avoided by African penguins. Cape gannet, Cape cormorant and various terns and gull species, pelagic seabirds such as albatross, petrels and shearwaters, are most likely to be encountered and affected by the acoustic surveys within Concession Area 7C. Note that inshore shore bird species such as the African Black Oyster Catcher (Swart Tobie) *Haematopus moquini*, that are very unlikely to be encountered as far offshore as Concession Area 17C, are not included as part of the impact assessment. The overall impact is assessed to be VERY LOW and with the implementation of mitigation is reduced to INSIGNIFICANT (Table 8-4).

Table 8-4. Impacts of underwater noise disturbance on seabirds.

	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	Medium
Essential mitigation measures: • A designated onboard Marine Mammal and Seabird Observer (MMSO) to ensure compliance with mitigation measures during geophysical surveying • MMSO to conduct pre-survey visual scans of at least 30 minutes for the presence of feeding seabirds in the survey area • If spotted wait until all marine life (seabirds, seals, cetaceans and turtles) have cleared an area of 500 m radius of the centre of the seismic source before resuming with seismic survey (initiate soft start procedure when resuming seismic survey). • Terminate the survey, if any seabirds show affected behaviour within 500 m of the survey vessel or equipment, until they have vacated the area. • Record incidences of encounters with marine life (seabirds, turtles, seals, fish) their behaviour and response to seismic survey activity. • Suspend operations if any obvious mortalities or injuries to marine life are observed.								
With mitigation	Local 1	Medium 2	Short term 1	Very low 4	Improbable	**INSIGNIFICANT**	-ve	High

Impacts of underwater noise disturbance on turtles

The overlap of turtle hearing sensitivity with the higher frequencies produced by seismic survey equipment suggests that turtles may be considerably affected by seismic noise. Recent evidence suggests that turtles only detect seismic survey equipment at close range (< 10 m, possibly linked to visual rather than auditory cues) or are not sufficiently mobile to move away from approaching survey vessels (particularly if basking). Initiation of a sound source at full power in the immediate vicinity of a swimming or basking turtle could result in physical injury. This also means that turtles may be vulnerable to boat strikes and entanglement with seismic towed equipment. Turtles are restricted to offshore pelagic waters off the west coast of South Africa and are likely to be encountered in Concession 7C. However, most incidents involve foraging turtles or turtles diving in an escape response becoming trapped by towed survey equipment which is not in the scope of works for the proposed seismic survey in Concession 7C. The overall impact is therefore assessed to be INSIGNIFICANT (Table 8-5). Despite the low probability of impacts on turtles during the short survey duration, their inability to timeously avoid an approaching survey vessel warrants a precautionary approach and required mitigation includes delayed start-ups and a 500m buffer. Impacts with mitigation measures would still remain INSIGNIFICANT (Table 8-5).

Table 8-5. Impacts of underwater noise disturbance on turtles.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
Essential mitigation measures: • A designated onboard Marine Mammal, Turtle and Seabird Observer (MMSO) to ensure compliance with mitigation measures during geophysical surveying • MMSO to conduct pre-survey visual scans of at least 30 minutes for the presence of feeding seabirds in the survey area • If spotted wait until all marine life (seabirds, seals, cetaceans and turtles) have cleared an area of 500 m radius of the centre of the seismic source before resuming with seismic survey (initiate soft start procedure when resuming seismic survey). • Terminate the survey, if any turtles show affected behaviour within 500 m of the survey vessel or equipment, until they have vacated the area. • Record incidences of encounters with marine life (seabirds, turtles, seals, fish) their behaviour and response to seismic survey activity. • Suspend operations if any obvious mortalities or injuries to marine life are observed								
With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High

8.2.1.2 Marine megafauna collisions with survey vessels

There is a low risk of survey vessel collisions with marine megafauna such as whales and turtles that are susceptible to “ship strikes”. Any increase in vessel traffic in habitat used by these animals can

increase the risk of collision or entanglement with equipment. The potential for collision is directly proportional to the vessel speed and the abundance and behaviour of cetaceans in the area. The 7C concession area is part of the natural range of several species of marine mammals including large whales such as humpback and southern right whales, but it is not considered an important aggregation site or migration route. The number of marine fauna expected to be encountered during the limited time that the survey vessel is active is therefore expected to be very low and the intensity of the impact is considered high for the individual affected animal and medium for the population as a whole. Seabird collision with the vessel is not anticipated as the vessel will not be creating fish offal or create light more intense than that on any other operational vessel, that would attract seabirds. The potential impact of marine megafauna collision with the survey vessel or entanglement in sampling equipment is therefore assessed to be of VERY LOW significance and with the implementation of mitigation measures is reduced to INSIGNIFICANT (Table 8-6).

Table 8-6. Marine megafauna collisions with survey vessels.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Medium 2	Short-term 1	Low 5	Possible	**VERY LOW**	-ve	High
Essential mitigation measures: • A designated onboard Marine Mammal Observer (MMO) and vessel operator to keep watch for marine megafauna in the path of the vessel during geophysical surveying. • Avoid planning geophysical surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations. • Vessel transit speed to not exceed 12 knots (22 km/hr), except within 25 km of the coast where it should be kept to less than 10 knots (18 km/hr) as well as when sensitive marine fauna are not present in the vicinity.								
With mitigation	Regional 2	Low 1	Short term 1	Very Low 4	Improbable	**INSIGNIFICANT**	-ve	High

8.2.1.3 Benthic impact of seabed sampling and tailings disposal

The impacts from grab and core sampling are expected to be virtually negligible due to having a relatively small footprint. Recolonisation from adjacent undisturbed areas area also possible because sediment from grab samples is expected to dissipate almost immediately and core samples do not require onboard processing (i.e., no sediment spill in the ocean). Considering the available area of similar habitat on the West Coast, the reduction in benthic biodiversity can be considered negligible. However, of concern is the proposed use of the larger drill tool, high sample density and large volume of tailings discarded in the resource development phase as this is expected to have high intensity impacts including habitat loss and smothering of the benthos at sites associated with discarded tailings. The impact on the offshore benthos because of the cumulative removal of sediments from sampling is of high intensity at a local scale (i.e. sampling locations). Full recovery is expected to take place within the short to medium term (i.e. 6 - 15 years), as the sampled areas are expected to have slow infill rates and may persist for extended periods (years). Furthermore, biomass often remains

reduced for several years as long-lived species like molluscs and echinoderms need longer to re-establish the natural age and size structure of the population. It is generally accepted that offshore disturbed areas take longer to recover than those in shallow water further inshore. Important drivers of inshore habitat recovery are related to the exposure to dynamic physical processes such as wave action and sediment refill from river mouths (Biccard *et al*. 2020b). Hence, recovery times greatly increase with depth and distance from sources of sedimentation. The overall consequence of this impact is considered to be low and is of MEDIUM significance but will be LOW with the implementation of mitigation measures.

Table 8-7 Benthic Impacts of seabed sampling and tailings disposal.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	High 3	Medium-term 2	Medium 6	Definite	**MEDIUM**	-ve	High
Essential Mitigation: • No destructive sampling or tailings discharge to take place withing a buffer of at least 100m from identified reefs and sensitive areas of potential ecological significance. • Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats, reefs and important fishing areas, particularly for drilling activities. • Total number of resource development areas must be kept to a minimum • Areas of potential ecological significance must be avoided (Penney et al. 2007; Pulfrich 2017).								
With Mitigation	Local 1	Medium 2	Medium-term 2	Low 5	Probable	**LOW**	-ve	Medium

8.2.1.4 Fine sediment plumes

During the sampling process, sedimentary material that has been brought to the surface will be processed onboard and unwanted material (tailings) will be discarded overboard, thereby causing sediment plumes. These plumes can affect light penetration through the water column and can adversely affect phytoplankton productivity (O'Toole 1997; Pulfrich 2017). Suspended sediments may also affect the biological responses of consumers (hatching success, larval survival and foraging behaviour) (Clarke and Wilber 2000). Marine communities in the Benguela region are, however, well adapted to such events as they are frequently exposed to naturally elevated suspended-sediment levels (Penney *et al* 2007). Where deep-water sampling/prospecting is practiced, increased turbidity in the pelagic offshore environment as result of tailings plumes is not expected to have any significant effects on the marine biota (Penney *et al.* 2007; Pulfrich 2017). This is well supported as numerous modelling studies and aerial observations of plumes generated from mining vessels have shown that concentration of suspended sediments reduces rapidly with distance from the vessel, allowing a fairly fast settlement and dilution of fine sediment fractions (Poopetch 1982; Hitchcock and Drucker 1996; Shillington and Probyn 1996; CSIR 1998; Carter and Midgley 2000). In addition, studies conducted on dredge-mining operations have recorded that water-column turbidity returns to natural background levels within a few hours after dredging has ceased (Evans 1994; Whiteside *et al.* 1995).

The coring and grabbing phase of sampling in 7C will not be contiguous. This will result in a delay in time while the seabed tool is transferred to the new sampling site before additional sediment is released overboard with the next sample. Furthermore, the volumes of sediment that are expected to be collected and processed during this phase of prospecting are relatively small. No direct mitigation is feasible for tailings in this phase as tailings disposal is an integral part of this sampling method and the impacts on the environment associated with these forms of sampling are expected to be insignificant and without any measurable cumulative impact. However, for the drilling phase, the volumes of sediment generated will be greater, therefore, it will be necessary for sediment tailings to be discarded in areas of low ecological significance. Should tailings be disposed of on-site during the resource development phase, this will result in the disposal being somewhat contiguous, as the samples are located in proximity (50 metres) from each other, leading to very short transit times between sites, and increased turbidity.

Due to the low intensity, short-term nature and very localised scale of the impact relative to the large spatial scale of the fish nursery area (most of the west coast inner shelf), the significance of any sediment plumes generated by prospecting activities on fish stock recruitment will be very low. Overall, the impacts are rated as VERY LOW without mitigation, and remains VERY LOW with the mitigation measure of discarding the drilling tailings away from the sampling area and outside of CBA or EBSA area. This mitigation measure also reduces the intensity of the activities from Medium to Low (Table 8-8).

Table 8-8. Potential Impact of tailings discharge and fine sediment plumes on the pelagic habitat.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Short-term 1	Very low 3	Definite	**VERY LOW**	-ve	High
Essential mitigation measures: • Tailings disposal must be done in a designated area with no reefs or sensitive habitat.								
Without mitigation	Local 1	Low 1	Short-term 1	Very low 3	Definite	**VERY LOW**	-ve	Medium

8.2.1.5 Waste discharges during vessel operations

Water quality in the vicinity of exploration, sampling and associated support vessels may be impaired by various forms of waste discharged into the marine environment including hydrocarbons, sewage, litter, food, detergents and cooling water. During vessel operations, normal discharges to the sea can come from a variety of sources but these are all regulated by onboard waste management plans which must be MARPOL compliant. MARPOL is the International Convention for the Prevention of Pollution from Ships and is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The duration and severity of the impact would depend on the bio-degradation potential of the type of waste and its toxicity. Solid wastes (e.g.

plastics, scrap metals) may take decades or centuries to degrade while hydrocarbons are toxic. Based on the relatively small volumes of waste that can be expected, the potential impact of operational discharges from exploration and sampling/prospecting on the marine environment are of very low consequence, and the extent is likely to be limited to the immediate area around the vessel(s). Overall, the potential impact of operational discharges on the marine environment is considered to be of VERY LOW significance. With the implementation of the stipulated mitigation measures this is reduced to INSIGNIFICANT (Table 8-9).

Table 8-9. Waste discharge during vessel operation.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Medium-term 2	Very low 4	Probable	**VERY LOW**	-ve	High
Best practise mitigation measures: • Inform & empower all staff about sensitive marine species & suitable disposal of waste; • Ensure compliance with relevant MARPOL standards; • Develop a waste management plan; • A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations; • Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm); • All process areas should be bunded to ensure drainage water flows into the closed drainage system; • Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system; • Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages; • All hydraulic systems should be adequately maintained and hydraulic hoses should be frequently inspected; and • Spill management training and awareness should be provided to crew members of the need for thorough cleaning-up of any spillages immediately after they occur in order to minimise the volume of contaminants washing off decks.								
With mitigation	Local 1	Low 1	Short term 1	Very low 3	Improbable	**INSIGNIFICANT**	-ve	High

8.2.1.6 Impacts on the Namaqua Coastal Area EBSA and adjacent CBA

Approximately 4.15% of the concession area overlaps with the proposed Namaqua Coastal EBSA (i.e., 2.33% of the EBSA). It should further be noted that 48 418 ha (20.7%) of the concession area is situated in an area classified as being a Critical Biodiversity Area (CBA) which is still considered to be in a natural state (Harris *et al.* 2022; Figure 7.20). A further 1841.5 ha (0.91%) of Concession Area 7C is located within an Ecological Support Area (ESA).

According to the 2022 Marine Spatial Planning Report, non-destructive prospecting (which excludes bulk sampling, but includes acoustic sampling, coring and grab sampling) within CBAs or EBSAs are considered to be of restricted compatibility with the objectives of the EBSA and CBA and permissible should the impacts on the objectives be appropriately low (Harris *et al*. 2022). Destructive prospecting

is, however, not compatible with management objectives in CBAs. Mining within areas considered to be ESAs is also of restricted compatibility. Should the non-destructive forms of prospecting indicate the presence of sufficient mineral resources, then the selection of the site as a CBA could be re-evaluated as part of compromise negotiations in current or future Marine Spatial Planning processes and future mining might be possible should suitable mitigations and like-for-like offsets be put in place (Harris *et al*. 2022). Should these mitigation measures not be achievable, the recommendation is that the activity remains prohibited in the CBA (Harris *et al*. 2022). Destructive prospecting (which would include drilling) is, however, not compatible with these management objectives and should not occur in the CBA according to the 2022 Marine Spatial Planning Report.

Since most of the small overlap between 7C and the EBSA is considered to be CBA area, the regulations on CBA's will predominantly apply. It is the specialist's professional opinion that the proposed prospecting using the 3–5 m^2 drilling tool constitutes destructive sampling due to the volume of sediment removed from the sea floor, likely noise and vibration created, high sample intensity during the Resource Development Phase, and turbidity associated with the sediment plumes likely to be generated during onboard sample processing. The use of this drilling tool is not compatible with the CBA and EBSA guidelines, and it is considered an essential mitigation measure to not undertake destructive sampling in these portions of the 7C Concession. However, the low impact nature of acoustic surveying, coring, and grab sampling makes these activities permissible within this area. The significance of these impacts is considered to be MEDIUM, with High intensity and the duration being Medium term due to the slow recovery of the benthic environment (Table 8-10). With mitigation, however, the potential impact is assessed as INSIGNIFICANT.

Table 8-10 Impacts on the Namaqua Coastal Area EBSA and adjacent CBA

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	High 3	Medium-term 2	Medium 6	Probable	**MEDIUM**	-ve	High
Essential Mitigation: • Acoustic surveying, coring and grab sampling can take place over the entire concession due to their low impacts, however, all drilling activities which utilise the large 3-5 m^2 drill must not be used in the CBA areas.								
With mitigation	Local 1	Low 1	Short term 1	Very low 3	Improbable	**INSIGNIFICANT**	-ve	High

8.2.1.7 Impacts on fisheries

According to the International Regulations for Preventing Collisions at Sea (Colregs 1972), vessels engaged in seismic surveys are recognised as vessels limited in their ability to manoeuvre and as such, vessels engaged in other activities (such as fishing) are obliged to give way. Furthermore, the implementation of a safety (exclusion) zone of 500 m around the seismic vessel will temporarily exclude any other users of the sea from these areas. In practice, this exclusion zone takes form of a moving footprint extending around the survey vessel (Mason 2017).

Exclusion of fishing vessels from fishing areas, possible altered behaviour of fish due to acoustic activities and interference with shipping could have (indirect) socio-economic implications for the affected industries. Fisheries can also be indirectly impacted should prospecting activities negatively impact fish reproduction and recruitment.

Fisheries sectors operating within Concession 7C that could be impacted include Traditional Linefish and Tuna Pole and Line (when targeting snoek). Overlap with these sectors are of limited significance as a proportion of the national total catch of each of these fisheries but they may be important at the individual vessel, right holder or fisher level. Due to the short-term nature and small degree of overlap of proposed prospecting in 7C with fisheries and target species distributions, the impact is assessed to be VERY LOW and can be reduced to INSIGNIFICANT with implementation of mitigation (Table 8-11).

Table 8-11 Impacts on fisheries.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	High
Essential mitigation measures: Prior to survey commencement, key stakeholders (see below) should be consulted and informed of the proposed survey activity and the likely implications thereof: · Fishing industry / associations (contactable via liason@fishsa.org): ➢ SA Marine Linefish Management Association (SAMLMA); ➢ South African Tuna Association (SATA); ➢ Local fishing communities; • Other associations and organs of state · DFFE; · SAMSA; · South African Navy Hydrographic office; and · Overlapping and neighbouring right holders. • Appoint a fisheries liaison officer (FLO) to facilitate communication with potentially affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area. • Undertake surveys when fishing effort is lowest i.e., August to December. It is recommended that the snoek line fishing peak season (April-May) be avoided as far as possible, feasible and reasonable.								
With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

8.2.2 Heritage impacts

It is difficult to quantify the impacts on cultural heritage resources of seabed activities such as prospecting because the locations and extent of these resources — particularly submerged prehistoric and palaeontological resources — are generally poorly understood and the nature of the environment limits the potential for identifying such sites and monitoring the intrusive activities. The potential exists that sampling activities could disturb cultural heritage material on the seabed, particularly

historical shipwrecks and other palaeontological or rare geological objects. The potential impacts on cultural heritage material that are associated with the grab, coring and drilling prospecting activities were assessed in three resource classes: submerged pre-history (cultural and heritage artefacts), palaeontology and shipwrecks/ maritime heritage.

8.2.2.1 Impacts of grab, core and drill sampling on submerged pre-history (cultural heritage and artefacts)

The physical intrusion of grabs, cores and drills into the seabed is very small and, although the footprint of the drill rig is larger, the potential impacts of these sampling activities in Concession Area 7C on submerged pre-history on or in the seabed will be localised. Where impacts are likely to occur, they will be irreversible/permanent because heritage resources are considered non-renewable as they cannot be replaced nor recover after being disturbed, damaged or destroyed. The intensity of impact will be low, given the very limited physical intrusion into or disturbance of the seabed of the coring and the probability of occurrence is POSSIBLE. The significance of the impact is assessed to be VERY LOW but where impacts do occur their effects will be NEGATIVE. The lack of concrete information about the presence of submerged prehistoric resources in the concession area means that the level of confidence in this assessment of impacts is LOW.

In respect of mitigation measures, it is suggested that:

- samples of the coarser fraction (i.e. gravel and stone (20 mm +)) of sorted seabed sediment from each grab sample are retained or assessment by an archaeologist for the presence of prehistoric lithic material.
- any core samples sections which contain alluvial material, particularly where organic remains are present, are retained and are subject to palaeo-environmental assessment.
- any drill sample sections which contain alluvial material, particularly where organic remains are present, are retained and are subject to palaeo-environmental assessment.

Access to such samples for palaeo-environmental and archaeological assessment may offset the potential impacts of grab, core and drill sampling and would result in the changing of the impact status from negative to POSITIVE because of a potential benefit to archaeological and palaeo-environmental research and knowledge that could accrue from access to such information. It is suggested that the applicant engage with the archaeologist and palaeontologist prior to the geotechnical campaign to discuss and agree this proposed mitigation.

Table 8-12. Impacts of grab, core and drill sampling on submerged pre-history (cultural heritage and artefacts).

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term (Irreversible) 3	Low 5	Possible	**VERY LOW**	–ve	Low
Essential mitigation measures:								

• Retain samples of the coarser fraction (i.e. gravel and stone (20 mm +) of sorted seabed sediment from each grab sample for assessment by an archaeologist and palaeontologist for the presence of important material. • Retain core sample sections which contain alluvial material, particularly where organic remains are present, and subject to palaeo-environmental assessment. • Retain any drill sample sections which contain alluvial material, particularly where organic remains are present, and subject to palaeo-environmental assessment • Induction for site managers on archaeological site and artefact recognition. • Reporting of sites to the heritage practitioner for assessment and evaluation.								
With mitigation	Local 1	Low 1	Long-term 3	Low 5	Possible	**VERY LOW**	+ve	Low

8.2.2.2 Impacts of grab, core and drilling on palaeontological resources

Impacts of the proposed grab, coring and drilling activities in Concession Area 7C will be localised and where they do occur, they will be irreversible/ permanent as heritage resources are non-renewable. The intensity of impact will be LOW, given the very limited physical intrusion into or disturbance of the seabed of the sampling activities and the probability of occurrence is POSSIBLE. The significance of the impact is assessed to be VERY LOW but where impacts do occur their effects will be NEGATIVE. The lack of concrete information about the possible presence or distribution of palaeontological resources in the concession area means that the level of confidence in this assessment of impacts is LOW.

In respect of mitigation measures, the small volumes of the samples greatly reduce to likelihood of capturing the sparse fossils reworked from the older, pre- late Quaternary formations and the "extralimitals" in the Last Transgression Sequence. However, the potential for extralimital Agulhas species to be present in the recovered samples is important as these specimens have context in the geological and faunal succession in the core, unlike the specimens usually selected from the loose, mixed shells crossing the oversize screens on sampling/mining vessels. Any fossils such as petrified bone and teeth and shell casts, usually phosphatic, found during the processing of the grab samples must have the details of context recorded and must be kept for identification by an appropriate specialist and if significant, to be deposited in a curatorial institution such as the IZIKO SA Museum. It is also possible that a core or two might intersect rarely preserved lagoonal deposits which are important for providing points on the sea-level curve applicable to the West Coast (Runds *et al*., 2018). It is therefore suggested that a set of cores and material from the drilling from this poorly-known area are the subject of a detailed study (possibly as a B.Sc. Honours or M.Sc. project), with radiocarbon dates.

Such work would offset the potential impacts of the prospecting activities and would result in the changing of the impact status from negative to POSITIVE because of a potential benefit to palaeontological research and knowledge that could accrue from such information. It is suggested that the applicant engage with the archaeologist and palaeontologist prior to the geotechnical campaign to discuss and agree this proposed mitigation.

Table 8-13. Impacts of grab, core and drill sampling on palaeontological resources.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Negligible (Low) 1	Long-term (Irreversible) 3	Low 5	Possible	**VERY LOW**	-ve	Low
Essential mitigation measures: • Retain samples of the coarser fraction (i.e. gravel and stone (20 mm +) of sorted seabed sediment for assessment by an archaeologist and palaeontologist for the presence of important material. • Induction for site managers on archaeological site and artefact recognition. • Reporting of sites to the heritage practitioner for assessment and evaluation. • Any fossils such as petrified bone and teeth and shell casts, usually phosphatic, found during the processing of the cores must have the details of context recorded and must be kept for identification by an appropriate specialist and if significant, to be deposited in a curatorial institution such as the IZIKO SA Museum. • The possible detailed study and dating of a set of cores, possibly as a B.Sc. Honours or M.Sc. project should be considered.								
With mitigation	Local 1	Low 1	Long-term 3	Low 5	Possible	**VERY LOW**	+ve	Low

8.2.2.3 Impacts of grab, core and drill sampling on Maritime heritage

The West Coast, known for its dangerous currents, coastal fogs and a rocky shoreline, has claimed many vessels over the years. At least 89 shipwrecks have been reported between the Orange and Berg Rivers (As per the SAHRA Maritime and Underwater Cultural Heritage database (http://www.sahra.org.za/sahris). The significance of a shipwreck is hard to pinpoint without significant research and would have to be dealt with on an ad hoc basis if they are discovered. When such surveys are undertaken, and any shipwrecks or shipwreck debris is noted, images and coordinates for these should be shared with the heritage practitioner and the Maritime and Underwater Cultural Heritage (MUCH) Unit at the South African Heritage Resources Agency (SAHRA). The likelihood of disturbing a shipwreck is expected to be very small considering the vast size of the South African offshore area.

Although 13 vessels have been recorded in the immediate vicinity of Hondeklip Bay (5 km east of the concession area), these vessels were all lost in or around the bay and are extremely unlikely to be within Concession Area 7C (Figure 7.6). Only one known maritime casualty, *The Shanger*, appears to possibly be located within the concession area, although very limited information on its demise exists.

Due to limited records on its loss, the position as depicted in Figure 7.6 is approximate and it cannot be assumed that the wreck lies within the concession area. However, for the purposes of this impact assessment, the precautionary principle has been applied and the wreck has been assumed to lie within Concession Area 7C. There is therefore potential for the intrusive seabed prospecting activities – grab, core and drill sampling – to impact the wreck if it is present on the seabed.

If such impacts occur, they will be negative because the finite and non-renewable nature of heritage resources means that they cannot recover if disturbed, damaged or destroyed. Impacts are likely to be localised but will be irreversible/permanent where they occur because of the finite and non-renewable nature of shipwreck material. The intensity of impact could be medium to high, but the

likelihood of occurrence is improbable. The significance of the impact is assessed to be LOW. The lack of concrete information about the presence of this wreck in the concession area means that the level of confidence in this assessment of impacts is low. Analysis of geophysical data to be collected prior to and as part of the planning for the seabed sampling programme should indicate whether the wreck of the *Shanger* is in the concession area. If wreck material is found to be present, archaeological advice must be sought before prospecting commences. Buffers zones around such material may be required and will need to be agreed with the archaeologist and SAHRA.

Table 8-14 Impacts of grab, core and drill sampling on maritime heritage resources.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Moderate 2	Long-term (Irreversible) 3	Medium 6	Improbable	**LOW**	-ve	Very Low
Proposed mitigation measures: • Any geophysical data generated to support the prospecting programme must be reviewed for the presence of historical shipwrecks or related material. If wreck material is found to be present archaeological advice must be sought before prospecting commences and buffers zones around such material must be agreed with the archaeologist and SAHRA and implemented. • In the event that shipwreck material is accidentally encountered during the course of prospecting operations, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.								
With mitigation	1	1	3	5	Improbable	**LOW**	+ve	Low

8.2.3 Potential socio-economic impacts

The South African fisheries sector has an estimated value of R6 billion (DAFF 2021), contributing 0.1% to national GDP. Of the 22 commercial sectors (listed in SAG 2013/14) the most economically valuable, and with the greatest catch volumes, are the demersal-trawl (hake) and small-pelagic sectors (pilchards, anchovy, and red-eye round herring) (Brick & Hasson 2016; SAG 2013/14). In the Northern Cape, Port Nolloth, Boegoebaai and Hondeklipbaai were identified as having immense potential for both harbour infrastructure, marine/aquaculture, small town precinct development, tourism and job creation through projects of Expanded Public Works Programme (EPWP).

The economically most important sectors within the Kamiesberg Municipality, as identified in 2018, include the Mining and Quarrying Sector (21.5%) and the Agriculture, Forestry and Fishing Industries (10.0%; KM 2018). The agricultural activities in the Kamiesberg include sheep and goat farming, and crops consisting of fodder for livestock. Livestock farming was further identified as having the potential to grow and promote sustainable livelihoods for people (KM 2018). Although Aquaculture and Conservation and Ecological Restoration were identified as being two emerging sectors in 2016, they do not provide sufficient employment to address the level of unemployment in the area. This can be attributed to water scarcity, shortage of inland rivers to support large scale fishing, the absence of railways, harbours and airports and the sparsely populated nature of the area, with settlements being about 80 km apart and connected via gravel roads. Regardless, there might be potential opportunities for seaweed or kelp, oyster farming, marine food fish farming, abalone processing,

halophytes, brine shrimp (Artemia sp.), and shallow water hake in suitable coastal areas and towns (KM 2018).

There has been a recent increase in applications for prospecting and exploration rights along the west coast. An increase in prospecting/survey activity in the short term and marine mining in the long-term is therefore anticipated. The assessment considered the impacts of prospecting in Concession Area 7C on nine socio-economic sectors. These included:

1. Traditional Linefish sector;
2. West Coast Rock Lobster sector;
3. Tuna Pole and Linefish sector;
4. Small Pelagic Purse Seine Fisheries sector;
5. Aquaculture;
6. Local tourism and small businesses;
7. Sense of place, health and wellbeing;
8. Local Households; and
9. Local crime rates.

However, four of these are unlikely to occur and were therefore "SCOPED OUT" of the assessment. The remaining impacts were assessed to either be INSIGNIFICANT or could be reduced to INSIGNIFICANT after mitigation (where required). The Marine Specialist Study identified three fishery sectors (Tuna pole and line fisheries Traditional line fish and West Coast Rock Lobster (WCRL) that may overlap with the concession area, one of these (WCRL) was scoped out and the remaining two are briefly discussed in the following sections below. Positive impacts might include local and regional socio-economic benefits.

8.2.3.1 Traditional Linefish Sector (Commercial, recreational and small-scale)

Concession Area 7C is located offshore of Hondeklipbaai, which has a small traditional linefishing community. The concession area is situated relatively far offshore in water that is mostly deeper than 100m while linefishers operate in shallow water (generally <100 m depth) . However, commercial linefish catch data shows a small overlap with Concession Area 7C (Figure 7.10) as small scale linefishing activity by local Hondeklipbaai fishers that takes place on the inshore edge of the concession area. The low intensity potential impacts, small spatial scale and short duration of the proposed prospecting activities means that negligible impacts on the traditional linefish sector are anticipated. Regardless, small scale linefishing activity by local Hondeklipbaai fishers is likely very important at the individual vessel, right holder or fisher level and mitigation measure to minimise potential negative impacts on local fishers should be implemented. Linefishing activities in Concession Area 7C will potentially only be affected by small temporary closures/exclusion zones around survey vessels and geotechnical survey sites during prospecting and the spatial scale and intensity of potential impacts on target species is expected to be insignificant in relation to their distributions and movement patterns. The socio-economic impact is expected to be VERY LOW and can be reduced to INSIGNIFICANT with the implementation of mitigation measures (Table 8-15).

Table 8-15 Impact on the Traditional Linefish Sector.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Probable	**VERY LOW**	-ve	High
Essential mitigation measures: • Undertake surveys when fishing effort is lower (preferably outside of fishing seasons). • Appoint a Fisheries Liaison Officer (FLO) to facilitate communication with the local fishing community. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing vessels in the survey area.								
With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

8.2.3.2 Tuna Pole and Line (TPL)

The South African tuna pole and line (TPL) sector targets longfin tuna (*T. alalunga*), yellowfin tuna (*T. albacares*), bigeye tuna (*T. obesus*) and skipjack tuna (*Katsuwonus pelamis*) as well as snoek (*Thyrsites atun*) and yellowtail (*Seriola lalandii)* that are also important targets of the traditional linefishery. A significant amount of snoek-directed activity occurs inshore of the 100 m depth contour (SLR 2021), although this occurs only from April to May (SLR 2021). The commercial tuna pole fishing grounds lie between Cape Agulhas and the Orange River, but the fleet operates predominantly out of Cape Town and Hout Bay harbours and most fishing effort takes place within 100 nautical miles of these ports (particularly in the Cape Canyon area). Data suggests that no TLP fishing effort overlaps with Concession Area 7C. Snoek fishing activity within the concession area by the TLP fleet may, however, occur at times. Snoek does, however, utilise extensive offshore (150-400m depth) breeding grounds between the Agulhas Bank and central Namibia with generally random longshore movement (Griffiths 2002, Kerwath and Wilke 2012). Due to the minimal overlap between Concession Area 7C and the TPL fishing effort, coupled with the short-term nature of the prospecting activities and small spatial and temporal overlap with snoek fishing activity, impacts on the TPL fleet due are expected to be insignificant (Table 8-16).

Table 8-16 Impact on the Tuna Pole and Line fishery.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation measures required								
With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High

8.2.3.3 Impact on Aquaculture

Most of the aquaculture enterprises are found in Western Cape (56%) followed by the Eastern Cape (17%). All other provinces, including the Northern Cape (3%) account for less than 10% of aquaculture farms in South Africa. On the West Coast, sea-based mariculture primarily occurs in Saldanha Bay, whilst land-based abalone farms are established at Jacobsbaai, Doringbaai and Kleinzee. Oyster farming is also conducted at Kleinzee and abalone ranching takes place in four Northern Cape concession areas (three between Port Nolloth and Hondeklipbaai and one recently established at Doringbaai). Activities take place in kelp beds in water predominantly shallower than 20 m. Aquaculture and abalone ranching activities are therefore not expected to be impacted by the prospecting activities in Concession Area 7C and was SCOPED OUT of the assessment.

8.2.3.4 Impact on Local Tourism and Small Businesses

The Kamiesberg Local Municipality (KLM) supports high floral diversity, with one third of the total global succulent flora species being found here, of which nearly 40% are endemic (KM 2018). The natural flower season between August and October constitutes a major part of the tourism industry which in turn is a large contributor to the region's economy. The coastal town of Hondeklipbaai is home to a small fishing community and a popular holiday destination, thereby also contributing to the tourism and economy of the region. The municipality has also targeted three key areas to improve their tourism sector namely, The Uplands (mountainous land), The Plateau (midlands along the N7) and the Coast. These key areas will be promulgated through culture and heritage, arts and crafts, natural wonders and landscapes and tourism infrastructure. Although sediment plumes and water discolouration may occur during the invasive prospecting activities, it is highly unlikely that these plumes would be visible from the shore. It is unlikely that the offshore prospecting activities will negatively impact any businesses, establishments, owners of the farms, tourists visiting Kamiesberg tourism sectors. Due to the local and temporary nature of the proposed prospecting activities, the significance of the potential impact on the tourism industry and small businesses were assessed to be VERY LOW and can be reduced to INSIGNIFICANT with the implementation of mitigation measures (Table 8-17).

Table 8-17 Impact on Local Tourism and Small Businesses.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	Medium
Essential mitigation measures: • Monitor water-quality surrounding the sediment plumes. • Should any negative visual impacts be detectable, restrict prospecting activities during important tourism events and seasons. • Should any negative visual impacts be detectable, restrict operational activities to the section of the concession area out of sight from the shore.								
With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	Medium

8.2.3.5 Impacts on the Sense of Place, Health and Wellbeing

Sense of place is defined as the emotional relationship that you feel or experience in a particular location or environment which can have either positive connotation (e.g., safety and well-being) or negative connotations (e.g., fear) (Foote & Azaryahu 2009). It can also refer to a distinct character of an environment (Foote & Azaryahu 2009). The sense of belonging is deeply embedded in the history of the Khoisan people who were historically concentrated in the highlands of the Kamiesberg- and Matzikama municipal areas from where they migrated to other parts of the Namaqualand and other places in south Africa. The Khoisan people's history contributed immensely to the rich cultural heritage in these municipalities. In addition, the residents and community have a spiritual connection to the land and ocean and have used this region for fishing for generations. The prospecting vessel may disturb the unique character of the coastline and area. However, due to the area being remote and far from settlements, 5–60 km offshore, and the prospecting activity temporary in nature, the significance of the potential impact was assessed to be VERY LOW with no mitigation measures required (Table 8-18).

Table 8-18 Impacts on the Sense of Place, Health and Wellbeing.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Probable	**INSIGNIFICANT**	-	High
No mitigation measures required								

8.2.3.6 Local Households

The Hondeklipbaai community regard marine resource in the nearshore and offshore environment as extremely valuable for both their household income and livelihoods. For this reason, fisher group users of Concession Area 7C could be negatively impacted during the operational phase of prospecting (approximately 60–80days). However, the fact that prospecting will occur 5 km and further offshore in addition to the minimal overlap with local fisheries, the impact of prospecting on local households were assessed to be INSIGNIFICANT and improbable to occur (< 40% chance of occurring) (Table 8-19).

Table 8-19 Impacts Local Households.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
No mitigation measures required								

8.2.3.7 *Increase in Local Crime*

The Kamiesberg Municipalities have serious social crimes such as alcohol and drug abuse, illegal mining and selling of endangered species, violence and property crimes. The proposed prospecting will occur offshore at sea, crew members will not be able to come ashore and therefore the risk of an increase in the level of crime is, negligible and this impact was therefore SCOPED OUT of the assessment.

8.2.3.8 Potential positive impacts

Mining is economically important as it can create broad scale employment opportunities and boost the national and local economy. Little is known about the local development plans of existing mines in terms of provision of employment opportunities to the locals in the surrounding towns. Should prospecting reveal an economically viable resource and the project proceed to production phase, TAD guarantees and will make provision for approximately 27 employment opportunities. Many of these positions will likely be filled directly from within the surrounding communities. If not readily found, training could be provided (Table 8-20). Training opportunities will be available for people with several types and levels of skills. The potential impact of prospecting on the socio-economic performance is, however, likely to be insignificant on a local scale (Table 8-21).

Conversely, investment from TAD in South Africa will have a greater positive impact on the regional economy. TAD should aim to incorporate codes of good practice on Broad Based Black Economic Empowerment issued under Section 9 of the Broad Based Black Economic Empowerment Act, Act 53 of 2003, as amended by Act 46 of 2013. Therefore, the following resource support aims are recommended:

- At least 25% from cost of sales, excluding labour cost and depreciation, must be procured from local producers or local suppliers in South Africa.
- 50% of jobs created are for people of colour, and B-BBEE measurements must be maintained. Employment opportunities that could be fulfilled:
  - Employment of local security companies.
  - Employment allocated to port duties
  - If feasible, employment of local small-scale fishers' vessels as support vessels during survey operations.
  - Employment of local or national geologists, a vessel manager, captain, crew members, scientists etc.
- At least 25% transformation of raw material or beneficiation which includes local manufacturing, production and/or assembly, and/or packaging, or at least 85% of labour costs paid to South African employees by service industry organizations
  - Prospecting equipment can be sourced within South Africa or neighbouring communities.
- Skills transfer – Training opportunities:
  - Environmental officers
  - Health and Safety Officers
  - Marine Mammal Observers (MMO's) and Passive Acoustic Monitoring (PAM) operators
  - General crew/ deck member

However, within the broader context, the significance of this impact is considered to be INSIGNIFICANT.

Table 8-20 Personnel requirement for the operational phase (mining) of the TAD project.

Personnel requirements	Department	Position	Community Sourced	Training
Ship's crew	Nautical	Deckhands	3	3
	Engineer	Electrician	1	0
		Greaser	2	1
	Catering	Chief Cook	1	0
		Assistant Cook	2	2
		Steward(ess)	4	4
Operation Crew	Plant	Plant operators	4	2
		Chief sorter	1	0
		Sorters	3	3
		Storeman	1	1
	General	Boiler Maker	1	0
		Welder	2	0
		Mine Helper	2	0
Total			**27**	**16**

Table 8-21 Impact rating of the prospecting activity on the local and regional socio-economic performance.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Medium 2	Short-term 1	Very Low 4	Possible	**INSIGNIFICANT**	+ve	Medium
No mitigation measures required								

8.3 Compliance statements by the EAP

8.3.1 Increase in noise levels

The proposed sampling via grabs, coring and drilling are not expected to create significant noise as the sound is largely restricted to the seabed material (sand/rock) and environmentally significant sound propagation in the water column is not anticipated. Hondeklipbaai and Koingnaas, are situated approximately 5 km and 10 km east of Concession Area 7C, respectively. It is unlikely that the survey vessel or prospecting activities will generate any noise that could be heard from the shoreline. The potential noise impacts will be localised, of short-duration, low intensity and are therefore expected to be INSIGNIFICANT without the need for mitigation measures.

Table 8-22. Increase in noise levels.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Low 3	Possible	**INSIGNIFICANT**	-ve	High
Mitigation measures: No essential or potential mitigation measures.								

8.3.2 Release of radioactive material or increase in natural maximum values of raw mineral radiation

The natural maximum values of raw mineral radiation from any materials extracted during prospecting are not expected to exceed safety guidelines. However, should radioactive material end up in the ocean, the extent of the impact associated with this could be regional and the duration long-term, although the intensity will be low due to the negligible radiation levels of the materials being prospected. The probability of this impact occurring is considered very low and the significance of this impact was therefore assessed to be LOW (Table 8-23). All regulations and standards as set out by the South African Maritime Safety Authority (SAMSA), International Maritime Organization (IMO), The International Maritime Dangerous Goods (IMDG) Code and International Atomic Energy Agency Safety Standards (IMDG) should be complied with when prospecting, extracting, working with, storing and transporting any minerals. This should ensure that any impacts associated with radioactive material be reduced to INSIGNIFICANT.

Table 8-23. Release of radioactive material or increase in natural maximum values of raw mineral radiation

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	+ve	Low
Essential mitigation measures: • When prospecting, extracting, working with, storing and transporting any minerals, there must be compliance with all regulations and standards as set out by the: • South African Maritime Safety Authority (SAMSA); • International Maritime Organization (IMO); • International Maritime Dangerous Goods (IMDG) Code; and • International Atomic Energy Agency Safety Standards (IMDG).								
With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

8.3.3 Potential interference with commercial and other shipping traffic

The majority of shipping traffic is located on the outer edge of the continental shelf, which is well offshore of the outer edge of Concession Area 7C (Figure 7.16). The inshore traffic of the continental shelf along the West Coast is largely comprised of fishing and mining vessels.

Several oil and gas and prospecting and mining activities occur on the west coast of South Africa. As these all occur within their own concession area, no overlap with prospecting activities in Concession Area 7C is expected. There is therefore unlikely to be much interaction between the vessel (s) involved with prospecting in the concession area and other vessels. The impact on shipping traffic is localised, of low intensity and short-term. The significance of this impact was therefore assessed to be INSIGNIFICANT and without potential mitigation measures (Table 8-24).

Table 8-24. Potential interference with commercial and other shipping traffic

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Negligible 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Low
Mitigation measures: No essential or potential mitigation measures.								

8.3.4 Decrease in the visual integrity of the area

Hondeklipbaai and Koingnaas, are situated approximately 5 km and 10 km east of Concession Area 7C. The vessel is unlikely to be visible from the shoreline, and in the rare cases that it may be, it is also not considered to be more conspicuous than any other vessel in the area. As the entire survey phase is also expected to take approximately 40–80 days (over the next 5 years) to complete any visual impact is temporary and of low intensity, and the presence of the vessel and activity in Concession Area 7C are expected to have negligible impacts on the visual integrity of the area (Table 8-25).

Table 8-25. Decrease in the visual integrity of the area.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Medium
Mitigation measures: No essential or potential mitigation measures.								

8.3.5 Contributions to science and research

Data collected during the acoustic survey can be used to map important habitat or features such as reefs or shipwrecks that may be present in the area. Soil and biological samples will be collected during the prospecting activities using a clamshell bucket instrument called a Van Veen Grab. Results from this survey will be used to describe and monitor the baseline sediment characteristics and

invertebrate macrofaunal communities in the area and can be used as reference data to monitor potential impacts should the project proceed to the production phase (mining). Should artefacts, fossils or any other heritage resources be discovered during the prospecting, these will be donated to scientific institutions and can make an invaluable contribution to the palaeontological knowledge and potential of the continental shelf. The contribution of information to science collected during prospecting will be positive, but was assessed to be of LOW significance (Table 8-26).

Table 8-26. Contributions to science and research.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term 3	Low 5	Definite	**LOW**	+ve	High
Mitigation measures: No essential or potential mitigation measures.								

8.3.6 Impacts on marine research

Marine research activities that may interact with the proposed prospecting on Concession Area 7C include the annual demersal biomass survey conducted in January or February and the bi-annual small pelagic acoustic surveys conducted in May/June and November by the Department of Forestry, Fisheries and the Environment (DFFE). These surveys are conducted at a national level and the probability of an overlap in space and time with the relatively short duration of planned prospecting activities in concession 7C is considered very low. Despite the low probability of an interaction, should the planned prospecting and fisheries survey vessels happen to coincide within the Concession Area 7C, this could be easily managed through consultation with the research managers at DFFE to ensure that the survey vessels to not hinder each other. Implementation of this simple mitigation would result in NO impacts of prospecting on the research activities (i.e., SCOPED OUT of the impact assessment).

8.4 Cumulative impacts

Coastal and marine mining is well-established along South Africa's west coast between St Helena Bay and the Orange River mouth (Figure 8.1). Indeed, there are prospecting, and mining permits allocated for most of the nearshore, land based and surf zone coastal concessions between the Olifants and Orange River mouths. These mines are largely extracting diamondiferous gravels. The applicant has also submitted applications for prospecting rights for concessions 10B, 14A, 14C and 11C, whilst other companies have submitted applications for prospecting rights in the adjacent concession areas. Between the Olifants estuary mouth and Brand se Baai, mineral sands are extracted by Tormin and Tronox mines in intertidal and land based coastal operations respectively. There are also offshore oil and gas production and prospecting licenses with additional exploration applications currently underway. The prospecting and exploration methods for oil and gas exploration (seismic surveys and core/drill sampling) are similar (although normally of greater intensity as the oil and gas reserves are

typically deeper and located in pockets of sedimentary rock below the sea floor) to those used for offshore diamond and other mineral exploration. There has been a recent increase in applications for prospecting and exploration rights along the west coast and increased prospecting/survey activity in the short term and marine mining in the long-term is anticipated.

This means that cumulative impacts of marine prospecting and mining must be considered at a broader spatial scale in a strategic manner for each potential impact identified. Obtaining detailed information on the scale, extent, methodology (and hence intensity) of various current and pending applications is, however, not possible within the prescribed timeframes of a Basic Assessment Process for a single application (such as this one). This requires and it is recommended that a revised strategic level EIA process based on marine spatial planning principles be undertaken to assess and manage potential cumulative impacts in a holistic manner with a medium to high level of confidence and to identify and implement regional level mitigation measures. The decision-making authority (DMRE) must take cognisance of this recommendation to do a strategic level EIA in order for Specialists and Environmental Assessment Practitioners to accurately assess cumulative impacts.

It is, however, logical and reasonable, to anticipate that many of the potential impacts assessed for this project would continue together with other projects that are ongoing or scheduled to come on-line. The result is that the spatial extent of many impacts would change from "local" to "regional", whilst the duration would change from short-term (<2 years) to at least medium term (2–15 years) or even long-term (>15 years, mostly reversible in the case of prospecting, but not always for mining). The intensity of impacts is anticipated to remain as they are assessed here for operations of this nature but may be higher for other sea-based mineral and energy projects in different areas with different objectives. The cumulative effect of each of the identified impacts is therefore provided in the Impact Assessment tables below using this precautionary approach (assumption of simultaneous/consecutive prospecting and mining activities in the region). These cumulative impacts are assessed after mitigation (Table 8-30). The assessment of cumulative impacts has a low confidence rating due to the uncertainty of the timing and location of other anthropogenic activities in the region.

Cumulative impact could not be assessed for heritage resources. The value and significance of heritage resources is a highly emotive and subjective field. Certain sites are deemed significant due to their age, or the activity they were engaged in at the time of the event, these include slave and war ships, others may be unique in respect of their construction and rarity in the archaeological record. Some wrecks are not unique or even very old but may have spiritual significance to a local fishing community due to fatalities at the time of wrecking. While some wrecks are not necessarily deemed important now, destruction without due diligence can have a negative future impact. The wreck databases are built on reported wrecks. It is not possible to assess cumulative impacts with any level of confidence due to the unknown nature of the heritage resources in the region. Each wreck must be assessed as it is found, and if it is treated with the knowledge that we do not always know if is significant, whether locally or internationally, we can mitigate against high, negative cumulative impacts. Cumulative impacts for all impacts reviewed in the Basic Assessment Report are summarised in Table 8-30, below.

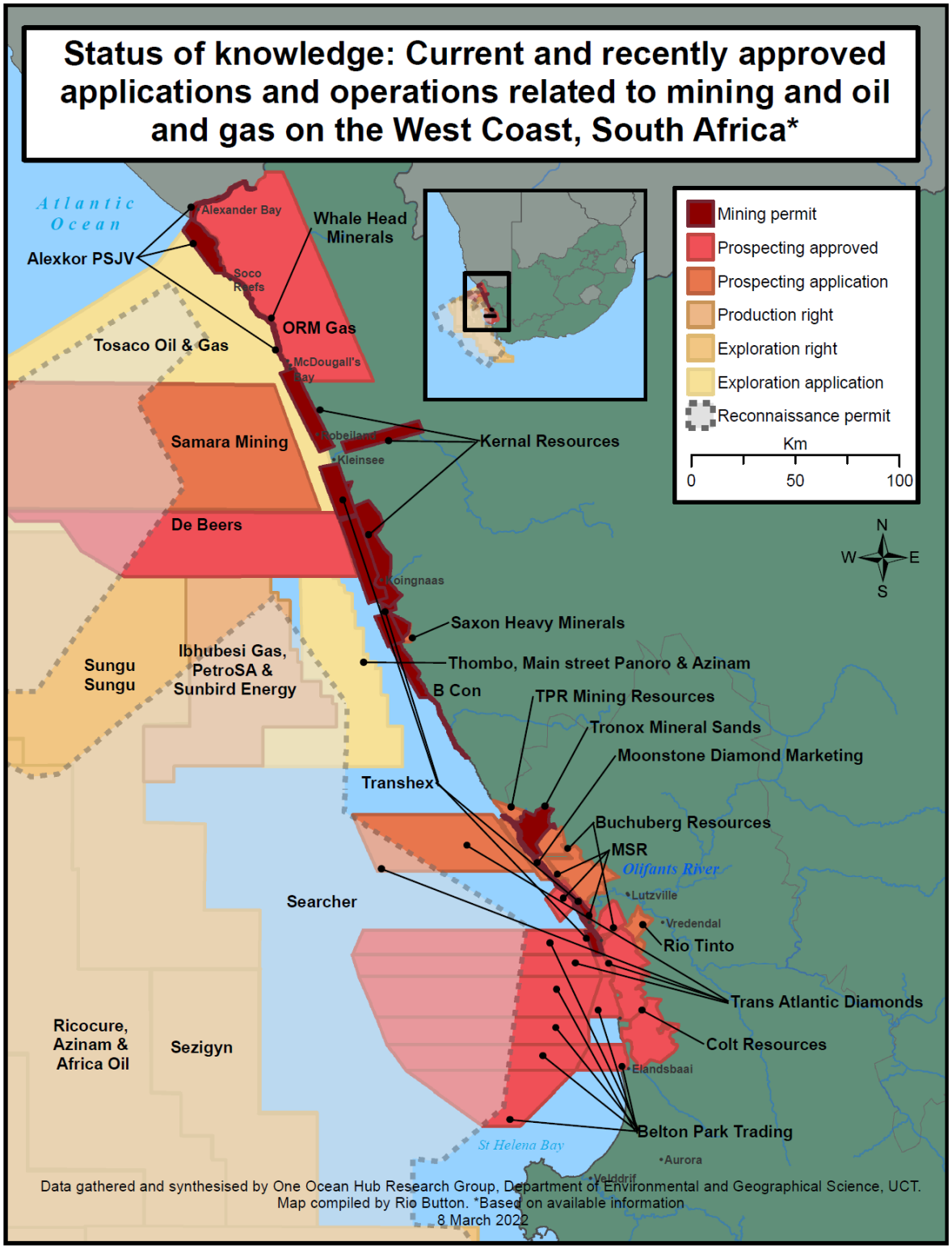


Figure 8.1 **Extent of prospecting and mining applications and operations within concession areas along South Africa's West Coast (Source: One Ocean Hub Research Group, Department of Environmental and Geographical Science, UCT. Map compiled by Rio Button. *Based on available information 8 March 2022.) (Note that economically viable resources and hence production phase activities are typically restricted to a small portion of offshore concessions).**

8.5 The "No-go" alternative

The implications of not going ahead with the proposed prospecting activities are as follows:

- Loss of opportunity to establish whether or not a viable offshore diamond resource exists in Concession Area 7C off the West Coast of South Africa;
- Prevention of any socio-economic benefits associated with the continuation of prospecting activities; and
- Lost environmental baseline data.

The potential negative impact related to the lost opportunity to further delineate the offshore diamond resource on the west coast and maximise the use of South Africa's own resources is considered to be of LOW significance (Table 8-27). The positive implications on the no-go option are that there would be no impacts on the biophysical environment in the area proposed for the prospecting activities. These were also assessed to be of LOW positive significance (Table 8-28).

Table 8-27. Assessment of the "No-go" alternative in terms of the negative impacts.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Regional 2	Medium 1	Long-term 3	Medium 6	Possible	**LOW**	-ve	Medium
No mitigation measures required.								

Table 8-28. Assessment of the "No-go" alternative in terms of the positive impacts.

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local 1	Low 1	Long-term 3	Low 5	Probable	**LOW**	+ve	Medium
No mitigation measures required.								

8.6 Summary table of impacts

A summary of the potential impacts of the proposed development are presented below using the following colour scheme to indicate whether the impact is positive or negative as well as the significance of impacts:

Negative	Positive
VERY HIGH	VERY HIGH
HIGH	HIGH
MEDIUM	MEDIUM
LOW	LOW
VERY LOW	VERY LOW
INSIGNIFICANT	INSIGNIFICANT

Table 8-29. Potential impacts associated with prospecting in Concession area 7C, as identified during the Basic Assessment Process, before and after mitigation.

POTENTIAL IMPACT		EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
IMPACTS ON MARINE AND FISHERIES RESOURCES									
Impact 1	**Underwater noise disturbance to invertebrates**	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	Medium
	With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Probable	**VERY LOW**	-ve	Medium
Impact 2	**Underwater noise disturbance to fish**	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Medium
	No mitigation								
Impact 3	**Underwater noise disturbance to marine mammals**	Regional 2	High 3	Short-term 1	Medium 6	Probable	**MEDIUM**	-ve	Medium
	With mitigation	Regional 2	Medium 2	Short term 1	Low 5	Improbable	**VERY LOW**	-ve	Medium

POTENTIAL IMPACT		EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
Impact 4	**Underwater noise disturbance to seabirds**	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	Medium
	With mitigation	Local 1	Medium 2	Short term 1	Very low 4	Improbable	**INSIGNIFICANT**	-ve	High
Impact 5	**Underwater noise disturbance to turtles**	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
	With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
Impact 6	**Marine megafauna collisions with survey vessels**	Regional 2	Medium 2	Short-term 1	Low 5	Possible	**VERY LOW**	-ve	High
	With mitigation	Regional 2	Low 1	Short term 1	Very Low 4	Improbable	**INSIGNIFICANT**	-ve	High
Impact 7	**Benthic Impact of seabed sampling and tailings disposal**	Local 1	High 3	Medium-term 2	Medium 6	Definite	**MEDIUM**	-ve	High
	With mitigation	Local 1	Medium 2	Medium-term 2	Low 5	Definite	**LOW**	-ve	Medium
Impact 8	**Fine sediment plumes**	Local 1	Medium 2	Short-term 1	Very Low 3	Definite	**VERY LOW**	-ve	High
	With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Definite	**VERY LOW**	-ve	Medium
Impact 9	**Waste discharges during vessel operations**	Local 1	Low 1	Medium-term 2	Very low 4	Probable	**VERY LOW**	-ve	High
	With mitigation	Local 1	Low 1	Short term 1	Very low 3	Improbable	**INSIGNIFICANT**	-ve	High
Impact 10	**Impacts on objectives of Namaqua Coastal EBSA and CBA**	Local 1	High 3	Medium-term 2	Medium 6	Probable	**MEDIUM**	-ve	High
	With mitigation	Local 1	Low 1	Short term 1	Very low 3	Improbable	**INSIGNIFICANT**	-ve	High
Impact 11	**Impact on fisheries**	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	High
	With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

POTENTIAL IMPACT		EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
IMPACTS ON MARINE HERITAGE RESOURCES									
Impact 12	**Impacts on submerged pre-history (cultural heritage and artefacts).**	Local 1	Low 1	Long-term (Irreversible) 3	Low 5	Possible	**VERY LOW**	– ve	Low
	With Mitigation	Local 1	Low 1	Long-term 3	Low 5	Possible	**VERY LOW**	+ ve	Low
Impact 13	**Impacts on palaeontological resources**	Local 1	Negligible 1	Long-term (Irreversible) 3	Low 5	Possible	**VERY LOW**	-ve	Low
	With Mitigation	Local 1	Low 1	Long-term 3	Low 5	Possible	**VERY LOW**	+ve	Low
Impact 14	**Impacts on maritime heritage**	Local 1	Medium 2	Long-term (Irreversible) 3	Medium 6	Improbable	**LOW**	-ve	Very Low
	With Mitigation	Local 1	Low 1	Long-term (Irreversible) 3	Low 5	Improbable	**LOW**	+ve	Low
IMPACTS ON SOCIO-ECONOMIC RESOURCES									
Impact 15	**Impacts on Traditional Linefish Sector**	Local 1	Low 1	Short-term 1	Very Low 3	Probable	**VERY LOW**	-ve	High
	With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High
Impact 16	**Impacts on West Coast Rock Lobster sector**	SCOPED OUT							
Impact 17	**Impacts on Tuna pole and linefisheries**	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
	With mitigation	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
Impact 18	**Impacts on Small Pelagic Purse Seine Fisheries**	SCOPED OUT							

POTENTIAL IMPACT		EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
Impact 19	**Impacts on aquaculture**	SCOPED OUT							
Impact 20	**Local tourism and businesses**	Local 1	Medium 2	Short-term 1	Very Low 4	Probable	**VERY LOW**	-ve	Medium
	With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	Medium
Impact 21	**Sense of place, health and wellbeing**	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-	High
	No mitigation								
Impact 22	**Local households**	Local 1	Low 1	Short-term 1	Very Low 3	Improbable	**INSIGNIFICANT**	-ve	High
	No mitigation								
Impact 23	**Local crime**	SCOPED OUT							
Impact 24	**Local and regional socio-economic performance**	Local 1	Medium 2	Short-term 1	Very Low 4	Possible	**INSIGNIFICANT**	+ve	Medium
	No mitigation								
COMPLIANCE STATEMENT IMPACTS BY EAP									
Impact 25	**Noise impacts associated with prospecting**	Local 1	Low 1	Short-term 1	Low 3	Possible	**INSIGNIFICANT**	-ve	Local 1
	No mitigation								
Impact 26	**Impacts associated with prospecting radioactive material**	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	-ve	Low
	With mitigation	Local 1	Low 1	Short term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	High

POTENTIAL IMPACT		EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
Impact 27	**Potential interference with commercial shipping traffic**	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Low
	No mitigation								
Impact 28	**Impacts on the visual integrity of the area**	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Medium
	No mitigation								
Impact 29	**Contributions to Science**	Local 1	Low 1	Long-term 3	Low 5	Definite	**LOW**	+ve	High
	No mitigation								
Impact 30	**Impacts on marine science**	SCOPED OUT							

Table 8-30. Assessment of cumulative impacts for all impacts reviewed in the Basic Assessment Report. Note that these impacts are assessed "after mitigation".

CUMULATIVE IMPACT	EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
IMPACTS ON MARINE AND FISHERIES RESOURCES								
Impact 1: Underwater noise disturbance to invertebrates	Regional 2	Low 1	Long-term 3	Medium 6	Probable	**MEDIUM**	-ve	Low
Impact 2: Underwater noise disturbance to fish	Regional 2	Low 1	Long-term 3	Medium 6	Possible	**LOW**	-ve	Low
Impact 3: Underwater noise disturbance to marine mammals	Regional 2	Medium 2	Long term 3	High 7	Improbable	**MEDIUM**	-ve	Low
Impact 4: Underwater noise disturbance to seabirds	Regional 2	Medium 2	Long term 3	High 7	Improbable	**MEDIUM**	-ve	Low
Impact 5: Underwater noise disturbance to turtles	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	-ve	Low
Marine 6: megafauna collisions with survey vessels	Regional 2	Low 1	Long term 3	Medium 6	Possible	**LOW**	-ve	Low
Impact 7: Offshore based seabed sampling and tailings disposal	Local 1	Medium 2	Long term 3	Medium 6	Probable	**MEDIUM**	-ve	Low
Impact 8: Fine sediment plumes	Local 1	Low 1	Medium-term 2	Very low 4	Definite	**VERY LOW**	-ve	Low
Impact 9: Waste discharge during vessel operations	Local 1	Low 1	Long term 3	Low 5	Improbable	**VERY LOW**	-ve	Low
Impact 10: Impacts on objectives of Namaqua Coastal EBSA and CBA	Local 1	Low 1	Long term 3	Low 5	Possible	**VERY LOW**	-ve	Low
Impact 11: Impact on fisheries	Regional 2	Low 1	Long-term 3	Medium 6	Possible	**LOW**	-ve	Low
IMPACTS ON MARINE HERITAGE RESOURCES								
NOT POSSIBLE TO ASSESS								
IMPACTS ON SOCIO-ECONOMIC REOURCES								
Impact 15: Impacts on Traditional linefish Sector	Regional	Medium	Long-term	Medium	Possible	**LOW**	-ve	Medium

CUMULATIVE IMPACT	EXTENT	INTENSITY	DURATION	CONSEQUENCE	PROBABILITY	SIGNIFICANCE	STATUS	CONFIDENCE
	2	2	3	7				
Impact 16: Impacts on West Coast Rock Lobster sector	SCOPED OUT							
Impact 17: Impacts on Tuna pole and linefisheries	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	-ve	Low
Impact 18: Impacts on Small Pelagic Purse Seine Fisheries	SCOPED OUT							
Impact 19: Impacts on aquaculture	SCOPED OUT							
Impact 20: Local tourism and businesses	Regional 2	Low 1	Long-term 3	Medium 6	Possible	**LOW**	-ve	Low
Impact 21: Sense of place, health and wellbeing	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	-ve	Low
Impact 22: Local households	Regional 2	Low 1	Long-term 3	Medium 6	Improbable	**LOW**	-ve	Low
Impact 23: Local crime	SCOPED OUT							
Impact 24: Local and regional socio-economic performance	Regional 2	Medium 2	Long-term 3	High 7	Possible	**MEDIUM**	+ve	Low
COMPLIANCE STATEMENTS BY THE EAP								
Impact 25: Noise impacts associated with prospecting	Local 1	Low 1	Long-term 3	Low 5	Possible	**VERY LOW**	-ve	Low
Impact 26: Impacts associated with prospecting radioactive material	Regional 2	Medium 2	Long-term 3	High 7	Improbable	**MEDIUM**	-ve	Low
Impact 27: Potential interference with commercial shipping traffic	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Low
Impact 28: Impacts on the visual integrity of the area	Local 1	Low 1	Short-term 1	Very Low 3	Possible	**INSIGNIFICANT**	-ve	Low
Impact 29: Contributions to Science	National 3	High 3	Long-term 3	Very High 9	Definite	**VERY HIGH**	+ve	Low
Impact 30: Impacts on marine science	SCOPED OUT							

8.7 Assessment of each identified potentially significant impact and risk and impact statement

8.7.1 Summary of the key findings of the environmental impact assessment, including the positive and negative impacts and risks of the proposed activity and identified alternatives on the environment and the community that may be affected.

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties. This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

Impacts have been assessed in Section 8 above. A summary of Specialist Reports is also included in this Section. Specialist Reports are included as Appendices 3, 4 and 5. The supporting impact assessment conducted by the EAP is included as part of this BAR in Section 8.3. A summary of the Activities, Potential Impacts, Aspects Affected, Mitigation Measures, Standards to be Achieved, Management Outcomes, Management Actions, and Compliance with Standards are contained in Section 12. Below follows a summary of these impacts.

Prospecting and mining activities are only permitted by individuals that are in possession of a mining or prospecting right, and only within specially designated areas that allow the industry, the trade of commodities, the associated activities and potential impacts, environmental management and the responsible extraction of minerals, to be monitored. Companies can apply for prospecting and/ or mining rights within concession areas for which rights are available. As this is a competitive industry, few concession areas are available at any given time. Although several alternative concession areas were considered by the applicant, the prospecting and mining rights for many of these were already held by other companies. No alternatives sites were therefore considered in this Basic Assessment Process. As the intention of the proposed prospecting activity is to search for diamondiferous, gemstone, mineral and metal deposits, and to ensure the economic feasibility of mining within a certain concession area, an area known to contain these resources needs to be selected. This concession area is targeted as it is known to contain kimberlite pipes which is a source of diamonds and other mineral deposits.

The preferred activities, i.e. geophysical surveys and drilling are the primary methods used for mineral prospecting, and will facilitate the discovery and estimation of mineral resources within the concession area. These activities will include invasive and non-invasive methods such as geophysical surveys, drilling and baseline biological sampling. These methods have been developed through many years of research and development by the mining industry and are the preferred methods for resource estimation and cannot easily be replaced by any other methods.

The potential positive and negative impacts associated with prospecting in Concession Area 7C were grouped and assessed based on the following major receptors: (1) Marine ecology and fisheries, (2) Heritage resources, (3) Socio-economic aspects, (4) Noise, (5) Safety surrounding the material prospected (radioactivity), (6) Shipping traffic, (7) Visual integrity, and (8) Science and Research. Cumulative impacts and the no-go option were also considered. The study assessed 30 potential impacts associated with prospecting in Concession Area 7C. Five of these were “SCOPED OUT” of the assessment due to being unlikely to occur. In total, 23 potential negative impacts ranging from

MEDIUM to INSIGNIFICANT and two potential positive impacts of LOW and INSIGNIFICANT, were identified. With the implementation of effective mitigation measures, the negative impacts can all be reduced to LOW, VERY LOW, or INSIGNIFICANT.

The negative impacts are associated with the disturbance of fauna (invertebrates, fish, mammals, seabirds and turtles), submerged prehistoric resources, shipping activities, fishing activities, tourism, livelihood and income, sense of place, health and well-being, visual aspects, safety and noise levels. Mechanisms include disturbance by means of physical sampling activities, acoustic surveys or vessel movement and noise. Due to the location of the concession area relative to the nearest town and harbours (i.e., at least 5 km offshore) and the short duration of the activities, prospecting is not expected to have a significant impact on fishing effort, the visual integrity of the area, tourism, sense of place, noise levels or local crime rates.

Prospecting is expected to have the greatest impact on marine mammals (MEDIUM significance) due to the acoustic survey's potential to disrupt their echolocation and hence behaviour and critical activities such as feeding. Drilling activities would also have an impact of MEDIUM significance on the objectives of the EBSA and CBA (as per the 2022 Marine Spatial Planning Report), or if tailings are disposed of in sensitive areas.

The impact of prospecting on maritime heritage and cultural, prehistoric and palaeontological resources is expected to be LOW and VERY LOW, respectively, and could yield a positive outcome if any resources found are reported to the South African Heritage Resource Agency and retained for assessment and reported to.

Prospecting activities could also provide benefits in the form of local and regional socio-economic opportunities in addition to contributing towards scientific knowledge, specifically in terms of baseline environmental sediment, species and high-resolution bathymetry data. These benefits are, however, considered to be relatively low in the broader context.

The assessment of impacts in this concession area further revealed that the significance of the impacts is lower when compared to that of impacts identified in other nearshore concession areas. This could be attributed to the concession area's distance from and location relative to the coastline, fishing areas, aquaculture farms, harbours, shipping routes and towns. In light of the above, Concession Area 7C is considered to be situated in a suitable location where prospecting will have relatively low negative impacts and provide potential benefits. The potential impacts that have been identified and assessed according to each major receptor is provided in Section 8 above, while a summary of these is included below.

8.7.2 Marine ecology and fisheries

Eleven potential negative impacts on the Marine Environment and Fisheries were identified, with impacts before mitigation ranging from MEDIUM to INSIGNIFICANT. With effective mitigation these impacts can all be reduced to VERY LOW or INSIGNIFICANT.

Impacts include sound disturbance to marine fauna due to acoustic surveys; survey vessel collision with marine megafauna; direct impact of seabed excavation and tailings disposal on benthic habitats

(soft sediment and reef associated communities); impact of fine sediment plumes on surrounding benthos and water column; waste discharges during vessel operations; impacts on the EBSA and CBA; and impacts on fisheries and the livelihoods of fishing communities due to exclusion from fishing grounds and disturbance of target fish species. The proposed sampling via coring and drilling is not expected to create significant underwater noise as the sound is largely restricted to the seabed material (sand/rock) and environmentally significant sound propagation in the water column is not anticipated. Seabird collision with the vessel is not anticipated as the vessel will not be creating fish offal to attract sea birds and is not expected to create light that will be brighter or more intense than that on any other operational vessel. Potential impacts of acoustic surveys on zooplankton were scoped out of the assessment as previous studies did not find any discernible effects on zooplankton.

The potential impact of most concern is that of acoustic disturbance to marine mammals and impacts of drilling and tailings disposal on the EBSA and CBA. These impacts were assessed to be of MEDIUM negative significance prior to mitigation. It is known that migrating humpback, southern right whales, dusky dolphins and the near threatened Heaviside's dolphin are frequently encountered on the west coast of southern Africa. Of the proposed seismic survey activities, the Topas sub-bottom profiler system could present a risk to dusky and Heaviside's dolphins. Effective implementation of mitigation measures should ensure that potential impacts of the proposed prospecting activities on marine mammals and the EBSA and CBA in Concession 7C would be reduced to LOW, VERY LOW OR INSIGNIFICANT.

The limited spatial scale, temporary nature of operations (approximately 40–80 days over 5 years) and low volume of any sediment plumes generated during sampling are not anticipated to have noticeable impacts on small pelagic fish recruitment. It is noted that much of the West Coast constitutes a recruitment area for anchovies and only a tiny proportion may be impacted by the generation of turbidity plumes for a very short duration.

8.7.3 Marine Heritage Resources

Prospecting activities in Concession Area 7C could possibly have an impact on submerged Prehistoric Heritage, and Palaeontological Resources present within the concession area. The significance of impacts on such material was assessed to be VERY LOW. One shipwreck, *The Shanger*, is possibly located in the concession area and intrusive sampling could have a negative impact of LOW significance should it damage the wreck. There is potential for the status of the impacts to be changed from negative to positive if samples are retained for assessment of paleoenvironmental and prehistoric lithic material and if any resources found are reported to the South African Heritage Resources Agency.

8.7.4 Socio-economics aspects

Prospecting activities may have potential negative impacts on several fishing sectors and other economic activities within or adjacent to Concession Area 7C. These include potential impacts to, Traditional Linefish, Tuna Pole and Line, West Coast Rock Lobster (WCRL), small pelagic purse seine, aquaculture, tourism and small businesses, sense of place, health and well-being, local households

and crime levels. Impacts on WCRL, purse seine, aquaculture and crime are unlikely to occur and were therefore SCOPED-OUT of the assessment. The impacts on the other activities were assessed to be INSIGNIFICANT, except for impacts on the traditional linefish and tourism which were assessed to be VERY LOW. All impacts are expected to be reduced to INSIGNIFICANT after the implementation of appropriate mitigation measures. Regardless, these activities and impacts on these are likely very important at the individual and community level and mitigation measure to minimise potential negative impacts should be implemented. Potential positive impacts from the prospecting activities include the generation of local and regional economic opportunities, although the benefits of these are expected to be INSIGNIFICANT.

8.7.5 Noise impacts associated with prospecting

The proposed sampling via coring and drilling is not expected to create significant noise as the sound is largely restricted to the seabed material (sand/rock) and environmentally significant sound propagation in the water column is not anticipated. It is unlikely that the survey vessel or prospecting activities will generate any noise that could be heard from the shoreline. The potential noise impacts will be localised, of short-duration, low intensity and are therefore expected to be INSIGNIFICANT without the need for mitigation measures.

8.7.6 Safety surrounding materials prospected (radioactivity)

The natural maximum values of raw mineral radiation from any materials extracted during prospecting are not expected to exceed safety guidelines. All regulations and standards as set out by the South African Maritime Safety Authority (SAMSA), International Maritime Organization (IMO), the International Maritime Dangerous Goods (IMDG) Code and International Atomic Energy Agency Safety Standards (IMDG) should be complied with when prospecting, extracting, working with, storing and transporting any minerals. This should ensure that any impacts associated with radioactive material be INSIGNIFICANT.

8.7.7 Potential interference with commercial shipping traffic

The majority of shipping traffic is located on the outer edge of the continental shelf, which is well offshore of the outer edge of Concession Area 7C. The impacts of prospecting activities within Concession Area 7C on shipping activities are therefore considered to be INSIGNIFICANT.

8.7.8 Impact on visual integrity of the ar*ea*

Hondeklipbaai and Koingnaas, are situated approximately 5 km and 10 km east of Concession Area 7C, respectively. The prospecting vessel is unlikely to be visible from the shoreline and the vessel is also not considered to be more conspicuous than any other vessel in the area. As the entire survey phase is also expected to take approximately 40–80 days (over the next 5 years) to complete any visual

impact is temporary and of low intensity, and the presence of the vessel and activity in Concession Area 7C are expected to have negligible impacts on the visual integrity of the area and was therefore assessed as INSIGNIFICANT.

8.7.9 Contribution to science and research

Data collected during the acoustic survey can be used to map important habitat or features such as reefs or shipwrecks that may be present in the area. Soil and biological samples will be collected during the prospecting activities using a clamshell bucket instrument called a Van Veen Grab. Results from this survey will be used to describe and monitor the baseline sediment characteristics and invertebrate macrofaunal communities in the area and can be used as reference data to monitor potential impacts should the project proceed to the production phase (mining). Should artefacts, fossils or any other heritage resources be discovered during the prospecting, these will be donated to scientific institutions and can make an invaluable contribution to the palaeontological knowledge and potential of the continental shelf. The contribution of information to science collected during prospecting will be positive but was assessed to be of LOW significance.

8.7.10 Impacts on marine research

Marine research activities conducted by the Department of Forestry, Fisheries and the Environment (DFFE) are conducted at a national level and the probability of an overlap in space and time with the relatively short duration of planned prospecting activities in concession 7C is considered very low. However, should the planned prospecting and fisheries survey vessels happen to coincide within the concession area, this could be easily managed and would result in NO impacts. This impact was therefore SCOPED OUT.

8.7.11 Cumulative impacts

There has been a recent increase in applications for prospecting and exploration rights along the west coast and increased prospecting/survey activity in the short term and marine mining in the long-term is anticipated. Cumulative impacts of marine prospecting and mining must be considered at a broader spatial scale in a strategic manner for each potential impact identified. Obtaining detailed information on the scale, extent, methodology (and hence intensity) of various current and pending applications is, however, not possible within the prescribed timeframes of a Basic Assessment Process for a single application (such as this one). This requires and it is recommended that a revised strategic level EIA process based on marine spatial planning principles be undertaken to assess and manage potential cumulative impacts in a holistic manner with a medium to high level of confidence and to identify and implement regional level mitigation measures.

It is, however, logical and reasonable, to anticipate that many of the potential impacts assessed for this project would continue together with other projects that are ongoing or scheduled to come on-line. The result is that the spatial extent of many impacts would change from “local” to “regional”, whilst the duration would change from short-term (<2 years) to at least medium term (2-15 years) or even long-term (>15 years, mostly reversible in the case of prospecting, but not always for mining). The intensity of impacts is anticipated to remain as they are assessed here for operations of this nature

but may be higher for other sea-based mineral and energy projects in different areas with different objectives. The cumulative effect of each of the identified impacts were assessed after mitigation and used a precautionary approach (assumption of simultaneous/consecutive prospecting and mining activities in the region) and ranged from MEDIUM to VERY LOW significance. The assessment of cumulative impacts has a low confidence rating due to the uncertainty of the timing and location of other anthropogenic activities in the region. Cumulative impact could not be assessed for heritage resources as the value and significance of these resources is a highly emotive and subjective field.

8.7.12 No-go option

Both positive and negative impacts area related to not continuing with the prospecting activities. These include lost opportunities in terms of collecting baseline environmental data, determining the presence of offshore mining resources and socio-economic benefits. The impacts, are, however, all considered to be of LOW significance. The positive implications of the no-go option, on the other hand, is that there would be no effects on the biophysical environment in the proposed area. This was also assessed to be of LOW significance considering the lost opportunity in terms of scientific data and economic opportunities.

8.7.13 Final site map

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

Refer to Section 7.7 and Section 7.8 above. The final site map and buffers will be completed pending consultation with I&APs during the Public Participation Process and results from the acoustic surveys. The current site map has been attached as Appendix 7.

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

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

8.8.1 Marine ecology

Essential mitigation measures

- The destructive 3-5 m^2 drilling method should not take place within the area considered to be a CBA. Should the acoustic survey and coring identify potentially economically viable resources, suitable offsets must be identified and implemented prior to commencement of the resource development phase.

- Vessel operator must keep watch for marine megafauna in the path of the vessel during vessel operation.
- At least two on-board independent Marine Mammal and Seabird observers (MMSOs) with experience in marine megafauna (including, but not limited to, all marine mammals (cetaceans and seals), sea turtles and seabirds) identification and observation techniques must be employed to carry out daylight observations and ensure compliance with mitigation measures during geophysical surveying. It must be ensured that there are sufficient MMOs on board the vessel to prevent fatigue and meet health and safety requirements, during the survey periods.
- It is recommended that activity be restricted to specific areas or a time of year as far as possible, feasible and reasonable, and as per the recommendations from an MMSO and specialist. This includes:
    - Avoid planning any surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations;
    - Avoid planning any surveys during mating season (confirm these times with MMSOs); and,
    - Confine surveys to seasons when cetaceans are scarce to ensure minimal disturbance (confirm these times with MMSOs).
- MMSOs to conduct pre-survey visual scans of at least 30 minutes for the presence of megafauna around the survey vessel prior to any vessel movement.
- Protocol must be followed to avoid mortalities and/or injuries to marine animals when they are encountered. If no protocol exists, this must be developed by the Scientific Officer in consultation with the applicant and specialists, prior to commencement.
- "Soft starts" should be carried out for equipment with source levels greater than 210 dB re 1 µPa at 1 m over a period of 20 minutes to give adequate time for marine mammals to leave the vicinity. Where this is not possible, the equipment should be turned on and off over a 20-minute period to act as a warning signal and allow cetaceans to move away from the sound source.
- Terminate the survey if any marine mammals show affected behaviour within 500 m of the survey vessel or equipment until the mammal has vacated the area.
- Passive Acoustic Monitoring (PAM) technology must be incorporated into the survey programme. A designated onboard PAM Observer uses the PAM technology to detect the vocalisations of marine species, particularly during periods of low visibility, such as at night or during adverse weather conditions and thick fog, to prevent collision and impact due to acoustic survey. It must be ensured that there are sufficient PAM operators on board the vessel to prevent fatigue and meet health and safety requirements, during the survey periods.
- Operations must be suspended if any obvious mortalities or injuries to marine life are observed.
- Marine mammal incidence data and sound source output data from surveys must be made available on request to the Marine Mammal Institute (MMI), the Department of Forestry, Fisheries and the Environment (DFFE) and the DMRE.
- Ensure that MMSOs compile a survey close–out report incorporating all recorded data to the relevant DFFE authorities

- Record encounters with marine life (seabirds, turtles, seals, fish), their behaviour and response to vessel, acoustic survey activity, feeding behaviour around the survey vessel; data on position, distance from the vessel, swimming speed and direction and obvious changes in behaviour (e.g., startle responses or changes in surfacing/diving frequencies, breathing patterns).
- Wait until all marine megafauna have cleared an area of 500 m radius of the survey vessel (centre of the sound source) before resuming with acoustic survey. If, after a period of 30 minutes, megafauna is still within 500 m of the vessel, the normal "soft start" procedure should be allowed to commence for at least 20-minutes duration. Behaviour during "soft starts" must be monitored.
- Vessel transit speed must not exceed 12 knots (22 km/hr), except within 25 km of the coast where it should be kept to less than 10 knots (18 km/hr) as well as when sensitive marine fauna are present in the vicinity.
- Sound containment and improvement of equipment used must be implemented.
- The potential marine impacts must be reassessed after completion of the geophysical surveys and biological analysis as these might elucidate areas that would need to be avoided and species of conservation concern.
- Should any ecologically sensitive features such as reefs be identified within the concession area during the initial acoustic survey, these areas must be avoided and suitably buffered. Appropriate buffers must be determined by a suitably qualified specialist. Once suitable buffers have been mapped it should be illustrated on a map and form part of the EMPr.
- Baseline grab samples should be collected before core samples to determine the nature of benthic communities before disturbance.
- Grab samples collected should be analysed as soon as possible to determine the benthic macrofaunal communities in the area. Results from this survey could be used to inform additional mitigation measures if required. Results will represent baseline data against which any change in macrofaunal communities in the area can be benchmarked after prospecting and mining.
- If possible, prospecting should primarily take place on the seaward side of concession area, to minimise the risk to endangered and vulnerable coastal systems.

Best Practice Mitigation (Recommended)

- No destructive sampling or tailing discharge to take place in the part of the concession which falls wholly within the Namaqua Coastal EBSA and a CBA.
- Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats, reefs and important fishing areas.
- Inform and empower all staff about sensitive marine species and suitable disposal of waste.
- Ensure compliance with relevant MARPOL standards.
- Develop a waste management plan using waste hierarchy.
- A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations.
- Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm).

- All process areas should be bunded to ensure drainage water flows into the closed drainage system.
- Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system.
- Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages.
- All hydraulic systems should be adequately maintained, and hydraulic hoses should be frequently inspected.
- Spill management training and awareness should be provided to crew members of the need for thorough cleaning-up of any spillages immediately after they occur in order to minimise the volume of contaminants washing off decks.

8.8.2 Fisheries, socio-economic and other shipping

Essential mitigation measures

- Prior to survey commencement, the following key stakeholders should be consulted and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof:
    - Fishing industry / associations (contactable via liason@fishsa.org):
        - South African Pelagic Fishing Industry Association (SAPFIA);
        - Local fishing communities;
    - Other associations and organs of state
        - DFFE;
        - SAMSA;
        - South African Navy Hydrographic office; and
        - Overlapping and neighbouring right holders.
- These stakeholders should again be notified at the completion of surveying when the survey vessel(s) is/are off location. The operator must request, in writing, that the South African Navy Hydrographic office release Radio Navigation Warnings and Notices to Mariners throughout the survey periods. The Notice to Mariners should give notice of (1) the co-ordinates of the proposed survey area, (2) an indication of the proposed timeframes of surveys and day-to-day location of the survey vessel(s), and (3) an indication of the required safety zone(s) and the proposed safe operational limits of the survey vessel. These Notices to Mariners should be distributed timeously to fishing companies and directly onto vessels where possible.
- Undertake surveys when fishing effort is lowest i.e., August to December. It is recommended that small pelagic peak fishing seasons (January-July) and snoek line fishing peak seasons (April-May) be avoided as far as possible, feasible and reasonable.
- The survey and sampling vessels must be certified for seaworthiness through an appropriate internationally recognised marine certification programme (e.g,. Lloyds Register, Det Norske Veritas). The certification, as well as existing safety standards, requires that safety precautions should be taken to minimise the possibility of an offshore accident. Collision prevention equipment should include radar, multi-frequency radio, foghorns, etc. Safety equipment and training of personnel to ensure the safety and survival of the crew in the event of an accident is a further legal requirement.

- Appoint a Fisheries Liaison Officer (FLO) to facilitate communication with the small pelagic purse seine fishing industry association. The FLO should report daily on vessel activity and respond and advice on the action to be taken in the event of encountering purse seine fishing vessels in the survey area.
- Monitor water-quality surrounding the sediment plumes.
- Should any negative impacts be detectable, restrict prospecting activities during important tourism events and seasons.
- In addition, restrict operational activities to the section of the concession area out of sight from the shore.
- It is recommended that additional compensation and resource support measurements be introduced to reduce the severity of the impacts on the socio-economic performance. These should include:
    - A Skills Development through training programs and formal education opportunities such as financial management skills
    - Support of local initiatives, investments, and entrepreneurship.
- Assistance should be given to support local communities in navigating new Small Scale Fisheries Policy structures.
- Assistance should be given to support the development of a streamlined communication platform between local community, community representatives, stakeholders, and government officials.

8.8.3 Heritage resources

Essential mitigation measures

- The contractor must be notified that archaeological sites could be exposed during sampling activities, as well as the procedure to follow should archaeological material be encountered during sampling.
- Reporting of sites to the heritage practitioner for assessment and evaluation.
- Retain samples of the coarser fraction (i.e. gravel and stone (20 mm +) of sorted seabed sediment from each grab sample for assessment by an archaeologist for the presence of important material.
- Retain any core and drill sample sections which contain alluvial material, particularly where organic remains are present and subject to palaeo-environmental assessment.
- Any fossils such as petrified bone, teeth and shell casts, usually phosphatic, found during the processing of cores must have the details of context recorded, must be kept for identification by an appropriate specialist and, if significant, be deposited in an appropriate institution such the IZIKO SA Museum.
- The possible detailed study and dating of a set of cores, possibly as a B.Sc. Honours or M.Sc. project should be considered.
- If shipwreck material is encountered during the course of sampling in any of the concession areas, the following mitigation measure should be applied:
    - Cease work in the directly affected area to avoid damage to the wreck until the South African Heritage Resources Agency (SAHRA) has been notified and the contractor has complied with any additional mitigation as specified by SAHRA; and

- Where possible, take photographs of them, noting the date, time, location and types of artefacts found. Under no circumstances may any artefacts be removed, destroyed or interfered on the site, unless under permit from SAHRA.

Best Practice Mitigation (Recommended)

It is recommended that the onboard Trans Atlantic representative must undergo a short induction on archaeological site and artefact recognition, as well as the procedure to follow should archaeological material be encountered during sampling.

8.8.4 Prospecting radioactive material

Essential mitigation measures

- When prospecting, extracting, working with, storing and transporting any material, there must be compliance with all regulations and standards as set out by the following organisations:
  - South African Maritime Safety Authrisation (SAMSA);
  - International Maritime Organisation (IMO);
  - International Maritime Dangerous Goods (IMDG) Code; and
  - International Atomic Energy Agency Safety Standards.

8.8.5 Cumulative impacts on the environment and community

Essential mitigation measures

Mitigation measures as recommended for each individual impact should be implemented. Furthermore, a strategic level Environmental Impact Assessment (EIA) process based on marine spatial planning principles should be conducted to assess and manage potential cumulative impacts in a holistic manner and to identify and implement further mitigation measures.

8.9 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

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

The nature, intensity and extent of any potential impacts that have been identified, including those issues identified by I&APs during the consultation process, have been carefully assessed and incorporated into the BAR and specifically into the EMPr. This information was used to inform management actions (an impact management plan) that will form part of the EMPr. The objectives of the impact management plan are to anticipate and avoid risks and impacts. Each prospecting activity has been considered, together with its potential impacts on the environment, fisheries, socio-economic, heritage and other resources. Through the development of the EMPr, measures have been developed to avoid environmental, social and other risks and impacts, and to provide mitigation where possible. These mitigation measures will all be included in an impact management plan to be retained

by the Environmental Control Officer (or such designated authority) who can oversee and report on the impact monitoring and mitigation measures.

It is strongly recommended that mitigation measures be further developed in consultation with local stakeholders so that effective and mutually acceptable mitigation measures can be implemented during the seismic survey, prospecting and future mining phase activities. Communication protocols should inform on all prospecting activities including timelines and impacts. A "living framework" such as a Monitoring and Evaluation Plan (M&EP) for identifying, monitoring, assessing, and evaluating TAD Corporate Social Responsibility (e.g., employment and training opportunities) and socio-economic impacts should be developed. This framework should be developed with IAPs and surrounding community representatives that are potentially impacted by the TAD prospecting project. Adherence to the M&EP is necessary to ensure that socio-economic deliverable is met. In addition, TAD should aim to incorporate codes of good practice on Broad Based Black Economic Empowerment issued under Section 9 of the Broad Based Black Economic Empowerment Act, Act 53 of 2003, as amended by Act 46 of 2013. This will include skills transfer programmes, job creation, and supporting local service industry organizations such as manufacturing, production and/or packaging services.

The objectives of this impact management framework or the EMPr will be to:

- Provide sufficient information to strategically plan the prospecting activities so as to mitigate social, economic, heritage, environmental and other impacts.
- Provide a management plan that is effective and practical for implementation.
- Anticipate the risks and impacts of the prospecting activities through environmental monitoring and inspections.
- Create an adaptive framework for management of impacts such that unplanned events or incidents can be effectively controlled or minimised.
- The impact management plan and associated mitigation measures will be developed in adherence to international (such as UNCLOS), national and regional legal standards such as those implemented by designated authorities which include the DMRE, NEMA, and EIA regulations and guidelines.
- Through the development of the EMPr, measures will be developed to avoid environmental, social and other risks and impacts, and to provide mitigation where possible. This will then be included in the EMPr to be retained by the Environmental Control Officer (or such designated authority) who can oversee and report on the impact monitoring and mitigation measures.

To ensure the implementation of the impact management plan, the outcomes will be measured through compliance monitoring, evaluations, routine inspections and independent audits which will also be defined in the EMPr.

8.10 Aspects for inclusion as conditions of authorisation.

(Any aspects which must be made conditions of the Environmental Authorisation)

It is the opinion of the EAP that the following conditions should form part of the authorisation:

- The information collected during the acoustic survey must be reviewed by both the geologist and the Environmental Control Officer and results reviewed by an independent specialist, to identify any areas that need to be avoided before commencement of sampling.
- Baseline grab samples should be collected before core samples to determine the nature of benthic communities before disturbance.
- Grab samples should be analysed as soon as possible after collection to determine the benthic macrofaunal communities in the area. These results should be used to inform additional mitigation measures should unacceptable negative impacts be anticipated. This monitoring will also establish a baseline for comparison of any future surveys and sampling.
- Potential marine impacts should be reassessed after completion of the acoustic surveys and biological analysis, as these might elucidate areas that would need to be avoided and species of conservation concern.
- Affected stakeholders should be consulted at least 1 month before the start of the survey.
- A map detailing sampling locations should be provided to the affected stakeholder as well as the DMRE prior to commencement of prospecting activity.
- All environmental legislation must be complied with. Specific aspects to be adhered to from environmental legislation include National Environmental Management Act, Act 107 of 1998 (NEMA), Minerals and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA).
- All mitigation measures outlined in the BAR and any that might come to light before, during or after any prospecting phase, including information obtained following acoustic and benthic grab sampling, or due to new regulations or scientific information becoming available, must be implemented by the applicant and adhered to.

8.11 Methodology used in determining, assessing and ranking impacts

The National Environmental Screening Tool was used to assess terrestrial habitat adjacent to Concession Area 7C. The purpose of a screening process is to identify any environmental site sensitivities within the area. Specialists were appointed to assess these site sensitivities and any potential impacts associated with prospecting in this area. Information from these studies and the screening tool, together with the expertise from the EAP and consultation with stakeholders were used to identify and assess the potential impacts of prospecting in this area.

The method used to assess the impacts of the proposed prospecting activity is guided by the requirements of the NEMA, 1998 (Act No. 107 of 1998) and EIA Regulations, 2014 (as amended). The broad approach to the assessment criteria is to ensure that it is comprehensive in its approach to determine the overall significance as accurately as possible. Therefore, the following criteria will be taken into consideration: The significance of all potential impacts that would result from the proposed project is determined in order to assist decision-makers.

The **significance** of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The significance of each identified impact was thus rated according to the methodology set out below:

Step 1 – Determine the **consequence** rating for the impact by determining the score for each of the three criteria (A-C) listed below and then **adding** them. The rationale for assigning a specific rating, and comments on the degree to which the impact may cause irreplaceable loss of resources and be irreversible, must be included in the narrative accompanying the impact rating:

Rating		Definition of Rating	Score
A. *Extent – the area over which the impact will be experienced*			
Local		Confined to project or study area or part thereof (e.g. limits of the concession area)	1
Regional		The region (e.g. the whole of Namaqualand coast)	2
(Inter) national		Significantly beyond Saldanha Bay and adjacent land areas	3
B. *Intensity – the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources*			
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered		1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way		2
High	Site-specific and wider natural and/or social functions or processes are severely altered		3
C. *Duration – the time frame for which the impact will be experienced and its reversibility*			
Short-term		Up to 2 years	1
Medium-term		2 to 15 years	2
Long-term		More than 15 years (state whether impact is irreversible)	3

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Combined Score (A+B+C)	**3 – 4**	**5**	**6**	**7**	**8 – 9**
Consequence Rating	Very low	Low	Medium	High	Very high

Step 2 – Assess the **probability** of the impact occurring according to the following definitions:

Probability– the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

Step 3 – Determine the overall **significance** of the impact as a combination of the **consequence** and **probability** ratings, as set out below:

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	**INSIGNIFICANT**	**INSIGNIFICANT**	**VERY LOW**	**VERY LOW**
	Low	**VERY LOW**	**VERY LOW**	**LOW**	**LOW**
	Medium	**LOW**	**LOW**	**MEDIUM**	**MEDIUM**
	High	**MEDIUM**	**MEDIUM**	**HIGH**	**HIGH**
	Very High	**HIGH**	**HIGH**	**VERY HIGH**	**VERY HIGH**

Step 4 – Note the **status** of the impact (i.e. will the effect of the impact be negative or positive?)

Step 5 – State the level of **confidence** in the assessment of the impact (high, medium or low).

Depending on the data available, a higher level of confidence may be attached to the assessment of some impacts than others. For example, if the assessment is based on extrapolated data, this may reduce the confidence level to low, noting that further ground-truthing is required to improve this.

Confidence rating	
Status of impact	+ ve (beneficial) or – ve (cost)
Confidence of assessment	Low, Medium or High

The significance rating of impacts is considered by decision-makers, as shown below. Note, this method does not apply to minor impacts which can be logically grouped into a single assessment.

- **INSIGNIFICANT**: the potential impact is negligible and **will not** have an influence on the decision regarding the proposed activity.
- **VERY LOW**: the potential impact is very small and **should not** have any meaningful influence on the decision regarding the proposed activity.
- **LOW**: the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity.
- **MEDIUM**: the potential impact **should** influence the decision regarding the proposed activity.
- **HIGH**: the potential impact **will** affect a decision regarding the proposed activity.

- **VERY HIGH**: The proposed activity should only be approved under special circumstances.

Step 6 – Identify and describe practical **mitigation** and **optimisation** measures that can be implemented effectively to reduce or enhance the significance of the impact. Mitigation and optimisation measures must be described as either:

- **Essential**: must be implemented and are non-negotiable; and
- **Best Practice**: must be shown to have been considered and sound reasons provided by the proponent if not implemented.

Essential mitigation and optimisation measures must be inserted into the completed impact assessment table. The impact should be re-assessed with mitigation, by following Steps 1-5 again to demonstrate how the extent, intensity, duration and/or probability change after implementation of the proposed mitigation measures.

Example of a completed impact assessment table

	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Regional **2**	Medium **2**	Long-term **3**	**High 7**	Probable	**HIGH**	**– ve**	High
Essential mitigation measures: xxxxx xxxxx								
With mitigation	Local 1	Low 1	Long-term 3	**Low 5**	Improbable	**VERY LOW**	**– ve**	High

Indicate whether the proposed development alternatives are environmentally suitable or unsuitable in terms of the respective impacts assessed by the relevant specialist and the environmentally preferred alternative.

9 GENERAL INFO PERTAINING TO THE BAR, PROSPECTING ACTIVITIES AND ENVIRONMENTAL AUTHORISATION

9.1 Description of assumptions, uncertainties and gaps in knowledge

(Which relate to the assessment and mitigation measures proposed)

- It is assumed that all relevant project description information has been provided by Trans Atlantic Diamonds and that all information provided is correct.
- After completion of the survey, information should be reviewed to determine if the EMPr needs to be amended.
- The precise location of the grab, core and drill samples are yet to be determined, pending the results of the seafloor mapping.
- It is assumed that the project description and activities will not change after the completion of this report.

9.2 Volumes and rate of water use required for the operation.

No water use is required as this is an offshore application

9.3 Has a water use licence has been applied for?

No. As this is an offshore application, no water will be required, and a such a water use licence is not required.

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

9.4.1 Reasons why the activity should be authorised or not.

The EAP recommends that Environmental Authorisation for prospecting rights within sea Concession Area 7C be granted to the applicant, on condition that mitigation measures be implemented and adhered to. This is because the significance of potential negative impacts due to prospecting in this area was assessed to range from LOW significance to INSIGNIFICANT with the implementation of mitigation measures. The EAP also recommends that the DMRE commissions an updated Strategic Environmental Impact Assessment to better understand and manage cumulative impacts of marine and coastal mining along the South African West Coast. It is further requested that the DMRE considers extending the period granted for conducting Basic Assessment and Environmental Impact Assessment Processes for prospecting and mining applications in remote locations as the limited time granted creates challenges in undertaking consultations with isolated communities.

9.4.2 Conditions that must be included in the authorisation

See Section 8.10 above.

9.5 Period for which the Environmental Authorisation is required.

The proposed activity is set to take place seasonally over a three to five-year prospecting period. This will largely be influenced by the data and findings collected during initial phase of the proposed prospecting activities. The authorisation is thus required for five years plus a potential to extend the right by an additional three years, although this extension is unlikely to be necessary.

10 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

10.1 Compliance with the provisions of

(sections 24(4)(a) & (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act, the EIA report must include the):

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

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an **Appendix** .

Please refer to Section 8 regarding the assessment of the socio-economic conditions of the communities. A socio-economic considerations report has also been attached as Appendix 5.

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

The Heritage Impact Assessment Report has been attached as Appendix 4. Also see Section 8.2.2.

10.2 Other matters required in terms of Sections 24(4)(a) and (b) of the Act

A motivation has been attached as Appendix 8.

10.3 Financial provision

Please note that Trans Atlantic Diamonds plan to conduct their prospecting work in a phase-by-phase approach in several of the concession areas for which they have been awarded prospecting rights. This will allow them to save time and costs. The below budget has therefore accounted for prospecting in several concession areas as opposed to only one area. A total amount of R 915 000.00 has already been secured by Trans Atlantic Diamonds for the rehabilitation and remediation of the environment.

Approximately R10,143,071 would be required to complete surveying, sampling and a feasibility study in Concession area 7C (in addition to several other areas). Additional funds of R 915 000.00 have been set aside for the management of potential negative environmental impacts. These amounts were derived based on market research, quotations and information from other similar surveys.

The impacts from grab and core sampling are expected to be virtually negligible although the impacts from drill sampling are expected to be more extensive but it is considered essential mitigation to not use the 3-5m ^{2} drill tool in this concession due to its status as a CBA and location within the Namaqua Coastal EBSA. Recolonisation by benthic biota is, however, possible. Important drivers of habitat recovery are related to the exposure to dynamic physical processes such as currents and sediment refill. Considering the available area of similar habitat on the West Coast, the reduction in benthic biodiversity can be considered negligible. Full recovery is expected to take place within the medium to long-term (i.e. 10 – 15 years). As offshore environments are known to recover naturally after a prospecting/ mining event, active rehabilitation of the environment is not necessary, in addition to not being logistically possible. A monitoring programme will, however, be implemented after prospecting has been completed to monitor the recovery of the seafloor in that area.

No rehabilitation is expected but should the remediation of any negative environmental impacts or damages become necessary, there is sufficient funds available for this. Financial provision has been made for potential remediation and/ or rehabilitation. Funds are also available for the implementation of the EMPr in order to manage the health and integrity of the environment. In the unlikely event of an emergency such as a megafauna or vessel collision or oil spill, emergency response funds will be utilised. The following funds are available: R170,000.00 to monitor the rehabilitation of the environment, R365,000.00 to implement the EMPr and R380,000.00 for emergencies such as clean-ups and remediation.

10.3.1 Explain how the aforesaid amount was derived.

This amount was derived based on market research, quotations and information from other similar surveys.

Table 10-1 A cost estimate of the expenditure to be incurred for each phase of the proposed prospecting operation.

PROSPECTING SURVEY FINANCIAL PLAN		
PHASE	**ACTIVITY**	**Cost ZAR (R)**
GEOPHYSICAL OPERATIONS – DP Star		

PHASE 1 -	Acoustic survey: Survey data acquisition Phase 1	
	Data interpretation by geological team	
	Sub-total	R2,397,768
PHASE 2	Survey data acquisition Phase 2	
	Data interpretation by geological team	
	Sub-total	2,000,000
	Survey deliverables (footwall DEM, SedT, contours, maps)	
DRILL SAMPLING OPERATIONS – The Explorer		
PHASE 3	Sampling Planning	
	Sampling Execution	
	Sub-total	4,185,303
MINING FEASIBILITY STUDY REPORT		
PHASE 4	Cost of competent person (Geologist)	1,080,000
TOTAL COST		**10,143,071**

Table 10.2 Potential costs required to both manage and rehabilitate the environment in respect of rehabilitation, including rehabilitation monitoring, implementation of the EMPR and emergency responses.

REMEDIATION FINANCIAL PLAN		
1) MONITORING SURVEY TO ASSESS REHABILITATION OF ENVIRONMENT		
ACTIVITY	**TASK**	**TOTAL COST**
Water quality monitoring	pH, metals, organic and inorganic pollutants	R40,000.00
	Analysis	
Sediment quality monitoring	Sample collection	R60,000.00
	Laboratory analysis	
Annual biophysical monitoring	Benthic macrofauna	R70,000.00
	Sample collection and drop-camera photos	
	Laboratory analysis	
TOTAL COST		**R170,000.00**

2) COSTS TO IMPLEMENTAT EMPR		
ACTIVITY	**TASK**	**COST (R)**
Training	Environmental awareness training & archaeological heritage preservation induction course	R15 000.00
Stakeholder consultation	Appointing a FLO to consult with stakeholders and communities	R50 000.00
Baseline survey	Benthic macrofauna	R80 000.00
	Sample collection and drop-camera photos	

	Laboratory analysis	
Pollution control and waste management	Waste hierarchy system and implementation	R20 000.00
Auditing and compliance	Internal audits by Scientific Officer	R100 000.00
	External audits by independent ECO	
Marine megafauna conservation	Appointment of MMSOs' and PAM operators.	R100 000.00
	PAM equipment	
TOTAL COST		**R 365 000.00**

3) EMERGENCY RESPONSES		
ACTIVITY	**TASK**	**TOTAL COST**
Emergencies that cause environmental impacts (oil spill/vessel collision)	Emergency services required (e.g. Dedicated oil clean-up vessel)	R100 000
	Implementation of Shipboard Oil Pollution Emergency Plan (SOPEP) as required by MARPOL	
	Implementation of Emergency Response Plan (including MEDIVAC plan)	
	Implementation of Waste Management Plan as required by MARPOL	
Physical harm to Marine mammals	Emergency services required	R80 000.00
Rehabilitation of seabed	Natural rehabilitation of seabed	R0
Emergency Impact survey	Sample collection	R100 000
	Analysis and Write-up	
Reimbursement for damages		R100 000
TOTAL COST		**R 380 000.00**

10.3.2 Confirm that this amount can be provided for from operating expenditure

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

Trans Atlantic Diamonds (Pty) Ltd is affiliated with more than one Financial Institution and is financially in good standing. Guarantees from banks and investors have been issued to the DMRE as part of the Prospecting Work Programme that formed part of the Application. This confirms the availability of sufficient funds to undertake the prospecting activities, the decommissioning and closure of the operations; and the potential undertaking of the remediation of any negative environmental impacts which may become known. The applicant is also committed to ensure the prevention of pollution and environmental degradation as referred to in section 24(b)(ii) of the Constitution. On completion of the prospecting activities, Trans Atlantic Diamonds would have to apply for a closure certificate from the DMRE. Six month's bank statement have been submitted to the DMRE. Should further information be required, these will be provided upon request. Supporting documents and Proof of Funds have been uploaded as part of the Work Programme on the SAMRAD system.

11 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

11.1 Public participation process

The public participation process was an integrated process that engaged Interested and Affected Parties (I&APs) for the duration of the project. The following steps were undertaken as part of the public participation process:

11.1.1 Lodge Application

A prospecting right and environmental authorisation application were lodged with the DMRE. These applications were accepted by the DMRE on 24 May 2022. The DMRE informed Anchor about the acceptance of the application on 31 May 2022.

11.1.2 Identification of stakeholders, Registration Period, Initial Comment and Pre-Consultation Meeting

The Namakwa District Municipality and the Kamiesberg Local Municipality have been identified as the ruling authority for the area. As this is an offshore sea concession area, no landowners and no lawful occupiers of the land exist. I&APs for the towns of Hondeklipbaai and Koingnaas were identified through the use of existing I&AP databases and by contacting various government departments, community representatives, fisheries trusts, etc. and during the Pre-Consultation phase and meetings. The DFFE also suggested that we liaise with the communities through the community representatives in these towns. Many of the residents in these communities are subsistence fishers reliant upon fishing for food and income but, these small-scale fishers operate close to the shore and not in the offshore 7C concession area.

Notices were sent out to stakeholders on 3, 4 and 5 June 2022 to inform them that the application for prospecting rights and environmental authorisation in Concession Area 7C has been accepted by the DMRE and to invite them to register as Interested and Affected Parties (I&APs). Stakeholders were also asked to provide initial comment during the Pre-consultation phase which extended until 24 June 2022. See Appendix 9 for an example of the email requests that were sent out and Appendix 11 for examples and proof of the notices sent out. The following I&APs were considered:

(i) Host Communities;
(ii) Landowners (Traditional and Title Deed owners);
(iii) Traditional Authority;
(iv) Land Claimants;
(v) Lawful land occupier;
(vi) The Department of Land Affairs;
(vii) Any other person (including on adjacent and non-adjacent properties) whose socioeconomic conditions may be directly affected by the proposed prospecting or mining operation;
(viii) Communities near or adjacent the concession area;
(ix) The Local Municipality;
(x) The District Municipality;
(xi) The adjacent Municipalities; and

(xii) The relevant Government Departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project.

An extensive database of I&APs was compiled based on responses received (see Appendix 12 for the complete stakeholder database). Please note that the names and contact details of the I&APs have been omitted to protect their personal information (as per the Protection of Personal Information Act or POPIA). See Appendix 13 for Anchor Environmental Consultant's Statement regarding compliance with the POPI Act.

A pre-consultation meeting was held at the Eric Baker Community Hall in Hondeklipbaai on 8 June 2022. The purpose of this meeting was to consult with the communities before the specialist and impact studies are carried out. The aim was to inform the communities and other interested and affected parties of the project and associated activities, to get the community's input and answer questions so that these can be taken into account during the impact studies. The pre-consultation was also used as an opportunity to obtain contact details of other important community representatives and organisations to inform them of the process and the official public participation process. All this information and findings were then compiled together with the stakeholder questions and comments into a report and submitted to the Department of Mineral Resources and Energy (DMRE). See Appendix 10 for more details on the public meeting, including the attendance register and proceedings of the meeting. Also see Appendix 14 for the Background Information Document which was distributed.

11.1.3 Request for Extension of submission of Final BAR

A request for extension of the submission of the Final BAR was submitted to, and granted by, the DMRE on 8 June 2022. The motivation behind the request was related to the Fisheries Specialist still awaiting more recent Fisheries data from the Department of Forestry, Fisheries and the Environment.

11.1.4 Circulate Draft BAR & Official Public Participation Period

The Draft Basic Assessment Report (BAR) is being made available on our website (https://anchorenvironmental.co.za/) and at the Hondklipbaai and Koingnaas Municipal Buildings for 30 days during the Public Participation Period which will extend from Wednesday 21 September 2022 to 23:59 on Friday 21 October 2022.

11.1.5 Public Participation Meeting

Public meetings will be held at the Eric Baker Community Hall in Hondeklipbaai on 11 October 2022 at 16:00 and on 12 October 2022 at the Koingnaas Community Centre at 16:00. During these meetings, members of Anchor (the EAP) and TAD (the applicant) provided more detail on the proposed prospecting activity and consulted with I&APs who then had the opportunity to ask questions and provide comment on the proposal.

11.1.6 Submit final BAR to the DMRE

Stakeholder comments were addressed and included in a Comments and Responses Table which forms part of the Final BAR. Comments and recommendations are also used to inform the EMPr. The final BAR was submitted to the DMRE for review on 1 November 2022.

11.1.7 Decision by the DMRE

The DMRE has 107 days to review all the documents and decide whether to grant Environmental Authorisation for prospecting in Concession Area 7C.

11.2 Summary of issues raised by I&APs

Copies of the emails received from I&APs during the Pre-Consultation Period have been included as Appendix 15. All comments and input received have been transcribed into the "comments and responses" table and included as Appendix 16 of the Draft BAR.

12 ENVIRONMENTAL MANAGEMENT PROGRAMME

12.1 Documentation, reporting and compliance

The completed EMPr must be signed and dated by the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the EMPr. Each method statement must be signed and dated on each page by the holder of the EA. This EMPr, once signed and dated, is legally binding. The holder of the EA will remain responsible for its implementation. Once completed and signed, the Applicant must make this EMPr available to the public in accordance with regulation 26 (h) of the Environmental Impact Assessment Regulations, 2014.

To ensure accountable and demonstrated implementation of the EMPr, a number of reporting systems, documentation controls and compliance mechanisms must be in place for this prospecting activity, as a minimum requirement. These are listed/described below.

12.1.1 Document control/Filing system

The holder of the EA is responsible for the management of the EMPr file in which all documentation detailed below must be filed. An electronic copy must also be kept as back-up. The filing system must be updated, and relevant documents added as required. The EMPr file must be made available at all times on request by the CA or other relevant authorities. The EMPr file will form part of any environmental audits undertaken as prescribed in the EIA Regulations.

12.1.2 Documentation to be available

The following documents must be placed in the filing system and be accessible at all times:

- Full copy of the signed EA from the Competent Authority in terms of NEMA, granting approval for the development or expansion;
- Copy of the EMPr as well as any amendments thereof;
- A map of the Concession area indicating proposed sampling sites within the concession area, sensitive habitats and reefs and buffers.
- Copy of declaration of implementing generic EMPr and subsequent approval of site specific EMPr and amendments thereof;
- All method statements;
- Completed environmental checklists;
- Minutes and attendance register of environmental site meetings;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off.
- Complaints register.

12.1.2.1 Weekly Environmental Checklist

The Scientific Officer is required to complete a Weekly Environmental Checklist, to ensure conditions, as set out in the EMPr, are implemented and adhered to. Checklists must be dated and signed, and a copy submitted to the Environmental Control Officer on a weekly basis. The checklists will form the basis for the Monthly Environmental Reports and be attached to the Environmental Audit Report as required in terms of the EIA regulations, 2014.

12.1.2.2 Required Method Statements

Method Statement means a written statement detailing the equipment, materials, labour, and method(s) that will be used by the Contractors conducting the sampling/ work and also setting out in detail how the management actions contained in the EMPr will be implemented during activities. A statement should be prepared for each phase of the prospecting activities (e.g. acoustic survey, grab sampling, core sampling, drill sampling, tailings disposal, resource development, or any other activity that could result in environmental impacts). These should be prepared in consideration of the mitigation measures. These method statements should be submitted and reviewed by the Project Manager, Scientific Officer and Environmental Control Officer. The Environmental Control Officer and Scientific officer shall ensure that the contractors perform in accordance with these method statements. They are not required to be submitted to the CA. These statements must be prepared in such detail that the Project Manager, Scientific Officer and Environmental Control Officer are able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification. Method statements are to be prepared by the contractor prior to commencement of the activity.

The Method Statement must cover applicable details with regard to:

- Prospecting procedures;
- Materials and equipment to be used;
- How and where samples/ material/ equipment will be stored;
- Waste management system that will be implemented;
- Timing and location of activities;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Compliance/ non-compliance; and
- Any other information deemed necessary by the Project Manager/ Scientific Officer or Environmental Control Officer.
- Fauna interaction and risk management – only if the risk was identified – wildlife interaction especially on game farms; and
- Heritage and palaeontology management.

12.1.2.3 Environmental Incident Log

The Scientific Officer is required to maintain an up-to-date and current Environmental Incident Log to record all environmental incidents and/or all non-compliance notices. These must be reported to the Project Manager and ECO. An environmental incident is defined as:

- Any deviation from the listed impact management actions (listed in this EMPr)
- Any environmental impact resulting from an action or activity by a contractor in contravention of the environmental stipulations and guidelines listed in the EMPr (e.g. injury to marine megafauna or accidental spill)

It includes, amongst other, the following information:

- The date, time and description of the incident;
- The name of the Contractor responsible;
- The incident must be listed as significant or minor;
- If the incident is listed as significant, a non-compliance notice must be issued, and recorded in the log; and
- Remedial or corrective action taken to mitigate the incident.

12.1.2.4 Non-compliance

Non-compliance means the contractor/ applicant deviated from the environmental conditions, management outcomes and actions activities. A non-compliance notice will be issued in writing to the responsible contractor by the Scientific Officer. For each non-compliance notice issued, a documented corrective action must be recorded. The contractors must take action to correct the matter within the stipulated timeframe. Any non-compliance with the agreed procedures of the EMPr is a transgression of the law. Failure to comply shall be reported to the relevant CA.

Note that any cost incurred by a Government Department or Municipality due to non-compliance to any relevant environmental legislation by the applicant, will be charged to the developer/ applicant.

12.1.2.5 Corrective action records

Corrective action is a critical component of the implementation–review–corrective action–implementation cycle and it is through corrective action that continued improvement can be achieved. Where repeated non-compliance is recorded, procedures may need to be altered accordingly to avoid the need for repeated corrective action.

If environmental compliance monitoring indicates non-conformance with the EMPr, The Project Manager will formally notify the operator through a Corrective Action Request. The Corrective Action Request documents:

- The nature of the non-conformance / environmental damage;
- The actions or outcomes required to correct the situation; and
- The date by which each corrective or preventive action must be completed.

For each non-compliance notice issued, a documented corrective action must be recorded. The contractors must take action to correct the matter within the stipulated timeframe. On completion of the corrective action the Scientific Officer must issue a Corrective Action Report to the ECO. Upon receipt of the Corrective Action Request, the operator will be required to report in the annual audit as to how the required actions were implemented and the success or failure of the corrective action.

Should proposed standards or targets be regularly exceeded, an independent committee or service provider should investigate and objectively assess the effectiveness of mitigation measures. If satisfied that the corrective action has been completed, the ECOs are to sign-off on the Corrective Action Report, and this has to be included with the non-compliance notice in the EMPr file. A corrective action is considered complete once the report has signed off by the ECO.

12.1.2.6 Photographic record

A digital photographic record must be kept if possible. The photographic record will be used to show the progress of the work.

12.1.2.7 Complaints register

The ECO shall keep a complaints register to record of all complaints received from communities, stakeholders and individuals. The Complaints Register must:

- Record the name and contact details of the complainant;
- Record the time and date of the complaint;
- Contain a detailed description of the complaint;
- Where relevant and appropriate, contain photographic evidence of the complaint or damage (ECOs to take relevant photographs); and
- Contain a copy of the ECOs written response to each complaint received and keep a record of any further correspondence with the complainant. The ECO's written response will include a description of any corrective action to be taken and must be signed by the Contractor, ECO and affected party.

12.1.3 Claims for damages

In the unlikely event that a Claim for Damages is submitted by a community, landowner or individual, this must be submitted to the ECO who must record the full detail of the complaint. The ECOs will evaluate the claim and associated damage and submit the evaluation to the Project Manager / Trans Atlantic Diamonds for consideration. Following consideration by the Project Manager, the DMRE and other relevant authorities will be contacted to determine the course of action.

12.1.4 Interactions with affected parties

Consultation with stakeholders should continue throughout the project to ensure successful management and mitigation of environmental impacts.

12.1.5 Environmental audits

In accordance with Section 34 of the EIA Regulations, 2014 (as amended in 2017), compliance with the conditions of the EA and the EMPr must be audited at intervals indicated in the EA and an audit report must submitted to the DMRE. This should alternate between an internal auditor (Scientific officer) and an independent Environmental Control Officer (ECO). Environmental audit reports must comply with the specifications in Section 34 and Appendix 7 of the EIA Regulations, 2014 (as amended in 2017). Audits should also consider the overall progress and achievement of the objectives and milestones related to the specified targets of employment, enterprise development, preferential procurement and socio-economic development.

12.1.5.1 Internal environmental audits

Internal Environmental Audits of the activity and implementation of the EMPr will be undertaken by the Scientific Officer. The findings and outcomes of these audits will be recorded in the EMPr file. The environmental audits and associated reports must be conducted and submitted to the ECO and CA at intervals as indicated in the EA. The Scientific Officer must prepare a monthly Environmental Auditing Report. As a minimum the Monthly report should include:

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental Monitoring;
- General environmental findings and actions; and
- Minutes of the Environmental Site Meetings.

12.1.5.2 External Environmental audits

An external audit should be conducted by the ECO at intervals indicated in the EA. The report is to be submitted to the CA for acceptance and approval. On final completion of the entire activity, the ECO must do a final external environmental audit and prepare a final Environmental Auditing Report. The report is to be submitted to the CA for acceptance and approval. The environmental report must comply with Appendix 7 of the EIA Regulations, 2014.

- Details of the independent person who prepared the report;
- Details of the expertise of independent person that compiled the report;
- A declaration that the independent auditor is independent in a form as may be specified by the CA;
- An indication of the scope of, and the purpose for which, the environmental audit report was prepared;
- A description of the methodology adopted in preparing the environmental audit report;
- An indication of the ability of the EMPr, and where applicable, the closure plan to-
    - Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis;

  - Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and
  - Ensure compliance with the provisions of EA, EMPr, and where applicable, the closure plan;
- A description of any assumptions made, and any uncertainties or gaps in knowledge;
- A description of any consultation process that was undertaken during the course of carrying out the EAR;
- A summary and copies of any comments that were received during any consultation process; and
- Any other information requested by the CA.

12.1.6 Amendments of the impact management outcomes and actions

Once the activity has commenced, the holder of an EA may make amendments to the impact management outcomes and actions in the following manner:

- Amendment of the impact management outcomes – in line with regulation 37 of the EIA Regulation, 2014
- Amendment of the impact management actions – in line with regulation 36 of the EIA Regulations, 2014

If any specific environmental sensitivities/attributes are present on the site which require more specific impact management outcomes and actions not included in the EMPr to manage impacts, the EMPr must be updated to include those impact management outcomes and actions. The amended EMPr must be submitted to the CA for approval prior to commencement of the activity.

12.2 Roles and responsibilities for environmental management programme implementation

Table 12-1. Roles and responsibilities for EMPr implementation.

FUNCTION	ROLE
Project Manager/ Applicant	**Role** The Project Manager is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). An independent environmental control officer (ECO) must be contracted by the Project Manager to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of environmental authorization (EA). The Project Manager is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent. **Responsibilities** • Be fully aware of the conditions of the EA; • Overall management of the project and EMPr implementation; • Ensure that all stipulations within the EMPr are communicated and adhered to by the Applicant, Sampling Contractor(s) and any crew on board the vessel; • Monitor the implementation of the EMPr throughout the project; • Ensure that periodic environmental performance audits are undertaken on the project implementation; • Provide updated information to the public; and • Communication of all modifications to the EMPr to the relevant stakeholders.
Scientific Officer (Internal monitoring)	**Role** The Scientific Officer reports directly to the Project Manager, oversees site works, liaises with the contractor(s) and the ECO. The Scientific Officer is responsible for the day to day implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and for ensuring the compliance of all contractors with the conditions and requirements stipulated **Responsibilities** • Oversees site works, liaison with Contractor, Project Manager and ECO; • Will issue all notices of non-compliances to contractors; and - Ratify the Monthly Environmental Reporting the EMPr. • Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; • Conduct environmental awareness training on site together with ECO and contractors;

FUNCTION	ROLE
	• Ensure that the necessary legal permits and / or licenses are in place and up to date • Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) and its sub-contractor(s); • Conduct environmental internal audits against the EMPr standard. • Assist the contractors in addressing environmental challenges • Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; • Assist the contractor in investigating environmental incidents and compile investigation reports; • Monitor the implementation of the EMPr throughout the project by means of weekly checklists and regular meetings;
Environmental Control Officer (ECO) (External or Independent monitoring)	**Role** The ECO should be appointed by the applicant/ project manager for the duration of the project. The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller that monitors all environmental concerns and associated environmental impacts. The ECO conducts site inspections, manages problems and suggest mitigation and should be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the Scientific Officer. The ECO provides feedback to the Scientific Officer and Project Manager regarding all environmental matters. All role players answer to the Environmental Control Officer for non-compliance. The ECO must also report to the relevant CA as and when required. **Responsibilities** • Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with these standards; • Undertake regular site inspections / audits of the activities according to the EMPr, including any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; • Monitoring the performance of the Contractors and recording compliance with the EMPr, EA and associated Method Statements; • Liaison between the Project manager, Scientific Officer, Contractors, authorities and other stakeholders; • Issuing of site instructions to the Contractor for corrective actions required; • Reviewing all documents submitted by the Scientific Officer (method statements, incident reports, complaints register, etc.)

FUNCTION	ROLE
	• Facilitate environmental awareness training; • In case of non-compliances, the ECO must first communicate this to the Scientific Officer, who must address this matter. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; and • Review the EMPr and update it if necessary.
Sampling Contractor/ Employees on vessel	**Role** The contractors are required to provide Method Statements detailing the equipment, materials, labour and method(s) that will be used by them to conduct the sampling/ work and also setting out in detail how the management actions contained in the EMPr will be implemented during activities to mitigate environmental impacts. The Contractor has overall responsibility for ensuring that all work, activities, are in line with the Environmental Management Programme and that Method Statements are implemented as described. All instructions relating to the EMPr will be given to contractors via the scientific officer. Contractors will report issues of concern to the scientific officer, who in turn will report on progress to the TAD. Contractors include the captain on the vessel, the crew handling the equipment and doing sampling, geologist, etc. **Responsibilities** • Preparing method statements of work that will be done; • Conducting the sampling activities as per the method statements and EMPr; • Ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly; operated and maintained, to facilitate proper access and enable any operation to be carried out safely; and • Attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones.
Fisheries Liaison Officer (FLO)	**Role** A fisheries liaison officer (FLO) should be appointed to facilitate communication with affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area.

FUNCTION	ROLE
	Responsibilities • Liaison between fishing sectors and Project Manager and Scientific Officer
Marine Mammal Observer (MMSO)	**Role** A designated onboard Marine Mammal and Seabird Observer (MMSO) keeps watch for marine megafauna in the path of the vessel during all vessel activity, including the geophysical surveying. Marine megafauna will include, but are not limited to, all marine mammals (whales, cetaceans, seals, etc.), sea turtles, fish and seabirds. They are also in charge of managing the passive acoustic monitoring (PAM) system during the survey activity to detect marine mammals that could be at risk. **Responsibilities** • Keeps watch for marine megafauna to prevent collision and impact due to acoustic survey. • Records all sightings and incidents with marine megafauna and fish, including behaviour.
Passive Acoustic Monitoring (PAM) Observer	**Role** A designated onboard Passive Acoustic Monitoring (PAM) Observer uses passive acoustic hydrophones to detect the vocalisations of marine species. This person can also be a MMSO, but must not be the designated MMSO. **Responsibilities** • Managing the PAM system • Listens out for underwater marine megafauna to prevent collision and impact due to acoustic survey.

12.3 Impact management objectives, outcomes, actions and statements

Key Management Outcomes and Actions are presented in this section and includes recommendations for mitigation measures that must be implemented should the environmental authorisation for the proposed prospecting activities be granted. The applicant is reminded of the "duty of care" prescribed in section 28 of the NEMA, 1998 which states that "Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment".

It is the applicant's duty to ensure that the EMPr and associated mitigation measures are implemented and that all relevant laws, legislation, regulations, guidelines and plans are adhered to. This list is not complete and should be updated regularly. All phases of the proposed prospecting project must comply with the Environmental Management Programme. The applicant should appoint the appropriate individuals to implement the EMPr and adhere to relevant legislation.

The nature, intensity and extent of any potential impacts that have been identified, including those issues identified by I&APs during the consultation process, have been carefully assessed and incorporated into the BAR and specifically into the EMPr. This information was used to inform management actions (an impact management plan) that will form part of the EMPr. The objectives of the impact management plan are to anticipate and avoid risks and impacts. Each prospecting activity has been considered, together with its potential impacts on the environment, fisheries, socio-economic, heritage and other resources. Through the development of the EMPr, measures have been developed to avoid environmental, social and other risks and impacts, and to provide mitigation where possible. This will then be included in the impact management plan to be retained by the Environmental Control Officer (or such designated authority) who can oversee and report on the impact monitoring and mitigation measures.

The mitigation Hierarchy in terms of the Department of Environmental Affairs and Development Planning guideline should be followed and includes:

- In order of priority aim to avoid, minimise, or remedy disturbance of ecosystems and loss of biodiversity;
- Avoid degradation of the environment;
- Avoid jeopardizing ecosystem integrity;
- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic, or stressed ecosystems.

12.3.1 Activities, impacts, mitigation measures and how these will comply with environmental management standards

POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION MEASURE	COMPLIANCE	TIME	STANDARD TO BE ACHIEVED
Planning and design phase					
N/A	N/A	N/A	N/A	Prior to commencement of operation	Avoiding impacts
Desktop study and literature review					
N/A	N/A	N/A	N/A	Prior to commencement of operation	Avoiding impacts
Stakeholder consultation					
N/A	Local Communities	N/A	N/A	Prior to commencement of operation and throughout the entire process	Avoiding and mitigating impacts. NEMA; EIA regulations
Geophysical acoustic survey					
Noise disturbance impacting marine fauna	Fish, marine mammals and turtles	• Activity must be restricted to specific areas or a time of year. • Sound containment and improvement of current equipment used must be implemented. • Avoid mortalities and/or injuries to marine animals when they are encountered. There should be an existing protocol developed by the Scientific Officer in consultation prior to commencement. • Implement "soft-starts" of at least 20 minutes duration. • Employ on board independent observer(s) / MMSO(s) with experience in seabird, turtle and marine mammal identification and observation techniques to carry out daylight observations. • Passive Acoustic Monitoring (PAM) must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility. Utilise PAM technology when surveying at night or during adverse weather conditions and thick fog.	N/A	Throughout the acoustic survey operation.	Limit noise levels, injury or death to animals; SANS 10103

POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION MEASURE	COMPLIANCE	TIME	STANDARD TO BE ACHIEVED
		• Record marine mammal incidences and responses to acoustic survey activity, including data on position, distance from the vessel, swimming speed and direction and obvious changes in behaviour (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns) along with noise levels. • Terminate acoustic survey if mass mortalities of fish are observed. • If spotted wait until all marine megafauna (seabirds, seals, cetaceans and turtles) have cleared an area of 500 m radius of the centre of the sound source before resuming with acoustic survey (initiate soft start procedure when resuming acoustic survey). • Record incidences of encounters with marine life (seabirds, turtles, seals, fish) their behaviour and response to acoustic survey activity. • Suspend operations if any obvious mortalities or injuries to marine life are observed. • Wait until all small cetaceans (<3 m in overall length) have cleared an area of 500 m radius of the survey vessel before resuming with acoustic survey. If, after a period of 30 minutes, small cetaceans are still within 500 m of the vessel, the normal "soft start" procedure should be allowed to commence for at least 20-minutes duration. Small cetacean behaviour during "soft starts" shall be monitored. • Record seabird incidences and behaviour, including any attraction of predatory seabirds and incidents of feeding behaviour around the survey vessel. • Ensure that MMOs compile a survey close–out report incorporating all recorded data to the relevant DFFE authorities. Make marine mammal incidence data and sound source output data from surveys available on request to the Marine Mammal Institute (MMI), DAFF and DMR.			
Geological modelling					
N/A	N/A	N/A	N/A	Directly after the acoustic survey.	To limit impacts by means of selecting specific sites for drilling and avoiding sensitive sites. Avoiding impacts such as injury or death to animals and damage to vessels.

POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION MEASURE	COMPLIANCE	TIME	STANDARD TO BE ACHIEVED
Grab, core and drill sampling techniques					
Disturbance of marine fauna due to physical activities and sediment plumes	Benthic macrofauna, reef epifauna, fish, marine mammals	• Avoid reef and sensitive habitats when grab sampling and coring • Do not use the proposed 3-5m^2 drill tool.	NEMA; EIA Regulations	Grab sampling: Approximately 2 to five days. Core sampling: Approximately 10 to 20 days and within six months. Drill sampling: Approximately 50 days and within six months.	Preservation and limit destruction of resources. Limit impacts and disturbance; Listing Notice 1
Disturbance, destruction and loss of Prehistoric, Maritime and Heritage Resources.	Prehistoric Heritage, palaeontological (fossils) and Maritime archaeological resources, particularly historical shipwrecks	• An onboard Trans Atlantic Diamonds representative must undergo a short induction on heritage and artefact recognition, as well as the procedure to follow should archaeological material be encountered during sampling. • Any core samples are retained and subjected to assessment. • If artefacts are found during the course of sampling in any of the concession areas, the following mitigation measure should be applied: • Cease work in the directly affected area to avoid damage until SAHRA has been notified and the contractor has complied with any additional mitigation as specified by SAHRA. • Take photographs, noting the date, time, location and types of artefacts found. • Do not remove, disturb or, destroy the artefacts or site. • Areas where shipwreck sites are identified during the geophysical surveys must be excluded prior to undertaking sampling activities.	Heritage Act; NEMA; EIA Regulations		Limit impacts and destruction of Prehistoric Heritage, palaeontological and Maritime archaeological resources.
Impacts on the Namaqua Coastal Area EBSA	The coastal ecosystem	• If possible, prospecting should primarily take place on the seaward side of the concession area, to minimise the risk to endangered and vulnerable coastal ecosystems. • No destructive sampling or tailing discharge to take place in the part of the concession which falls wholly within the Namaqua Coastal EBSA and a CBA.	NEMA; EIA Regulations		Limit on the coastal ecosystem

POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION MEASURE	COMPLIANCE	TIME	STANDARD TO BE ACHIEVED
Tailings disposal					
Disturbance of benthic macrofauna and due to physical activity and sediment plumes.	Phytoplankton and consumers such as fish and invertebrates	Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats.	N/A	During the drill sampling activities	To avoid impacts by means of not conducting destructive prospecting within a CBA
Waste discharges					
Waste discharges and pollution, deteriorating water quality and disturbance.	The marine environment and ecosystem functions.	• Management through informing staff. • Management through compliance with relevant waste standards and protocols. • Control and modify activities. • Stop impacts through avoidance and terminating activities; • Remedy through design measures. • Inform & empower all staff about sensitive marine species and suitable disposal of waste; • Ensure compliance with relevant MARPOL standards. • Develop a waste management plan using waste hierarchy. • A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations. • Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm). • All process areas should be bunded to ensure drainage water flows into the closed drainage system. • Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system. • Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages. • All hydraulic systems should be adequately maintained and hydraulic hoses should be frequently inspected. • Spill management training and awareness should be provided to crew members of the need for thorough cleaning-up of any spillages immediately after they occur in order to minimise the volume of contaminants washing off decks.	Adherence to South African Water Quality Guidelines and MARPOL	While the vessel is operating in the concession area. Throughout the entire prospecting operation	Limit impacts; limit waste through management; NEM:WA. Adherence to South African Water Quality Guidelines and MARPOL

POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION MEASURE	COMPLIANCE	TIME	STANDARD TO BE ACHIEVED
Vessel and equipment operation					
Disturbance to vessels, shipping activities and fishing activities.	Vessels, shipping and fishing.	Key stakeholders should be consulted and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof: • A Marine Linefish Management Association (SAMLMA); • South African Tuna Association (SATA); • South African Tuna Longline Association (SATLA) • Local fishing communities; • DFFE; • SAMSA; • South African Navy Hydrographic office; and Overlapping and neighbouring right holders	NEMA; EIA Regulations	Throughout sampling activities	Limit disturbance.
Injury or death of Megafauna such as whales due to collision with survey vessels.	Megafauna such as whales	• A designated onboard Marine Mammal Observer (MMO) and vessel operator to keep watch for marine megafauna in the path of the vessel during geophysical surveying. • Passive Acoustic Monitoring (PAM) must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility. • It is recommended that activity be restricted to specific areas or a time of year as far as possible, feasible and reasonable, and as per the recommendations from an MMSO and specialist. This includes avoid planning geophysical surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations • Vessel transit speed to not exceed 12 knots (22 km/hr), except within 25 km of the coast where it should be kept to less than 10 knots (18 km/hr) as well as when sensitive marine fauna are present in the vicinity		Throughout sampling activities	Avoiding impacts such as injury or death to animals and damage to vessels

POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION MEASURE	COMPLIANCE	TIME	STANDARD TO BE ACHIEVED
Reduction in fishing success and decline in socio-economic conditions community fishing sectors dependent upon these resources.	Species targeted during fishing, fishing operations and local fishing communities dependent upon these resources.	• Avoid designated fishing grounds and undertake surveys preferably out of fishing seasons or when fishing effort is lower • Continuous consultation with stakeholders • Appoint a fisheries liaison officer (FLO) to facilitate communication with potentially affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area • Best practice: • Key stakeholders should be consulted and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof: • SA Marine Linefish Management Association (SAMLMA); • South African Tuna Association (SATA); • South African Tuna Longline Association (SATLA)		Throughout sampling activities	Limit disturbance and impact on local communities.
Physical presence of the vessel					
Visual impact potentially decreasing sense of place.	Local communities	No essential or potential mitigation measures deemed necessary.	N/A	Throughout sampling activities	N/A
Data acquisition and synthesis					
N/A		N/A	N/A	Approximately three months	
Feasibility study and resource estimation					
N/A	N/A	N/A	N/A	Approximately six months	N/A
Decommissioning and Closure					
N/A		N/A	NEMA and the EIA regulations	Upon the cessation of prospecting.	Closure certificate; NEMA

POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION MEASURE	COMPLIANCE	TIME	STANDARD TO BE ACHIEVED
Rehabilitation					
N/A	N/A	Recolonisation of the habitat is possible and recovery is expected to take place within the short to medium term (i.e. 5 – 10 years). No direct mitigation is considered necessary, although careful planning and management of potential discharges to ensure that tailings are not discarded onto sensitive reef habitat, should be implemented.	N/A	N/A	N/A

12.3.2 Impact management outcomes and actions

Environmental awareness training

All onsite staff are aware and understands the individual responsibilities in terms of this EMPr

Prospecting activity: Prior to commencement	**Aspects affected: All**	
MITIGATION MEASURE/ MANAGEMENT ACTION	**Responsible person**	**Timeframe**
• Contractor personnel and staff should undergo environmental awareness training prior to commencement of the activities which would include being briefed about the sensitivities pertaining to the environmental and sensitive species, archaeological, heritage, and palaeontological resources, the consequences of any damage/removal of such resources • All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr; • Discussion of the potential environmental impacts of prospecting activities. • The benefits of improved personal performance. • Employees' roles and responsibilities, including emergency preparedness (this should be combined with this induction, but presented by the contractors Health and Safety Representative). • Explanation of the mitigation measures that must be implemented when carrying out their activities. • Explanation of the specifics of this EMPr and its specification (no-go areas, etc.) • Explanation of the management structure of individuals responsible for matters pertaining to the EMPr. • A staff attendance register of all staff to have received environmental awareness training must be available Emergency preparedness and response procedures; • Course material must be available and presented in appropriate languages.	Scientific Officer ECO Project manager	Before commencing with activities

Stakeholder Consultation

To ensure successful management and mitigation of environmental impacts.

Prospecting activity: Throughout the project	**Aspects affected: N/A**	
MITIGATION MEASURE/ MANAGEMENT ACTION	**Responsible person**	**Timeframe**
• Consult with relevant government departments, fishing industry/associations and local communities to discuss important fishing grounds, harvesting times, other relevant information and the possibility of altering the prospecting programme so as to minimise disruptions to both parties as required. • Appoint a fisheries liaison officer (FLO) to facilitate communication with fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area. • Landowners, land occupiers and affected stakeholders should be consulted at least 1 month after the start of the survey. • Key stakeholders that need to be notified of the commencement of operations (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof: o SA Marine Linefish Management Association (SAMLMA); o South African Pelagic Fishing Industry Association (SAPFIA) o West Coast Rock Lobster Association; o Local fishing communities; o DFFE; o SAMSA; o South African Navy Hydrographic office; and o Overlapping and neighbouring right holders	Project Manager Scientific Officer Fishing Liaison Officer ECO	Throughout the project

Prevent megafauna collision

Prevent injury or death of megafauna such as whales due to collision with survey vessels

Prospecting activity: Vessel operation	**Aspects affected: Marine fauna, such as marine mammals, seabirds and sea turtles**	
MITIGATION MEASURE/ MANAGEMENT ACTION	**Responsible person**	**Timeframe**

• Vessel operator must keep watch for marine megafauna in the path of the vessel during vessel operation.
• At least two on-board independent Marine Mammal and Seabird observers (MMSOs) with experience in marine megafauna (including, but not limited to, all marine mammals (cetaceans and seals), sea turtles and seabirds) identification and observation techniques must be employed to carry out daylight observations and ensure compliance with mitigation measures during geophysical surveying. It must be ensured that there are sufficient MMOs on board the vessel to prevent fatigue and meet health and safety requirements, during the survey periods.
• Activity must be restricted to specific areas or a time of year, this includes:
  ○ Avoid planning any surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (**beginning of June to end of November**) and ensure that migration paths are not blocked by sonar operations;
  ○ Avoid planning any surveys during mating season (confirm these times with MMSOs); and
  ○ Confine surveys to seasons when cetaceans are scarce to ensure minimal disturbance (confirm these times with MMSOs).
• MMSOs to conduct pre-survey visual scans of at least 30 minutes for the presence of megafauna around the survey vessel prior to any vessel movement.
• Protocol must be followed to avoid mortalities and/or injuries to marine animals when they are encountered.
• Passive Acoustic Monitoring (PAM) technology must be incorporated into any survey programme. A designated onboard PAM Observer uses the PAM technology to detect the vocalisations of marine species, particularly during periods of low visibility, such as at night or during adverse weather conditions and thick fog, to prevent collision and impact due to acoustic survey. . It must be ensured that there are sufficient PAM operators on board the vessel to prevent fatigue and meet health and safety requirements, during the survey periods.
• Suspend operations if any obvious mortalities or injuries to marine life are observed.
• Make marine mammal incidence data and sound source output data from surveys available on request to the Marine Mammal Institute (MMI), DFFE and DMRE.
• Ensure that MMSOs compile a survey close–out report incorporating all recorded data to the relevant DFFE authorities.
• Record incidences of encounters with marine life (seabirds, turtles, seals, fish), their behaviour and response to vessel, including any attraction of predatory seabirds and incidents of feeding behaviour around the survey vessel; data on
	MMSO
	
	PAM Operator
	
	Vessel operator
	
	Scientific Officer
		During vessel operation

Prospecting activity: Vessel operation	**Aspects affected: Marine fauna, such as marine mammals, seabirds and sea turtles**	
position, distance from the vessel, swimming speed and direction and obvious changes in behaviour (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns). • If spotted, wait until all marine megafauna have cleared an area of 500 m radius of the centre of the vessel. • Vessel transit speed to not exceed 12 knots (22 km/hr), except within 25 km of the coast where it should be kept to less than 10 knots (18 km/hr) as well as when sensitive marine fauna are present in the vicinity.		

Protection of sensitive habitats and resources

Protection of sensitive habitats and marine ecological resources from invasive sampling

Prospecting activity: Throughout prospecting activites	**Aspects affected: Benthic invertebrates, fish and any other species dependent on these habitats**	
MITIGATION MEASURE/ MANAGEMENT ACTION	**Responsible person**	**Timeframe**
• Should any ecologically sensitive features such as reefs be identified within the concession area during the initial acoustic survey, these must be avoided and suitably buffered. Appropriate buffers must be determined by a suitably qualified specialist. Once suitable buffers have been mapped it should be illustrated on a map and form part of the EMPr. • Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats • Grab samples collected should be analysed as soon as possible to determine the benthic macrofaunal communities in the area. Results of this monitoring should be used to inform additional mitigation measures if required. This will also establish a baseline for comparison of any future surveys and sampling. • Reassess the potential marine impacts after completion of the geophysical surveys and biological analysis as these might elucidate areas that would need to be avoided and species of conservation concern.	Geologist Scientific Officer ECO Contractors	During invasive sampling activities

Protection of marine fauna from noise pollution

Ensure that impact of noise on to marine fauna is minimised.

Prospecting activity: Acoustic Survey and other prospecting operations	**Aspects affected: Marine fauna, especially marine mammals**	
MITIGATION MEASURE/ MANAGEMENT ACTION	**Responsible person**	**Timeframe**

• Vessel operator must keep watch for marine megafauna in the path of the vessel during vessel operation;
• Employ two on-board independent Marine Mammal and Seabird observers (MMSOs) with experience in marine megafauna (including, but not limited to, all marine mammals (cetaceans and seals), sea turtles and seabirds) identification and observation techniques to carry out daylight observations and ensure compliance with mitigation measures during geophysical surveying;
• It is recommended that activity be restricted to specific areas or a time of year as far as possible, feasible and reasonable, and as per the recommendations from an MMSO and specialist. The following should be considered:
  o Avoid planning any surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (**beginning of June to end of November**) and ensure that migration paths are not blocked by sonar operations;
  o Avoid planning any surveys during mating season (confirm these times with MMSOs); and
  o Confine surveys to seasons when cetaceans are scarce to ensure minimal disturbance (confirm these times with MMSOs).
• MMSO to conduct pre-survey visual scans of at least 30 minutes for the presence of cetaceans around the survey vessel prior to the initiation of any acoustic impulses
• Protocol must be followed to avoid mortalities and/or injuries to marine animals when they are encountered;
• Passive Acoustic Monitoring (PAM) technology must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility, such as at night or during adverse weather conditions and thick fog;
• Suspend operations if any obvious mortalities or injuries to marine life are observed;
• Make marine mammal incidence data and sound source output data from surveys available on request to the Marine Mammal Institute (MMI), DFFE and DMRE;
• Ensure that MMSOs compile a survey close–out report incorporating all recorded data to the relevant DFFE authorities;
• Record marine life (cetaceans, seabirds, turtles, seals, fish), incidences and responses to acoustic survey activity, including data on position, distance from the vessel, swimming speed and direction and obvious changes in behaviour (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns, feeding behaviour) along with noise levels.
• "Soft starts" should be carried out for equipment with source levels greater than 210 dB re 1 µPa at 1 m over a period of 20 minutes to give adequate time for marine mammals to leave the vicinity. Where this is not possible, the equipment should be turned on and off over a 20-minute period to act as a warning signal and allow cetaceans to move away from the sound source.
	MMSO
	
	PAM operator
	
	Vessel operator
	
	Scientific Officer
		During Acoustic Survey

Prospecting activity: Acoustic Survey and other prospecting operations	**Aspects affected: Marine fauna, especially marine mammals**	
• Wait until all marine megafauna have cleared an area of 500 m radius of the survey vessel (centre of the sound source) before resuming with acoustic survey. If, after a period of 30 minutes, megafauna are still within 500 m of the vessel, the normal "soft start" procedure should be allowed to commence for at least 20-minutes duration. Behaviour during "soft starts" must be monitored; and • Sound containment and improvement of current equipment used must be implemented.		

Protection of underwater cultural heritage

Minimise impact to and protection of heritage resources

Prospecting activity: Grab, core and drill sampling, tailings disposal and resource estimation phase	**Aspects affected: Marine Heritage Resources**	
MITIGATION MEASURE/ MANAGEMENT ACTION	**Responsible person**	**Timeframe**
• It is recommended that the onboard Trans Atlantic representative must undergo a short induction on archaeological site and artefact recognition, as well as the procedure to follow should archaeological material be encountered during sampling. • The contractor must be notified that archaeological sites could be exposed during sampling activities, as well as the procedure to follow should archaeological material be encountered during sampling. • Areas where shipwreck sites are identified during the geophysical surveys must be excluded prior to undertaking sampling activities. • Heritage sites or objects may not be disturbed without a permit from the relevant heritage resources authority. • Any core sample sections which contain alluvial material, particularly where organic remains are present, are retained and are subject to paleo-environmental assessment. • Any fossils found during the processing of cores must have the details of context recorded, must be kept for identification by an appropriate specialist and, if significant, be deposited in an appropriate institution. • If shipwreck material is encountered during the course of sampling in any of the concession areas, the following mitigation measure should be applied: • Cease work in the directly affected area to avoid damage to the wreck until the South African Heritage Resources Agency (SAHRA) has been notified and the contractor has complied with any additional mitigation as specified by SAHRA; and • Where possible, take photographs of them, noting the date, time, location and types of artefacts found. • Under no circumstances may any artefacts be removed, destroyed or interfered on the site, unless under permit from SAHRA. • All updates and/or changes to the project, supporting documentation, correspondence, reports, or any other work relating to the project must be uploaded to the case on SAHRIS to provide SAHRA with the opportunity to comment. SAHRA does not accept emailed documents or hard-copy documents received via post.	Trans Atlantic representative that underwent induction course Scientific Officer Contractors	During invasive sampling activities

Shipping safety and safety to the public:

Ensure safety of all members onboard, public safety, and safety of other vessels on sea

Prospecting activity: During vessel operation	**Aspects affected: Members on board the survey, any other vessel and members of the public**	
MITIGATION MEASURE/ MANAGEMENT ACTION	**Responsible person**	**Timeframe**

• Prior to the commencement of activities, key stakeholders should be consulted and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) and the likely implications thereof:
  ○ Mariners
  ○ DMRE
  ○ Relevant Port Captains
  ○ Marine Resources Management (MRM);
  ○ SA Marine Linefish Management Association (SAMLMA);
  ○ South African Pelagic Fishing Industry Association (SAPFIA);
  ○ South African Tuna Association (SATA);
  ○ South African Tuna Longline Association (SATLA);
  ○ Large Pelagic Small Medium & Micro Enterprises Association (LPSMME);
  ○ Local fishing communities;
  ○ DFFE;
  ○ SAMSA;
  ○ South African Navy Hydrographic office; and
  ○ Overlapping and neighbouring right holders
• These stakeholders should again be notified at the completion of surveying when the survey vessel(s) is/are off location.
• A health and safety officer should be appointed and Health and Safety Regulations should be adhered to.
• The survey and sampling vessels must be certified for seaworthiness through an appropriate internationally recognised marine certification programme (e.g. Lloyds Register, Det Norske Veritas). The certification, as well as existing safety standards, requires that safety precautions should be taken to minimise the possibility of an offshore accident. Collision prevention equipment should include radar, multi-frequency radio, foghorns, etc. Safety equipment and training of personnel to ensure the safety and survival of the crew in the event of an accident is a further legal requirement.
• A buffer of 500 m in extent should be placed around the ship in terms of the International Regulations for Preventing Collisions at Sea (Colregs 1972). To avoid or minimise potential negative impacts on fisheries due to the exclusion from fishing grounds in the vicinity of the ship, mitigation measures as recommended under the fisheries section should be implemented.
	Vessel operator
	
	Scientific Officer
	
	Environmental Control Officer
	
	Health and Safety Officer
		During all activities

Prospecting activity: During vessel operation	**Aspects affected: Members on board the survey, any other vessel and members of the public**	
• Ensure that necessary emergency procedures and protocols are in place such as: o Shipboard Oil Pollution Emergency Plan (SOPEP) in accordance with MARPOL o Emergency Response Plan o Waste Management Plan in accordance with MARPOL		

Socio-economic and fishing:

Ensure that impacts on fishing and other affected sectors and any resultant socio-economic impacts are minimised

Prospecting activity: Throughout prospecting activities	**Aspects affected: Fishing sectors**	
MITIGATION MEASURE/ MANAGEMENT ACTION	**Responsible person**	**Timeframe**
Best Practice: • Undertake surveys when fishing effort is lowest i.e., August to December. It is recommended that small pelagic peak fishing seasons (January-July) and snoek line fishing peak seasons (April-May) be avoided as far as possible, feasible and reasonable. Avoid designated fishing grounds and undertake surveys when fishing effort is lower • It is recommended that additional compensation and resource support measurements be introduced to households reliant on fishing for subsistence, should prospecting activities prove to negatively impact fishing success, income and livelihood. • Appoint a fisheries liaison officer (FLO) to facilitate communication with potentially affected fishing sectors. The FLO should report daily on vessel activity and respond and advise on action to be taken in the event of encountering fishing gear in the survey area • Key stakeholders should be consulted throughout the process and informed of the proposed survey activity (including navigational co-ordinates of the survey area, timing and duration of proposed activities) (contactable via liaison@fishsa.org): o SA Marine Linefish Management Association (SAMLMA); o South African Pelagic Fishing Industry Association (SAPFIA); o South African Tuna Association (SATA); o South African Tuna Longline Association (SATLA); o Large Pelagic Small Medium & Micro Enterprises Association (LPSMME); and o Local fishing communities. • Other associations and organs of state: o DFFE;	Fishing Liaison Officer Scientific Officer ECO	During all activities

Prospecting activity: Throughout prospecting activities	**Aspects affected: Fishing sectors**	
○ SAMSA; ○ South African Navy Hydrographic office; and ○ Overlapping and neighbouring right holders. • These stakeholders should again be notified at the completion of surveying when the survey vessel(s) is/are off location.		

Waste management and water pollution:

Prospecting activity: Throughout prospecting activities	**Aspects affected: Marine environment and species**	
MITIGATION MEASURE/ MANAGEMENT ACTION	**Responsible person**	**Timeframe**
Hazardous Substances is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995; • Solid waste means all solid waste, including construction debris, hazardous waste, wrapping materials, timber, cans, drums, wire, nails, cigarette buds, food and domestic waste (e.g. plastic packets and wrappers); • Contractor personnel and staff should undergo waste management and spill management training and be informed about sensitive marine species & suitable disposal of waste; • Ensure compliance with relevant MARPOL standards; • Develop a waste management plan using waste hierarchy; • A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations; • Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm); • All process areas should be bunded to ensure drainage water flows into the closed drainage system; • Drip trays should be used to collect run-off from equipment that is not contained within bunded areas and the contents routed to the closed drainage system; • Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages; • All hydraulic systems should be adequately maintained and hydraulic hoses should be frequently inspected; and • No waste or pollution in the environment is allowed. The applicant shall be liable for the cost of any remedial action which has to be carried in addition to a fine equal to the transgression. • Appropriate pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into watercourses or water bodies must be designed and implemented;	All members on board the vessel	Throughout the project

Prospecting activity: Throughout prospecting activities	**Aspects affected: Marine environment and species**	
• Runoff from the ship must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager; • All measures regarding waste management must be undertaken using an integrated waste management approach; • Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided; • General waste produced onsite must be disposed of at recognised waste disposal sites/ recycling company; • Hazardous waste must be disposed of at a registered waste disposal site; • Certificates of safe disposal for general, hazardous and recycled waste must be maintained. • The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible; • All hazardous substances will be stored in suitable containers as defined in the Method Statement; • Containers will be clearly marked to indicate contents, quantities and safety requirements; • All storage areas will be bunded. The bunded area will be of sufficient capacity to contain a spill / leak from the stored containers; • An Alphabetical Hazardous Chemical Substance (HCS) control sheet will be drawn up and kept up to date on a continuous basis; • All hazardous chemicals that will be used on site will have Material Safety Data Sheets (MSDS); • Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available; • The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers • No smoking must be allowed within the vicinity of the hazardous storage areas; • Adequate fire-fighting equipment must be made available at all hazardous storage areas; • An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times; • The responsible operator must have the required training to make use of the spill kit in emergency situations;		

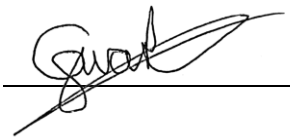
12.3.3 Determination of closure objectives.

- The survey vessel will leave the area.
- The stakeholders will be informed of the closure of the project.
- Any waste on the ship will be disposed of in a responsible manner.
- A feasibility study will be conducted to determine the feasibility of mining in Concession Area 7C.
- The impacts from grab and core sampling are expected to be virtually negligible although the impacts from drill sampling are expected to be more extensive and drilling with the larger 3-5m^2 drill tool should not be permitted within this concession that is zones as CBA and the Namaqua Inshore EBSA.. Recolonisation by benthic biota is, however, possible. Considering the available area of similar habitat on the West Coast, the reduction in benthic biodiversity can be considered negligible. Full recovery is expected to take place within the short to medium term (i.e. 5 – 10 years). No direct mitigation is considered necessary, although careful planning and management of potential discharges to ensure that tailings are not discarded onto sensitive reef habitat, should be implemented. Important drivers of habitat recovery are related to the exposure to dynamic physical processes such as currents and sediment refill.
- On completion of the prospecting activities, TAD would have to apply for a closure certificate from the DMRE.

13 UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports;	✔
b) the inclusion of comments and inputs from stakeholders and I&APs;	✔
c) the inclusion of inputs and recommendations from the specialist reports where relevant; and	✔
d) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected. parties are correctly reflected herein.	✔



Signature of the environmental assessment practitioner:

Anchor Environmental Consultants Pty Ltd

Name of company:

16 September 2022

Date:

-**END-**

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