TRANS ATLANTIC DIAMONDS

# FINAL BASIC ASSESSMENT REPORT FOR THE PROPOSED PROSPECTING IN SEA CONCESSION AREA 14C BY TRANS ATLANTIC DIAMONDS (PTY) LTD

## May 2022

### PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

ANCHOR environmental

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## May 2022

Report prepared for:

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TRANS ATLANTIC DIAMONDS

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# 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 |
| Aquifer | Underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand, or silt) from which groundwater can be extracted using a water well. |
| 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. |
| Functional group | A collection of organisms of specific morphological, physiological, and/or behavioural properties. |

| | |
|---|---|
| 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 |
| CA | Competent Authority |
| DFFE | Department of forestry, fisheries and the Environment (Formerly DEFF and DAFF) |
| DMRE | Department of Mineral Resources and Energy |
| EA | Environmental Authorisation |
| EAP | Environmental Assessment Practitioner |
| EBSA | Ecologically or Biologically Significant Marine Areas |
| ECO | Environmental Control Officer |
| EIA | Environmental Impact Assessment |
| EMPr | Environmental Management Programme Report |
| FLO | Fisheries Liaison Officer |
| IBA | Important Bird and Biodiversity Area |
| IEM | Integrated Environmental Management |
| IUCN | International Union for Conservation of Nature |
| MARPOL | The International Convention for the Prevention of Pollution from Ships |
| MBES | Multi Beam Echo Sounder |
| MMI | Marine Mammal Institute |
| MMSO | Marine Mammal and Seabird Observer |
| MPA | Marine Protected Area |
| MUCH | Maritime and Underwater Cultural Heritage |
| NBA | National Biodiversity Assessment |
| NEMA | National Environmental Management Act No. 107 of 1998, as amended |
| OMP | Operational Management Plan |
| PAM | Passive Acoustic Monitoring |
| ROV | Remotely Operated Vehicle |
| 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 |
| SOPEP | Shipboard Oil Pollution Emergency Plan |
| TAC | Total allowable catch |
| TAD | Trans Atlantic Diamonds (Pty) Ltd |

# 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. Trans Atlantic Diamonds Pty Ltd (The Applicant) have therefore 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), which are considered pivotal in today's modern society and everyday life.

The Applicant has applied for the right to prospect in offshore Sea Concession Area 14C. This area covers 106 001 ha and extends from just north of Doringbaai (northern boundary) to just north of Donkinsbaai (southern boundary). The area is situated 9 km south of Strandfontein and 21 km north of the Lamberts Bay (Figure 2.1). The inshore boundary (closest to the shore) of this concession area starts approximately 5 km (2.7 nautical miles) west of the high-water mark at a water depth of 70 m (70 m isobath). Concession Area 14C extends 100 km westwards from this point to 200 m water depth (200 m isobath) (Figure 2.2).

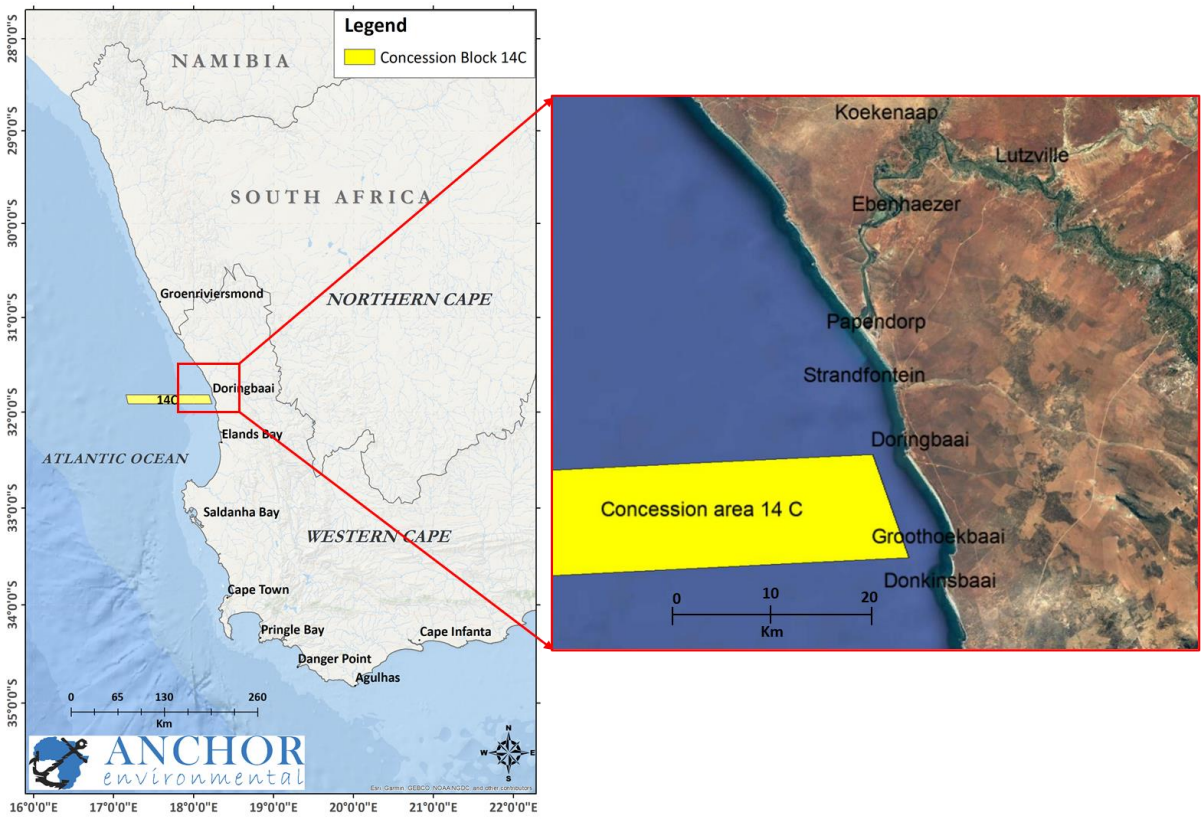


**Figure 2.1. The location of Concession Area 14C along the West Coast.**

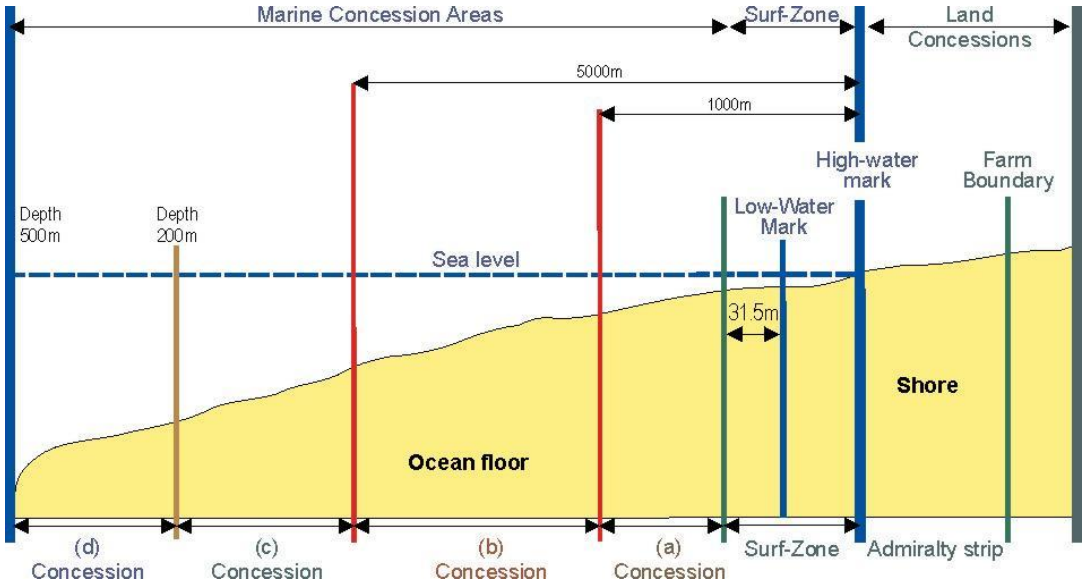


**Figure 2.2. Diagram of the onshore and offshore boundaries of the South African marine diamond mining concession areas (from Penney *et al.* 2007).**

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 additional 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 (this report). 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 Trans Atlantic Diamonds (Pty) Ltd to determine if mining within Concession Area 14C 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.

Anchor Environmental Consultants (Pty) Ltd was appointed by the Applicant as the Independent Environmental Assessment Practitioner (EAP) to submit the applications and to carry out a Basic Assessment and Public Participation process for prospecting rights application for Concession Area 14C.

## 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 Doringbaai or other nearby towns. No access from land is required, neither will vessel crew be able to come on land.

A brief description of the proposed project plan follows below (see Figure 2.3):

1. **Geophysical/ Acoustic Survey:** 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 the same way as fish finders used by fisherman in the area.
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 2.3). 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 macrofaunal communities in the area during and after prospecting and mining.

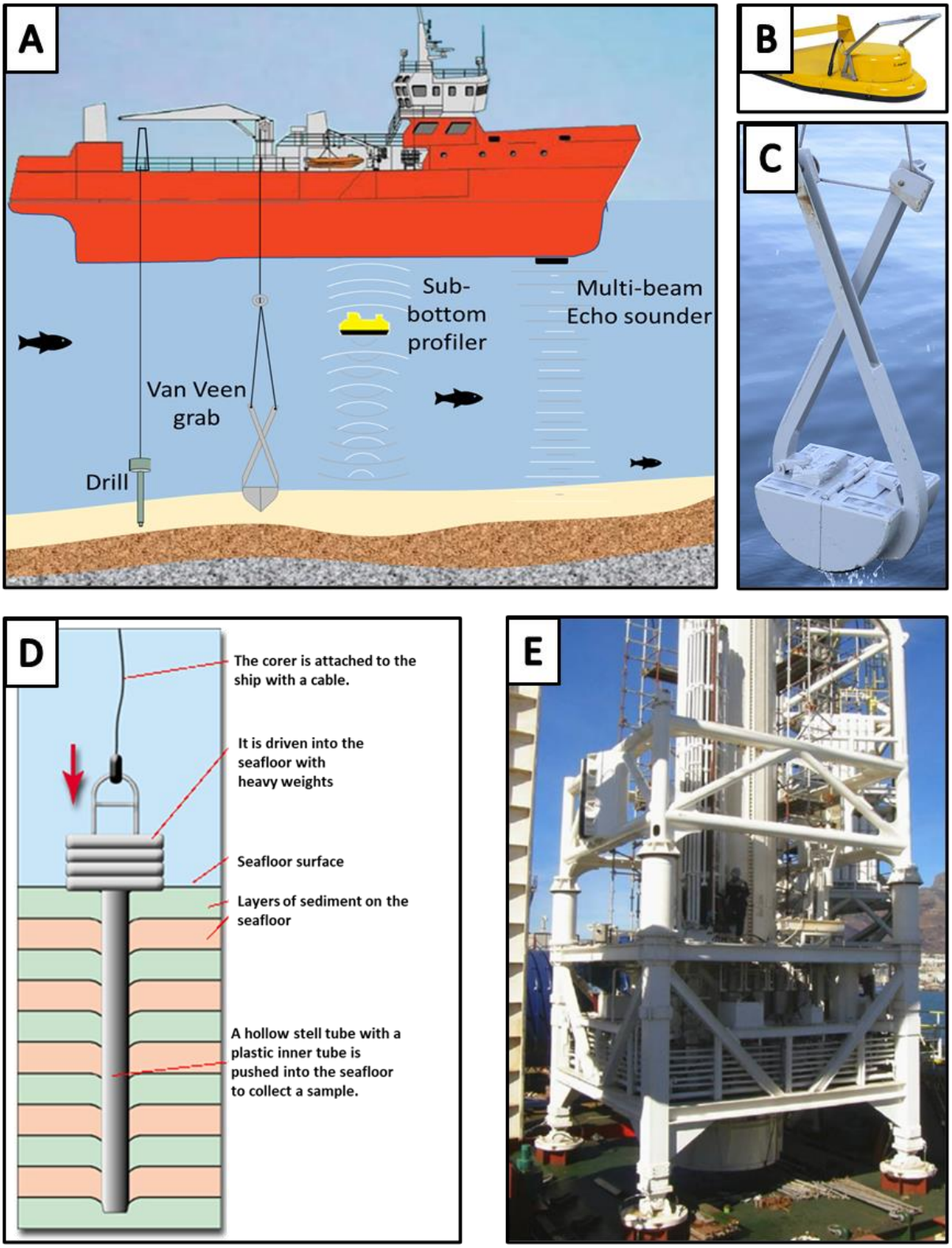


**Figure 2.3.** **The various sampling methods that will be used (a), including (B) acoustic equipment, (C) a Van Veen grab, (D) corers and (E) a drill.**

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 2.3). This information is then used to engineer the drilling tool. Geotechnical sampling is also used to determine whether there are materials that can be mined in the area and whether it will be economically viable. The core samples will disturb a total surface area of 1.57 $m^2$, 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 5$m^2$ (Figure 2.3). 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 7500$m^2$.

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 0.000007% of the total area of Concession Area 14C 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 14C is economically viable. Information will also be used to inform the construction of the mining vessel and to identify areas for mining.

## 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 14C 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 assessment identified 29 potential negative impacts ranging from MEDIUM to INSIGNIFICANT and two potential positive impacts ranging from LOW to INSIGNIFICANT. 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, and the community of Doringbaai. Mechanisms include disturbance by means of physical sampling activities, acoustic surveys or vessel movement and noise. These impacts have the potential to result in the loss of environmental integrity, social values and economic opportunities. It should, however, be noted that most of these impacts were assessed to be either INSIGNIFICANT or VERY LOW. Marine mammals and shipwrecks of high heritage significance are expected to be the most significantly

affected by the prospecting activities. For mammals, this is due to the impacts that the acoustic surveys could have on their echolocation and hence behaviour and critical activities such as feeding. For shipwrecks, this would be related to damage during invasive prospecting activities. However, this latter impact is not likely to occur as vessels of high significance are improbable to be present in Concession Area 14C and would be detected during the acoustic survey before invasive activities commence. The impact of prospecting on submerged cultural, prehistoric heritage and palaeontological resources is expected to be LOW or VERY LOW and would yield a positive outcome if samples and resources are retained for assessment and reported to the South African Heritage Resource Agency. Due to the location of the concession area relative to the nearest town and harbours (5 km offshore of Doringbaai) 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 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 14 C is considered to be situated in a suitable location where prospecting will have relatively low negative impacts and provide potential benefits. A more detailed summary of the potential impacts identified and assessed according to each major receptor is provided below.

### 1.3.2 Marine ecology and fisheries

Ten 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 seismic disturbance to marine fauna; 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; 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 seismic disturbance to marine mammals and was assessed as 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 on marine mammals

arising from the proposed seismic survey activities in Concession 14C would be reduced to VERY LOW significance.

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 limited spatial scale, temporary nature of operations (approximately two months 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 worth noting 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.

### 1.3.3 Heritage

Prospecting activities in Concession Area 14C are likely to have an impact on submerged Prehistoric Heritage, Marine Archaeological and Palaeontological Resources present within the concession area. The significance of prospecting-related impacts on such material was assessed to be LOW for Prehistoric Heritage and VERY LOW for Palaeontological Resources, while impacts on the Marine Archaeological Resources were assessed to range from MEDIUM to VERY LOW. The significance will depend on the type of maritime resource discovered and whether and whether it has been damaged during prospecting. There is potential for the status of the potential impacts to be changed from negative to positive if core samples are retained for assessment of paleoenvironmental and prehistoric lithic material.

### 1.3.4 Socio-economics

Prospecting activities are anticipated to have potential negative impacts on several sectors and other aspects within Concession Area 14C . These include potential impacts to tuna pole and line, traditional linefish, small pelagic purse seine fishing sectors, local households, tourism and small businesses, sense of place, crime levels and noise levels. These impacts are related to the 1) the operation and physical presence of vessels in the area; 2) the temporary disturbance of marine resources; 3) exclusion of fishing vessels from the concession area 14C; and 4) the degradation of water quality. The impacts of all of these were assessed to be INSIFGNIFICANT, except for impacts on the small pelagic purse seine fishing, the local households and tourism, which were assessed to be VERY LOW. These are expected to be reduced to INSIGNIFICANT after the implementation of appropriate mitigation measures. Despite this very low impact rating, the poor economic performance of the coastal communities should still be taken into consideration due to their high dependence on marine resources to support their household income and livelihoods. 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.

### 1.3.5 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 also unlikely that any noise would be heard from the shoreline or from Doringbaai which is situated approximately 5 km to the east of the concession area. 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.

### 1.3.6 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.

### 1.3.7 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 14C. The impacts of prospecting activities within concession area 14C on shipping activities are therefore considered to be INSIGNIFICANT.

### 1.3.8 Impact on visual integrity of the ar*ea*

The town closest to Concession Area 14C, Doringbaai, is situated approximately 5 km east of this concession area. It is unlikely that the survey vessel will be visible from the shoreline. The vessel is will not be considered more conspicuous than any other vessel (such as fishing vessels) already visiting the area. As the entire survey phase is also expected to only take approximately two months (over the next 5 years) to complete, the vessel and activity in Concession Area are expected to have negligible impacts on the visual integrity of the area.

### 1.3.9 Contribution to science and research

Soil and biological samples will be collected during the prospecting activities using a clamshell bucket instrument called a Van Veen Grab. These samples will then be sent to an independent environmental consultancy for analysis to establish a baseline of environmental data. This comprises analysing sediment composition and determining the composition and abundance of benthic species in the sediment. Data collected during the acoustic survey can be used to map important features such as reefs that may be present in the area. 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.

### 1.3.10 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. The decision-making authority (DMRE) must take cognisance of this recommendation to do a strategic level Environmental Impact Assessment (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 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. 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.

### 1.3.11 No-go option

Both positive and negative impacts are 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 2-1). Cumulative impacts are summarised in Table 2-2, while the no-go option assessments are presented in Table 2-3 (negative impacts ) and Table 2-4 (positive impacts). 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 2-1. Potential impacts associated with prospecting in Concession area 14C, as identified during the Basic Assessment Process, before and after mitigation.**

| POTENTIAL IMPACT | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|
| **IMPACTS ON MARINE AND FISHERIES RESOURCES** | | | | | |

| POTENTIAL IMPACT | | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|---|
| **Impact 1** | Underwater noise disturbance to invertebrates | Very low | Possible | **INSIGNIFICANT** | -ve | Medium |
| | **No mitigation** | | | | | |
| **Impact 2** | Underwater noise disturbance to fish | Very low | Possible | **INSIGNIFICANT** | -ve | Medium |
| | **No mitigation** | | | | | |
| **Impact 3** | Underwater noise disturbance to marine mammals | Medium | Probable | **MEDIUM** | -ve | Medium |
| | With mitigation | Low | Improbable | **VERY LOW** | -ve | Medium |
| **Impact 4** | Underwater noise disturbance to seabirds | Low | Probable | **LOW** | -ve | High |
| | With mitigation | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| **Impact 5** | Underwater noise disturbance to turtles | Very low | Improbable | **INSIGNIFICANT** | -ve | High |
| | With mitigation | Very low | Improbable | **INSIGNIFICANT** | -ve | High |
| **Impact 6** | Marine megafauna collisions with survey vessels | Low | Possible | **VERY LOW** | -ve | High |
| | With mitigation | Very low | Improbable | **INSIGNIFICANT** | -ve | High |
| **Impact 7** | Offshore based seabed sampling and tailings disposal | Low | Definite | **LOW** | -ve | High |
| | **No mitigation** | | | | | |
| **Impact 8** | Fine sediment plumes | Very low | Definite | **VERY LOW** | -ve | High |
| | **No mitigation** | | | | | |
| **Impact 9** | Waste discharges during vessel operations | Very low | Probable | **VERY LOW** | -ve | High |
| | With mitigation | Very low | Improbable | **INSIGNIFICANT** | -ve | High |
| **Impact 10** | Impact on fisheries | Very Low | Probable | **VERY LOW** | -ve | High |
| | With mitigation | Very Low | Possible | **INSIGNIFICANT** | -ve | High |
| **MARINE HERITAGE RESOURCES IMPACTS** | | | | | | |
| **Impact 11** | Cultural heritage and artefacts | Medium | Improbable | **LOW** | -ve | Medium |
| | With Mitigation | Medium | Improbable | **LOW** | +ve | Medium |
| **Impact 12** | Impacts on Maritime Heritage - shipwrecks DEFINITELY present | Low | Definite | **LOW** | -ve | High |

| POTENTIAL IMPACT | | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|---|
| | With Mitigation | Low | Definite | **LOW** | +ve | High |
| **Impact 13** | Impacts on Maritime Heritage - shipwrecks POSSIBLY present | Low | Possible | **VERY LOW** | -ve | Medium |
| | With mitigation | Low | Possible | **VERY LOW** | +ve | Medium |
| **Impact 14** | Impacts on Maritime Heritage - shipwrecks IMPROBABLE to be present with NO heritage significance | Low | Improbable | **VERY LOW** | -ve | Medium |
| | With mitigation | Low | Improbable | **VERY LOW** | +ve | Medium |
| **Impact 15** | Impacts on Maritime Heritage - shipwrecks IMPROBABLE to be present with LOW heritage significance | Low | Improbable | **VERY LOW** | -ve | Medium |
| | With mitigation | Low | Improbable | **VERY LOW** | +ve | Medium |
| **Impact 16** | Impacts on Maritime Heritage - shipwrecks IMPROBABLE to be present with MEDIUM heritage significance | Medium | Improbable | **LOW** | -ve | Medium |
| | With mitigation | Medium | Improbable | **LOW** | +ve | Medium |
| **Impact 17** | Impacts on Maritime Heritage - shipwrecks IMPROBABLE to be present with HIGH heritage significance | High | Improbable | **MEDIUM** | -ve | Medium |
| | With mitigation | High | Improbable | **MEDIUM** | +ve | Medium |
| **SOCIO-ECONOMIC IMPACTS** | | | | | | |
| **Impact 18** | Impacts on Tuna pole and linefisheries | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| | With mitigation | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| **Impact 19** | Impacts on Traditional linefish Sector | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| | **No mitigation** | | | | | |
| **Impact 20** | Impacts on Small Pelagic Purse Seine Fisheries | Very Low | Probable | **VERY LOW** | -ve | High |
| | With mitigation | Very Low | Possible | **INSIGNIFICANT** | -ve | High |
| **Impact 21** | Local households | Low | Improbable | **VERY LOW** | -ve | High |
| | **No mitigation** | | | | | |

| POTENTIAL IMPACT | | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|---|
| **Impact 22** | Local tourism and businesses | Very Low | Probable | **VERY LOW** | -ve | Medium |
| | With mitigation | Very Low | Improbable | **INSIGNIFICANT** | -ve | Medium |
| **Impact 23** | Sense of place, health and wellbeing | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| | **No mitigation** | | | | | |
| **Impact 24** | Local crime | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| | **No mitigation** | | | | | |
| **Impact 25** | Local and regional socio-economic performance | Very Low | Possible | **INSIGNIFICANT** | +ve | Medium |
| | **No mitigation** | | | | | |
| **LESS SIGNIFICANT IMPACTS** | | | | | | |
| **Impact 26** | Impacts on palaeontological resources | Low | Possible | **VERY LOW** | -ve | Low |
| | With mitigation | Low | Possible | **VERY LOW** | +ve | Low |
| **Impact 27** | Noise impacts associated with prospecting | Low | Possible | **INSIGNIFICANT** | -ve | High |
| | **No mitigation** | | | | | |
| **Impact 28** | Impacts associated with prospecting radioactive material | Medium | Improbable | **LOW** | -ve | Low |
| | With mitigation | Very Low | Possible | **INSIGNIFICANT** | -ve | High |
| **Impact 29** | Potential interference with commercial shipping traffic | Very Low | Possible | **INSIGNIFICANT** | -ve | Low |
| | **No mitigation** | | | | | |
| **Impact 30** | Impacts on the visual integrity of the area. | Very Low | Possible | **INSIGNIFICANT** | -ve | Medium |
| | **No mitigation** | | | | | |
| **Impact 31** | Impacts on Science | Low | Definite | **LOW** | +ve | High |
| | **No mitigation** | | | | | |

**Table 2-2. 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 | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|
| **IMPACTS ON MARINE AND FISHERIES RESOURCES** | | | | | |
| **Impact 1**: Underwater noise disturbance to invertebrates | Medium | Possible | **LOW** | -ve | LOW |
| **Impact 2:** Underwater noise disturbance to fish | Medium | Possible | **LOW** | -ve | Low |
| **Impact 3:** Underwater noise disturbance to marine mammals | High | Improbable | **MEDIUM** | -ve | Low |
| **Impact 4:** Underwater noise disturbance to seabirds | High | Improbable | **MEDIUM** | -ve | Low |
| **Impact 5:** Underwater noise disturbance to turtles | Medium | Improbable | **LOW** | -ve | Low |
| **Marine 6:** megafauna collisions with survey vessels | Medium | Possible | **LOW** | -ve | Low |
| **Impact 7:** Offshore based seabed sampling and tailings disposal | Medium | Possible | **LOW** | -ve | Low |
| **Impact 8:** Fine sediment plumes | Very low | Definite | **VERY LOW** | -ve | Low |
| **Impact 9:** Waste discharge during vessel operations | Low | Improbable | **VERY LOW** | -ve | Low |
| **Impact 10:** Impact on fisheries | Low | Probable | **LOW** | -ve | Low |
| **SOCIO-ECONOMIC IMPACTS** | | | | | |
| **Impact 18:** Impacts on Tuna pole and linefisheries | Medium | Possible | **LOW** | -ve | Low |
| **Impact 19:** Impacts on Traditional linefish Sector | Medium | Improbable | **LOW** | -ve | Low |
| **Impact 20:** Impacts on Small Pelagic Purse Seine Fisheries | Medium | Probable | **MEDIUM** | -ve | Low |
| **Impact 21:** Local households | High | Probable | **HIGH** | -ve | Low |
| **Impact 22:** Local tourism and businesses | Medium | Possible | **LOW** | -ve | Low |
| **Impact 23:** Sense of place, health and wellbeing | Medium | Improbable | **LOW** | -ve | Low |
| **Impact 24:** Local crime | Medium | Improbable | **LOW** | -ve | Low |
| **Impact 25:** Local and regional socio-economic performance | High | Possible | **MEDIUM** | +ve | Low |
| **LESS SIGNIFICANT IMPACTS** | | | | | |
| **Impact 26:** Impacts on palaeontological resources | Medium | Probable | **MEDIUM** | +ve | Low |
| **Impact 27:** Noise impacts associated with prospecting | Low | Possible | **VERY LOW** | -ve | Low |
| **Impact 28:** Impacts associated with prospecting radioactive material | Medium | Possible | **LOW** | -ve | Low |
| **Impact 29:** Potential interference with commercial shipping traffic | Medium | Probable | **MEDIUM** | -ve | Low |
| **Impact 30:** Impacts on the visual integrity of the area. | Medium | Probable | **MEDIUM** | -ve | Low |
| **Impact 31:** Impacts on Science | Medium | Definite | **MEDIUM** | +ve | Low |

**Table 2-3. 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 |
| **Mitigation measures:** No essential or potential mitigation measures. | | | | | | | | |

**Table 2-4. 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 |
| **Mitigation measures:** No essential or potential mitigation measures. | | | | | | | | |

## 1.5 Potential mitigation measures

### 1.5.1 Marine ecology

**Essential mitigation measures for impacts to marine megafauna**

- 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.
    - 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.
- 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, including any attraction of predatory seabirds and incidents of 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).
- 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.
- 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.
- 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 current 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.

**Best Practice Mitigation (Recommended) for impacts related to spills and waste generated by vessels:**

- Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats.
- Inform & empower all staff 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.
- 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 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;
    - 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.

**Best Practice Mitigation (Recommended):**

- Appoint a fisheries liaison officer (FLO) 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.
- 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 (e.g., communal vegetable garden and opening of the jetty restaurant in Doringbaai).
- Prospecting activities should be restricted during important tourism events and seasons (i.e., during the perlemoen festival, the school holidays and summer months).
- 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**

- Areas where shipwreck sites are identified during the geophysical surveys must be excluded prior to undertaking sampling activities.

- 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.
- 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.

**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 Cumulative impacts on the environment and community

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 Recommendation

The EAP recommends that Environmental Authorisation for prospecting rights within sea Concession area 14C 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 strongly 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 extends the period granted for conducting Basic Assessment and Environmental Impact Assessment Processes as the time granted has proved to be insufficient to adequately consult with the community, conduct specialist studies and assess potential impacts of prospecting.

## 1.7 Application process and timeline

**Phase 1: Lodge Application**

A prospecting rights and environmental authorisation application were lodged with the DMRE. These applications were accepted by the DMRE on 21 February 2022. The DMRE informed Anchor about the acceptance of the application on 24 February 2022.

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

Notices were sent out to stakeholders on 3 and 4 March 2022 to inform them that the application for prospecting rights and environmental authorisation in Concession Area 14C 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 from 4 March to 17 March 2022.

A pre-consultation meeting was held at Doringbaai on 11 March 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).

**Phase 3: Circulate Draft BAR & Official Public Participation Period**

The Draft Basic Assessment Report (BAR) was made available on our website (https://anchorenvironmental.co.za/) and at the Doringbaai, Ebenhaeser and Lutzville Libraries and the Strandfontein West Coast Information Centre for 30 days during the Public Participation Period which extended from **Monday 11 April 2022 to 23:59 on Wednesday 18 May 2022. w**

**Phase 4: Public Participation Meeting**

Public meetings were held in **Cape Town, Doringbaai** and **Ebenhaeser.** During these meetings, members of Anchor (the EAP) and Trans Atlantic Diamonds (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 5: 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 30 May 2022.

**Phase 6: 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 14C.

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:** | WC30/5/1/1/2/10405PR |

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

## 3.1 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

## 4.1 Details of the EAP

| Name of The Practitioner | Dr Barry Clark |
|---|---|
| **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:** | barry@anchorenvironmental.co.za/ info@anchorenvironmental.co.za |

### 4.1.1 Expertise of the EAP

Barry Clark holds a doctoral degree (Ph.D.) in Marine Biology, a Honours degree in Marine Biology, and a Bachelor of Science degree in Zoology and Ocean & Atmosphere Science. Dr Clark is also a SACNASP registered scientist and a Research Associate at the University of Cape Town. Qualifications and registrations will be included as appendices to this report. See Appendix 1 for more details. The CVs of the additional contributing consultants are also included as part of Appendix 1.

### 4.1.2 Summary of the EAP's past experience

(In carrying out the Environmental Impact Assessment Procedure). Dr Barry Clark has thirty years' experience in marine biological research and consulting on coastal zone and marine issues. He has worked as a scientific researcher, lecturer and consultant and has experience in tropical, subtropical and temperate ecosystems. He is presently Director of an Environmental Consultancy firm (Anchor Environmental Consultants) and Research Associate at the University of Cape Town. As a consultant has been concerned primarily with conservation planning, monitoring and assessment of human impacts on estuarine, rocky shore, sandy beach, mangrove, and coral reef ecosystems as well as coastal and littoral zone processes, aquaculture and fisheries. Dr Clark is the author of 27 scientific publications in class A scientific journals as well as numerous scientific reports and popular articles in the free press. Geographically, his main area of expertise is southern Africa (South Africa, Lesotho, Namibia, Mozambique, Tanzania, Seychelles, Mauritius and Angola), but he also has working experience from elsewhere in Africa (Republic of Congo, Sierra Leone, Liberia, Cote d'Ivoire, Ghana, Nigeria), the Middle East (UAE) and Europe (Azerbaijan, Greenland).

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# 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 Department of Mineral Resources and Energy (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.

Trans Atlantic Diamonds (Pty) Ltd (The Applicant) is 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. Should prospecting reveal an economically viable resource and Environmental Authorisation following an application for a mining right be granted, all diamonds mined in the 14C 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.

Trans Atlantic Diamonds (Pty) Ltd has applied for the right to prospect diamonds, gemstones, heavy and industrial minerals, as well as ferrous, base and precious metals in sea Concession Area 14C. This is an offshore concession area that extends from just north of Doringbaai (northern boundary) to just north of Donkinsbaai (southern boundary). The area is situated 9 km south of Strandfontein and 21 km north of the Lamberts Bay (Figure 6.2). The inshore boundary (closest to the shore) of this concession area starts approximately 5 km (2.7 nautical miles) west of the high-water mark at a water depth of 70 m (70 m isobath). Concession Area 14C extends 100 km westwards from this point to 200 m water depth (200 m isobath) (Figure 2.1 and Figure 2.2).

The prospecting activity triggers a number of 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), 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 Anchor Environmental Consultants (Pty) Ltd (Anchor) as the independent Environmental Assessment Practitioner 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 rights and environmental authorisation application were lodged with the DMRE. These applications were accepted by the DMRE on 21 February 2022. The DMRE informed Anchor about the acceptance of the application on 24 February 2022.

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

Notices were sent out to stakeholders on 3 and 4 March 2022 to inform them that the application for prospecting rights and environmental authorisation in Concession Area 14C 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 from 4 March to 17 March 2022.

A pre-consultation meeting was held at Doringbaai on 11 March 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).

**Phase 3: Circulate Draft BAR & Official Public Participation Period**

The Draft Basic Assessment Report (BAR) was made available on our website (https://anchorenvironmental.co.za/) and at the Doringbaai, Ebenhaeser and Lutzville Libraries and the Strandfontein West Coast Information Centre for 30 days during the Public Participation Period which extended from **Monday 11 April 2022 to 23:59 on Wednesday 18 May 2022. w**

**Phase 4: Public Participation Meeting**

Public meetings were held in **Cape Town, Doringbaai** and **Ebenhaeser.** During these meetings, members of Anchor (the EAP) and Trans Atlantic Diamonds (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 5: 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 30 May 2022.

**Phase 6: 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 14C

## 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 14C. 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 Environmental Management Programme (EMPr) updated.
- Due to the paucity of bathymetry data for this concession area, the exact location of the grab, core and drill samples are yet to be determined, pending the results of the acoustic surveys.
- It is assumed that the project description and activities will not change after the completion of this report.

# 6 DESCRIPTION OF THE PROPOSED ACTIVITY

## 6.1 Location and details of the overall Activity.

| **Farm Name:** | **Sea Concession Area 14C** |
|---|---|
| **Application area (Ha):** | 106 001 ha |
| **Magisterial district:** | Vanrhynsdorp |
| **Distance and direction from nearest town**: | This is an offshore sea concession area. The inshore boundary (boundary closest to the shore) is situated in the ocean 5 km west of Doringbaai. The Northern boundary extends from just north of Doringbaai and the southern boundary to just north of Donkinsbaai. The area is situated 9 km south of Strandfontein and 21 km north of the Lamberts Bay. |
| **21-digit Surveyor General Code for each farm portion:** | N/A |

## 6.2 Locality map

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

The application area, Concession 14C, is an area of sea covering 106 001 ha offshore of the Western Cape coast of South Africa (Figure 6.1, Figure 6.2, Figure 6.3). It extends from just north of Doringbaai (northern boundary) to just north of Donkinsbaai (southern boundary). The area is situated 9 km south of Strandfontein and 21 km north of the Lamberts Bay (Figure 2.1). The inshore boundary (closest to the shore) of this concession area starts 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 extends 100 km westwards from this point to 200 m water depth (200 m isobath).

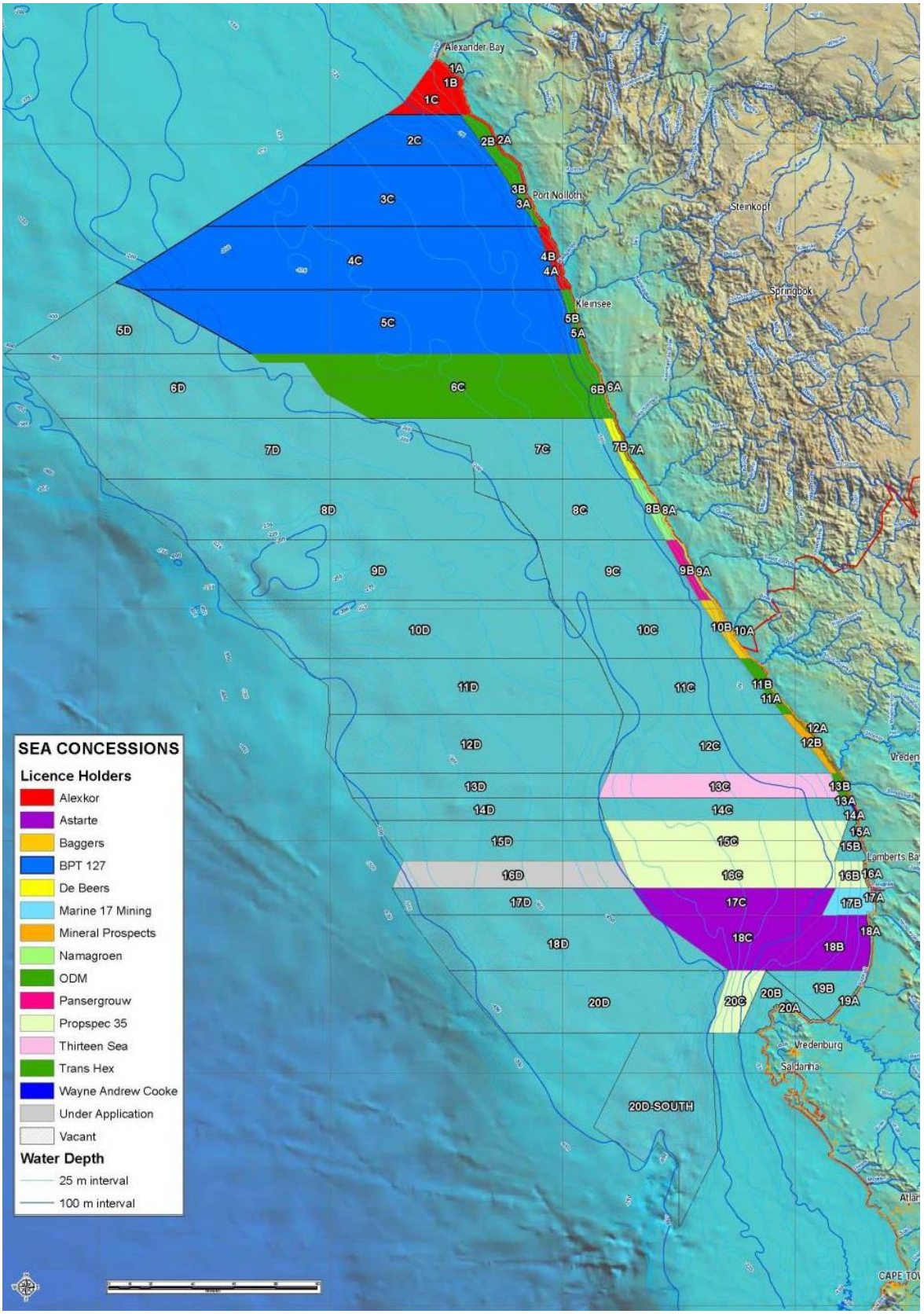



**Figure 6.1.** **The offshore diamond mining lease areas in South African waters. The coastal shelf waters have been divided into 20 contiguous, parallel strips which have been further subdivided into the onshore and offshore concession areas (A, B, C, D).**

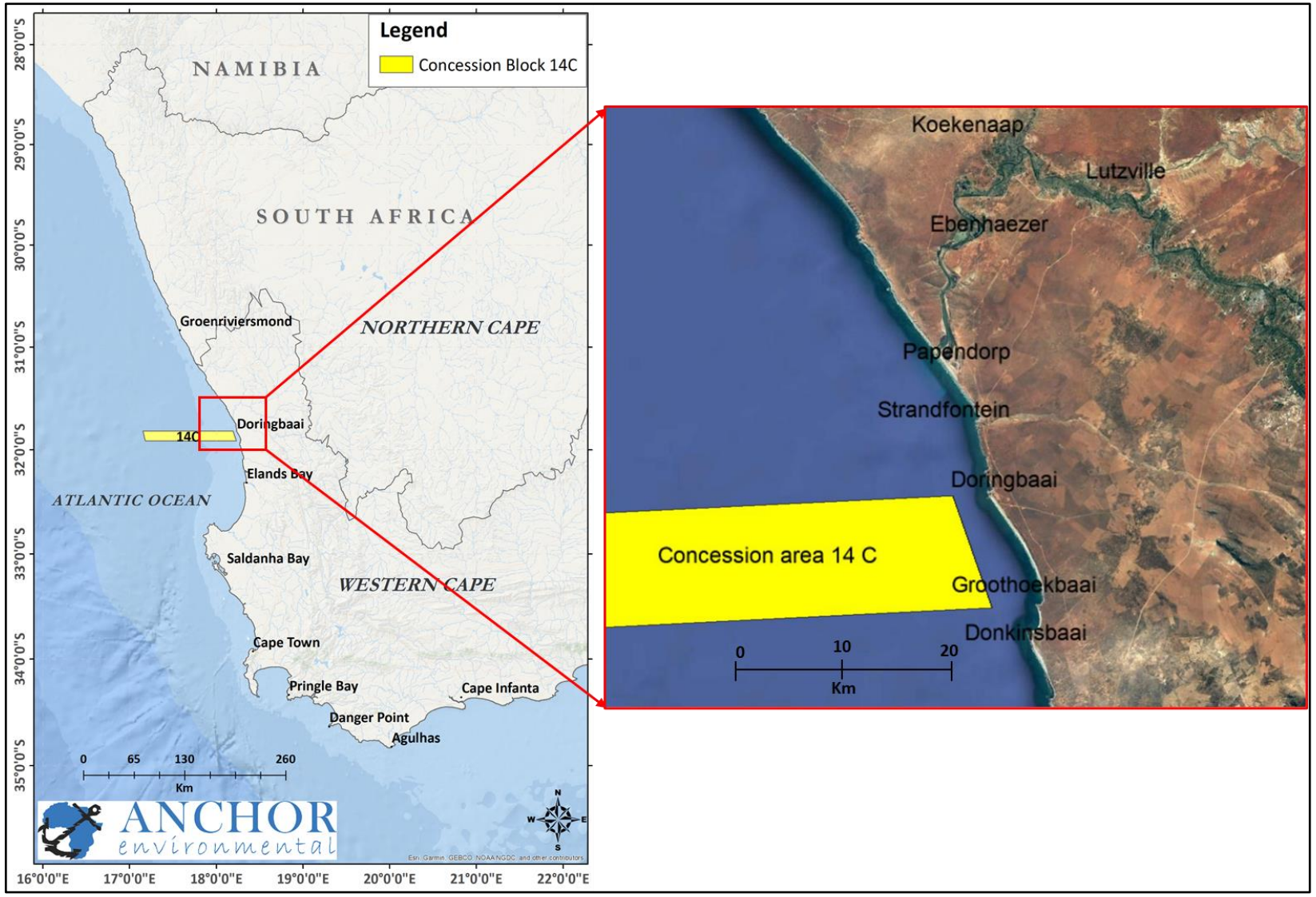
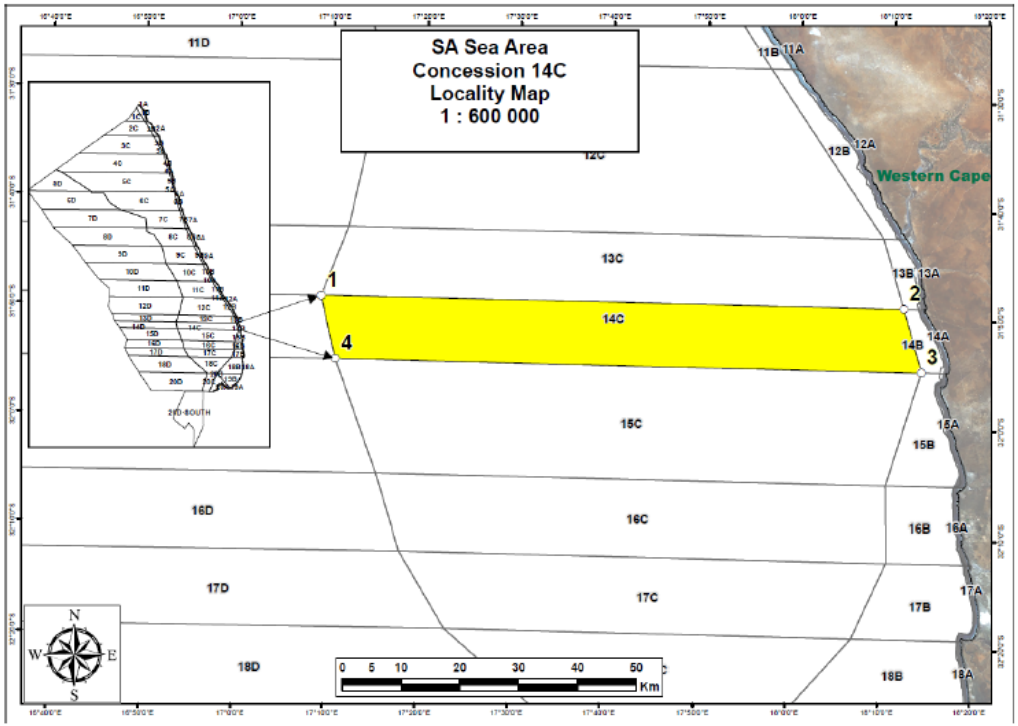



**Figure 6.2.** **Location of the concession area 14C off the Western Cape Coast. The concession starts 5 km offshore of the High-Water Mark and extends to the 200 m isobath which is approximately 100 km offshore.**




**PLAN AS REFERRED TO IN REGULATION 2.2 IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (28 OF 2002). IN SUPPORT OF AN APPLICATION FOR A PROSPECTING RIGHT IN SOUTH AFRICAN SEA CONCESSION 14C**

**WESTERN CAPE PROVINCE**
DESCRIPTION OF SEA AREA UNDER APPLICATION FOR PROSPECTING RIGHT

THE SOUTH AFRICAN SEA AREA 14 (C)
REPRESENTS THE AREA OF SEA IN EXTENT
106 001 HECTARES

**Concession 14C**

| Boundary Points | Easting | Northing | Latitude | Longitude |
|---|---|---|---|---|
| 1 | 703609,25 | 6477900,50 | 31.81638721 | 17.15111150 |
| 2 | 802375,31 | 6475451,00 | 31.81655636 | 18.19416646 |
| 3 | 805372,38 | 6464680,00 | 31.91277949 | 18.22916785 |
| 4 | 705998,13 | 6467161,00 | 31.91277985 | 17.17861154 |

Name of Applicant:

Trans Atlantic Diamonds (Pty) Ltd

Signature of Applicant

Name (Print): Anthony Peter

Date: 14 December 2021

Plan Approved:

Regional Manager
WESTERN CAPE PROVINCE
Department of Minerals and Energy

Date:

**Figure 6.3. Site Plan of concession area 14C 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

Trans Atlantic Diamonds (Pty) Ltd is proposing to prospect within Sea Concession Area 14C 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 6.4) or the Explorer (Figure 6.5).


**Figure 6.4. The DP STAR, an example of a vessel that could potentially be used for prospecting and exploration.**


**Figure 6.5. The EXPLORER, an example of a vessel that could potentially be used vessel for prospecting and exploration.**

## 6.4 Listed and specified activities

| **NAME OF ACTIVITY**<br>(E.g. For prospecting – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc<br>E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc. | **Aerial extent of the Activity Ha or m²** | **LISTED ACTIVITY Mark with an X where applicable or affected.** | **APPLICABLE LISTING NOTICE 1, 2 and 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. | 106 001 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 | 106 001 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 106 001 ha | X | GNR 544, as amended by GN327, Activity 20. |

| **NAME OF ACTIVITY**<br>(E.g. For prospecting – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc<br>E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc. | **Aerial extent of the Activity Ha or m²** | **LISTED ACTIVITY Mark with an X where applicable or affected.** | **APPLICABLE LISTING NOTICE 1, 2 and 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 106 001 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:<br>1. Step 1: A total of 150 samples will be collected.<br>2. Step2: Follow-up sampling will require an additional 150 samples.<br>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 7500$m^2$ (or 0.75 ha) is estimated to be disturbed across the entire concession area of 106 001 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…*".<br>Activity 20 as indicated above. |
| Desktop study and literature review | 106 001 ha | | No listed activity triggered |
| Data acquisition and synthesis | 106 001 ha | | No listed activity triggered |

| **NAME OF ACTIVITY**<br>(E.g. For prospecting – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc<br>E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc. | **Aerial extent of the Activity Ha or m²** | **LISTED ACTIVITY Mark with an X where applicable or affected.** | **APPLICABLE LISTING NOTICE 1, 2 and 3 (*GNR 544, GNR 545 or GNR 546)*** |
|---|---|---|---|
| Geological modelling | 106 001 ha | | No listed activity triggered |
| Feasibility study and resource estimation | 106 001 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. Trans Atlantic Diamonds (Pty) Ltd 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 14C (Table 6-1).

Note that the natural maximum values 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 6-1. 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)<br>• Gemstones (alluvial diamonds, sapphires and garnets),<br>• Ferrous and base metals:<br>  ○ rare earths (monasite mineral)<br>  ○ black sand minerals (titanium minerals e.g., ilmenite and rutile)<br>  ○ zirconium ore (zircon)<br>  ○ iron ore (magnetite) |
| **Locality** | This is an offshore sea concession area. The inshore boundary (boundary closest to the shore) is situated in the ocean 5 km west of Doringbaai. The Northern boundary extends from just north of Doringbaai and the southern boundary to just north of Donkinsbaai. The area is situated 9 km south of Strandfontein and 21 km north of the Lamberts Bay. |
| **Extent of the area required for prospecting** | 106 001 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. 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, 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 of these 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. It is anticipated to be completed within five (5) years. Sampling will be conducted in four phases and include a combination of non-invasive and invasive activities (Table 6-2 and Table 6-3) 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 6.6).

**Table 6-2. Non-invasive and invasive sampling activities planned during prospecting in Concession Area 14C.**

| 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 6-3. 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 |

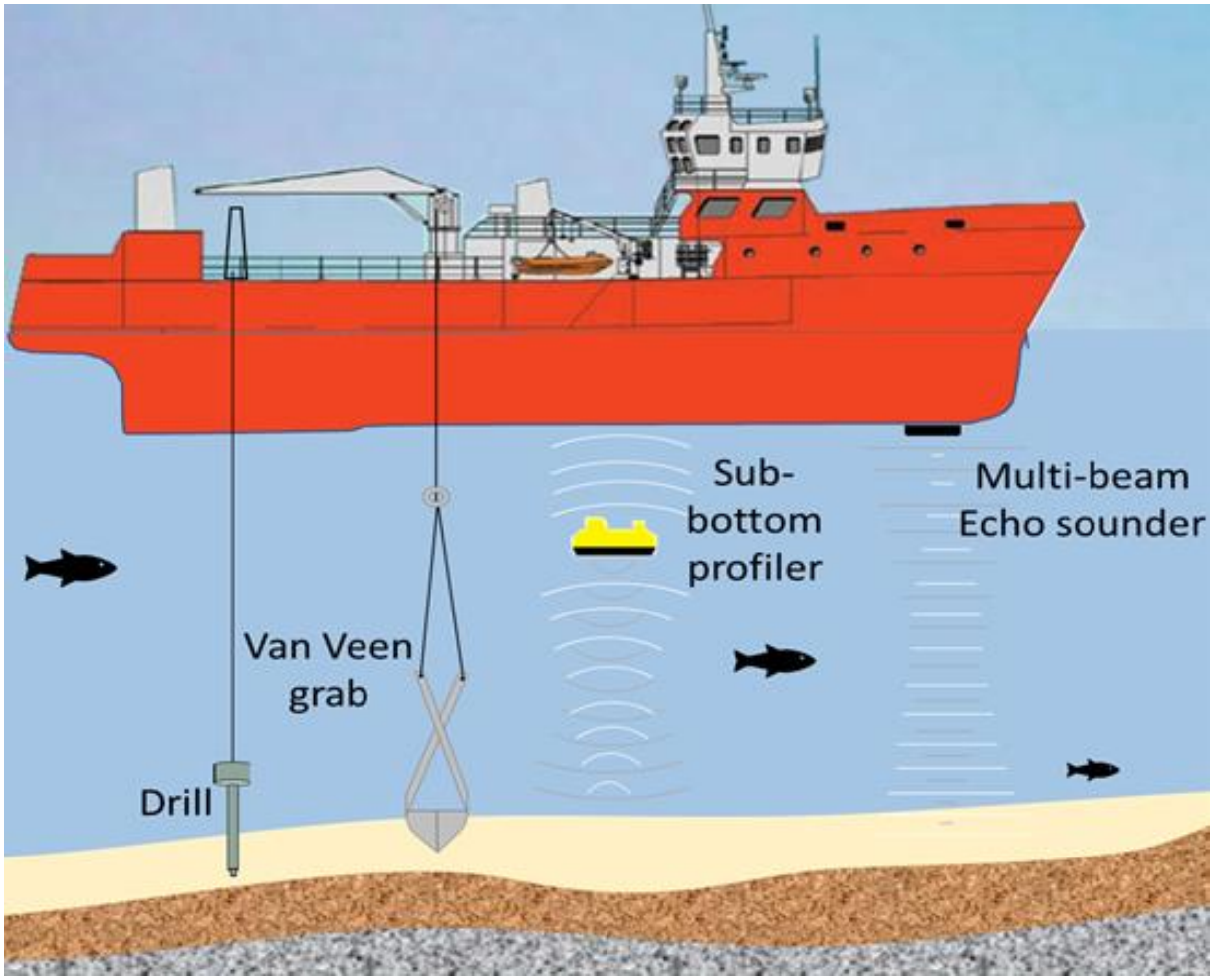



**Figure 6.6. Illustration of some of the various sampling methods that will be used.**

### *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 6.4) or the

Explorer (Figure 6.5). 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 6.7). 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 6.7. 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. The survey speed of the DP Star is typically 120 km/day in an offshore area such as the C-concession area. This would equate to approximately five day's work. It has been proposed that survey work will be conducted over a one-week window period during suitable calm sea and weather conditions (probably late summer-autumn 2022). The bathymetry of 14C 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. Three potential methods of collecting geophysical samples from the seabed are being considered.

#### *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 6.8). 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. The grab samples will disturb a total surface area of 5 square meters ($m^2$) while the total volume of samples that will be collected will be 1.5 cubic meters ($m^3$). 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).

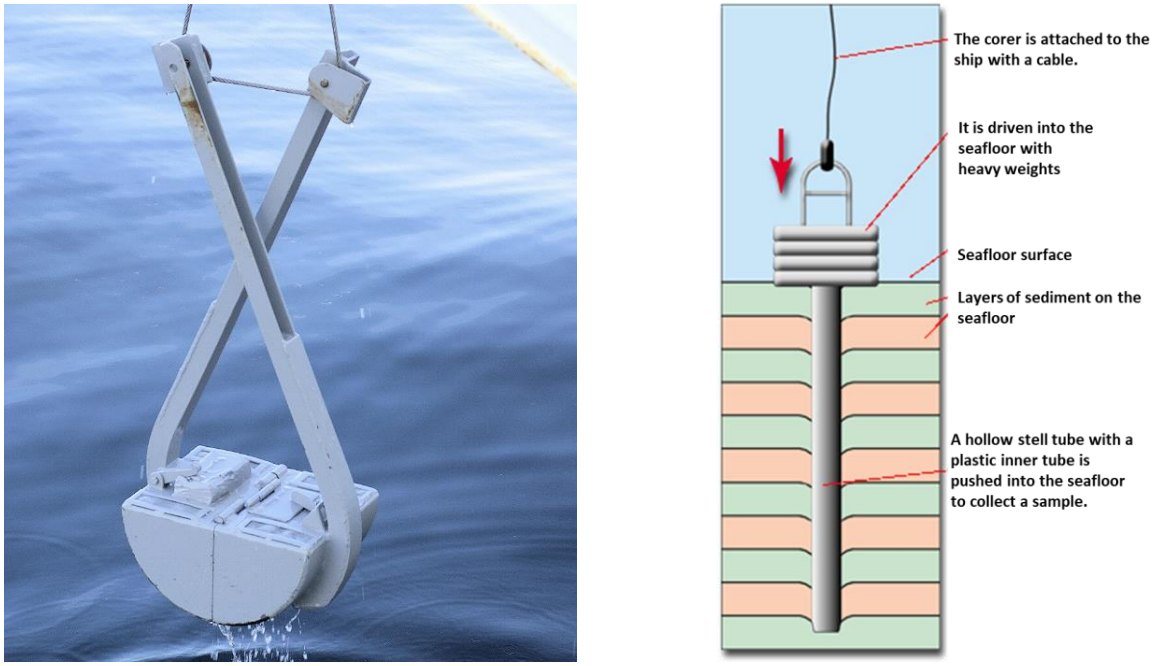



**Figure 6.8. (Left) A Van Veen grab works like a claw to grab sediment containing macrofauna from the seafloor. (Right) Example of a corer. Source: British Ocean Sediment Core Research Facility.**

***Coring***

Geotechnical samples will be collected at 100–200 sites using a special type of equipment called a core (Figure 6.8). 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 3–8 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 sampling of 200 cores will take approximately ten workdays. Sampling work will be restricted between the western boundary of the concession and not shallower than 20 m water depth. 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 $m^3$.

### *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 6.9). 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. 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 7.1 x $10^{-8}$ % or 0.000007 % of the total area of Concession area 14C that will be disturbed. 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 14C will be economically viable. Information will also be used to inform the construction of the mining vessel and to identify areas for mining.

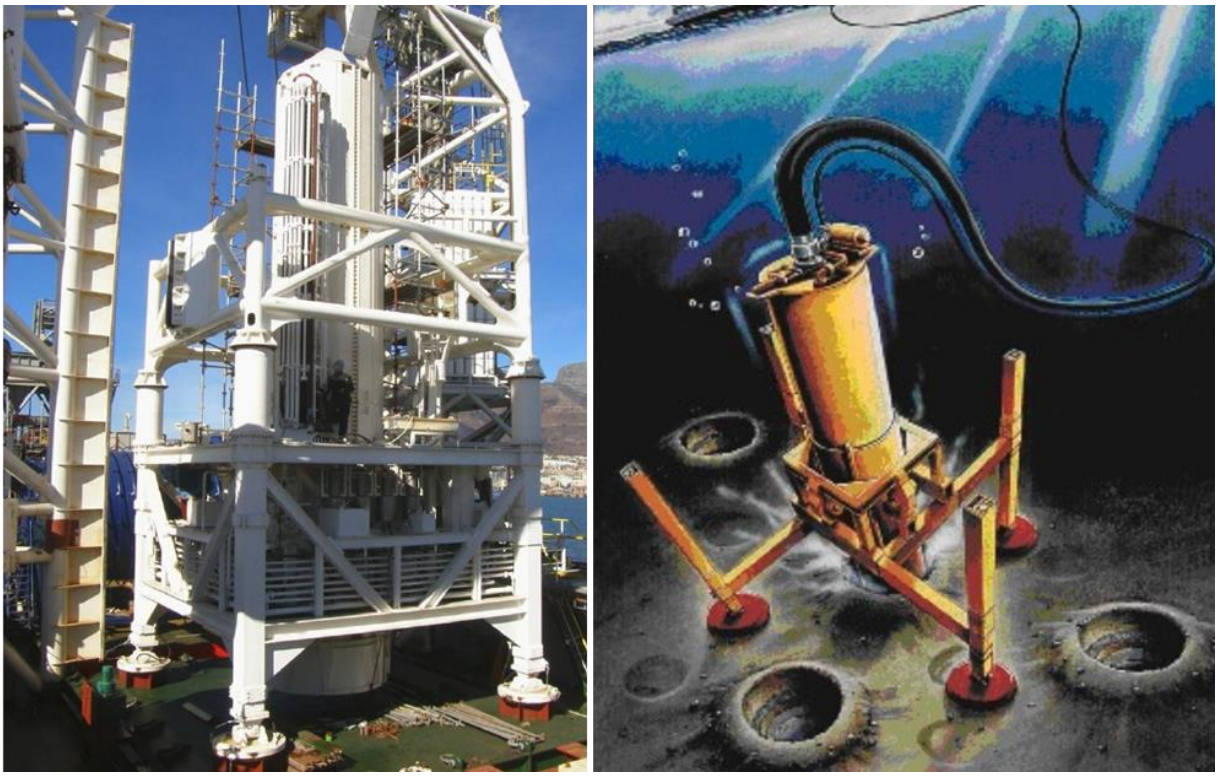


**Figure 6.9. A sampling drill tool onboard The Explorer with a drill bit footprint 5m² (left) and an artists impression of a smaller sampling drill tool with a drill bit footprint of 3m².**

#### *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 6-4. The most important legislation applicable to prospecting in Concession Area 14C.**

| 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.**<br><br>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.**<br><br>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).**<br><br>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.<br><br>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.**<br><br>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<br><br>The aim of this act is to:<br>• 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;<br>• 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**<br><br>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**<br><br>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**<br><br>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**<br><br>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.<br><br>Activities that typically require water use licenses are abstraction of water from dams or boreholes for irrigation, forestry operations, discharging waste water 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**<br><br>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<br><br>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**<br><br>*"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)**<br><br>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 14C 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**<br>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.**<br>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.**<br>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)**<br>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)**<br><br>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**<br><br>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)**<br><br>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<br><br>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**<br><br>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).<br><br>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)**<br><br>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 14C 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 for the overall preferred site, activities and technology alternative.

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. 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.

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 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.

### 6.8.2 Full description of the process followed to reach the proposed preferred alternatives within the site.

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

The National Web based Environmental Screening Tool was used to identify any areas of conservation that would need to be avoided (see Appendix 2). The SANBI BGIS database was consulted to review the Ecosystem Threat Status and to identify Marine protected Areas and Ecologically and Biologically Significant Areas in the area. GIS layers were extracted and overlaid on a map of Concession 14C in ArcGIS. This enabled the identification of areas of conservation concern that needs to be avoided (Figure 6.10 and Figure 6.11).

In addition to the areas of conservation concern that will be avoided, geophysical surveying will be undertaken along survey lines spaced 1000 m to 100 m apart throughout the concession area. This will be conducted over a period of suitable, calm sea and weather conditions (the survey speed of the DP Star is typically 120 km/day in an offshore). Furthermore, 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. No infrastructure will be placed on shore or in the sea.

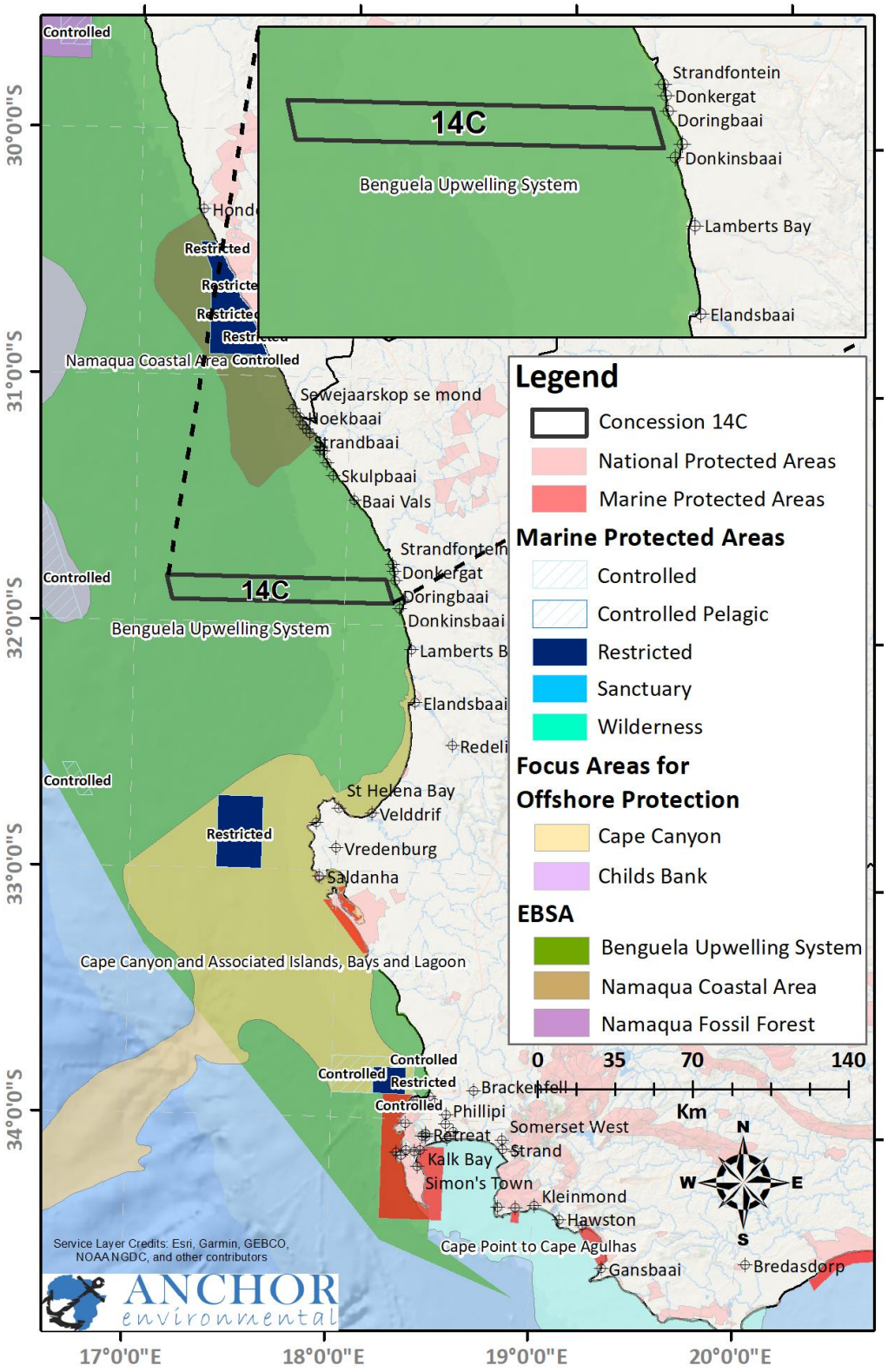



**Figure 6.10.** **Marine protected Areas (dark blue), proposed EBSA's and the location of concession area 14C. Source: https://bgis.sanbi.org/.**

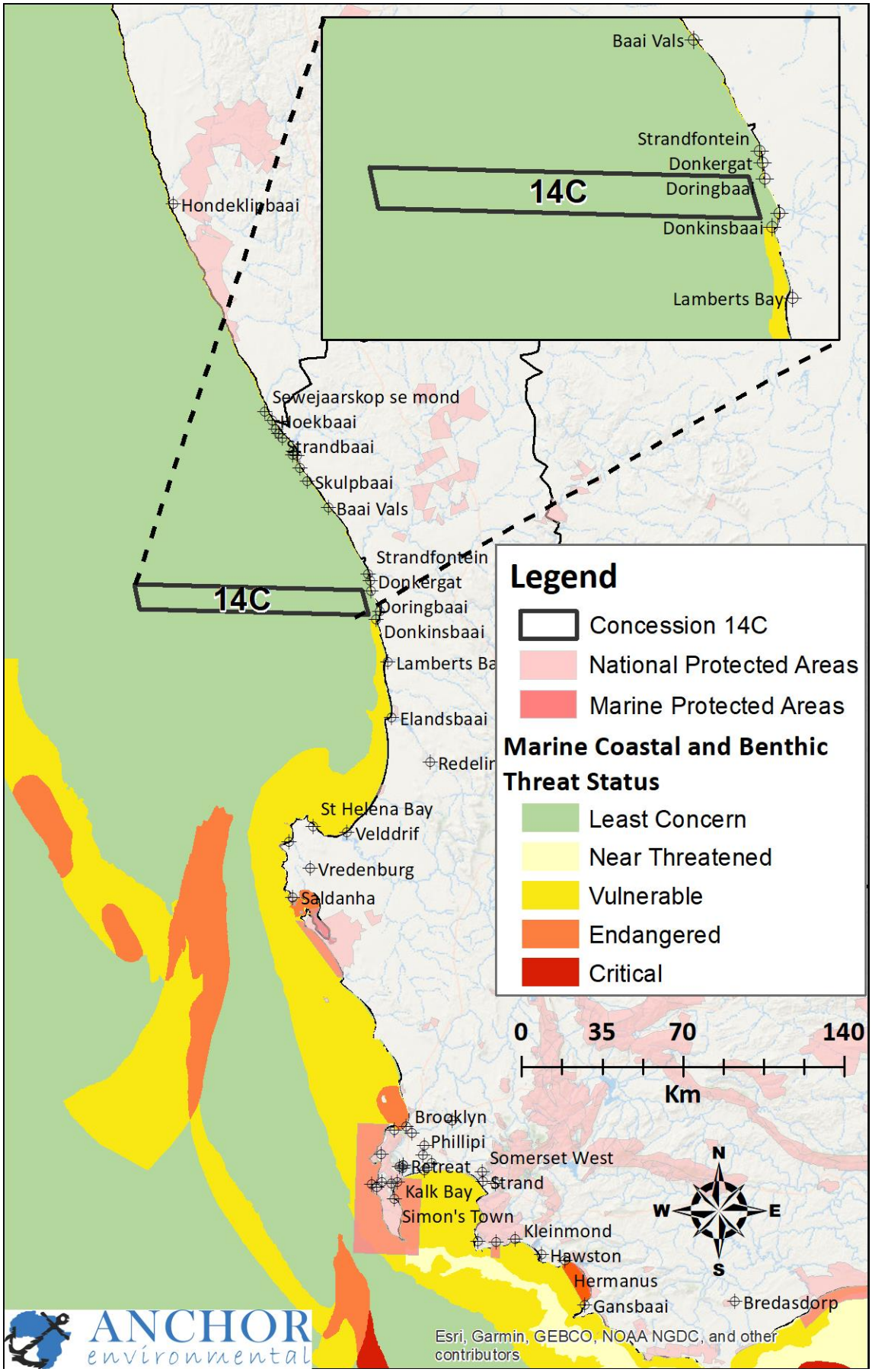



**Figure 6.11. SANBI Ecosystem Threat Status and location of concession area 14C. Source: https://bgis.sanbi.org/**

### 6.8.3 Details of the development footprint alternatives considered.

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

(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**

Prospecting and mining activities are only permitted within the specially designated concession areas along the west coast. In addition to this, only a limited number of these concession areas are available. As such, a limited number of alternative sites for prospecting and mining activities area available.

Results from prospecting and mining operations conducted within the neighbouring concession areas have indicated that the area is rich in mineral deposits. The study area is therefore expected to have similar resources. As the intention of the proposed prospecting activity is to determine the presence of diamondiferous, gemstone, mineral and metal deposits, and to ensure that they are present in quantities that will be economically viable to mine, it is important that a site known to be rich in resources, is selected. As such, few alternatives in terms of location exist. The preferred site has been identified as an area where palaeo-beach deposits are known to occur, and these are known from other concession areas to contain diamondiferous gravels.

It is important to note that the exact location of the core and drill sites will only be confirmed after the completion of the acoustic surveys. Buffers will be applied around reef areas and areas of conservation concern. The final site layout plan is thus subject to change.

**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. This will include core and drill samples with a footprint of less than 5 $m^2$ per sample.

**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, i.e. geophysical surveys and drilling are the primary methods used for mineral prospecting and will facilitate the discovery and estimation of natural mineral resources with the sea concession area. These activities will include invasive and non-invasive methods such as geophysical surveys, drilling and baseline biological sampling outlined in Section 6.5 above. These methods are thus the preferred activities and cannot be replaced by other methods.

Several types of core and drill tools do exist. Equipment with a small physical footprint has been selected. 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 7.1 x $10^{-6}$ % or 0.000007% of the total area of the concession area.

**e) the operational aspects of the activity**

There is some flexibility in terms of when, where and how the sampling and surveying will be carried out. This will be informed by the specialist studies, consultation with interested and affected parties (I&APs) and the acoustic surveys. For example, every effort will be made to avoid sampling and prospecting in marine protected areas or important conservation areas and also areas that are important for fisheries, particularly small-scale commercial fisheries. 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.

The preferred timing for this project is to undertake geophysical and sampling surveys over a period of 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. 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).

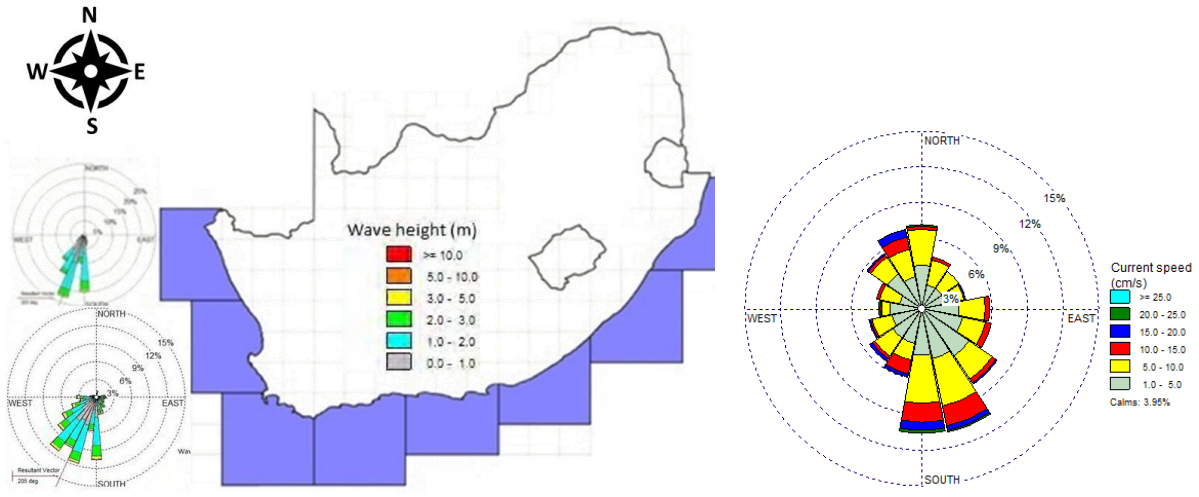



**Figure 7.1.** **(Left) Wave roses showing the frequency of significant wave heights and direction on the West Coast (Source: SADCO Voluntary Observing Ships data). (Right) Current rose showing current direction and strength data at -12 m water depth inshore of concession area 14C. (Source: Laird and Clark 2018).**

### 7.1.2 Biogeography

Concession Area 14C 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 7.2).

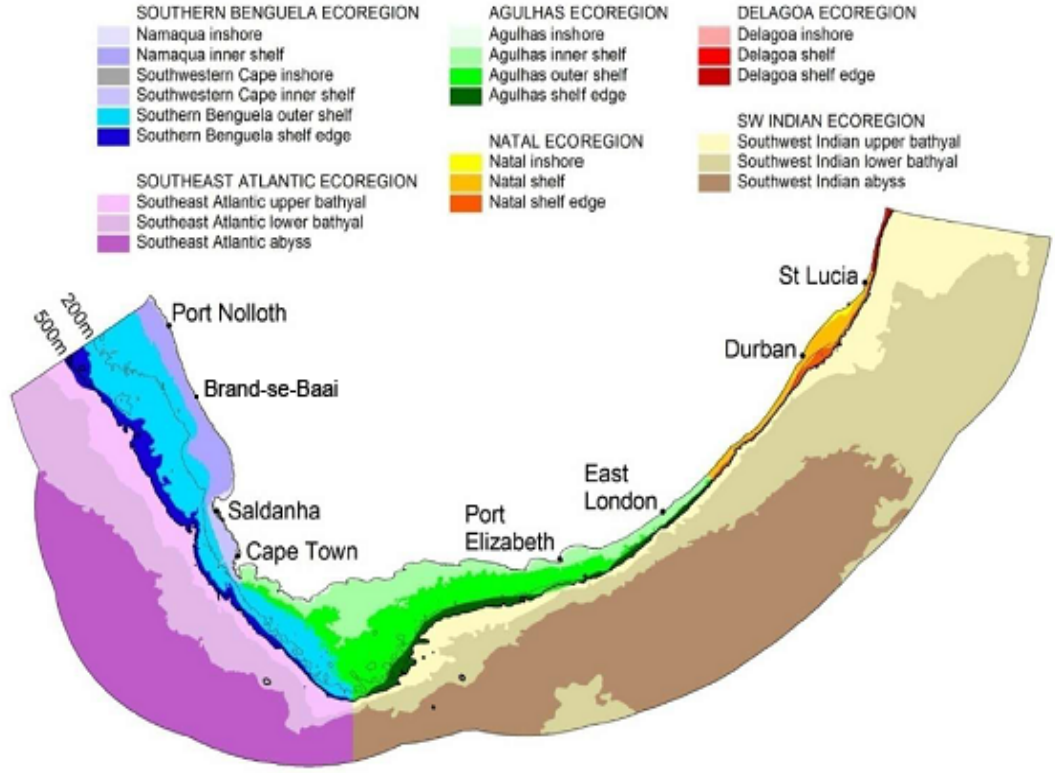



**Figure 7.2. Six marine ecoregions with 22 ecozones incorporating biogeographic and depth divisions in the South African marine environment as defined by Sink *et al.* (2012).**

### 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 the 14C Concession Area. These include sandy benthic habitat, offshore 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 14C) 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 14C 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 (Van Veen grab 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 14C lies within what is mostly classified as sandy inner shelf habitat interspersed

with rocky outcrops (Figure 7.3). 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).

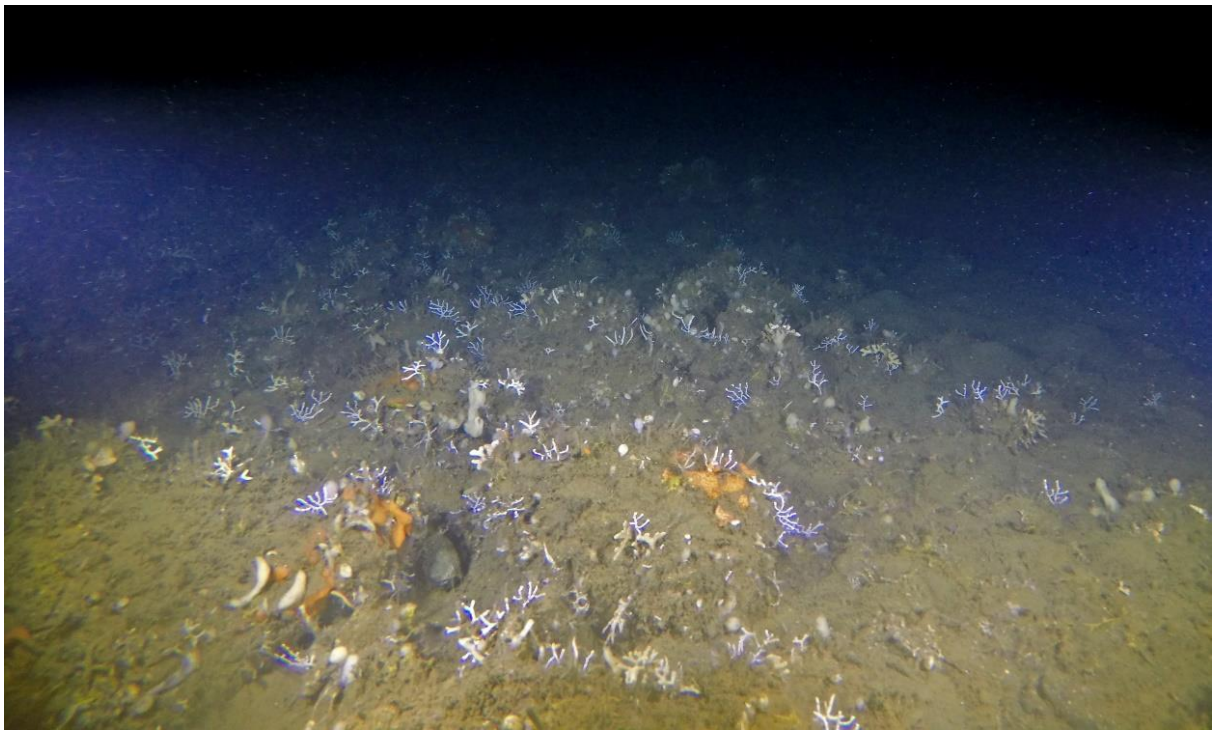


**Figure 7.3. A typical hard-bottom inner shelf benthic habitat off the west coast of South Africa consisting of both epifauna and infauna. Source: Anchor Environmental.**

These offshore reefs within Concession area 14C 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 14C 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 14C (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 14C, 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 |

| Common name | Species name | Global IUCN Status |
|---|---|---|
| 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 14C. 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 in 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 14C.

**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 thought to 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 14C 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 |

| Marine Mammal hearing group (Southall *et al.* 2019) | Species | Shelf/Offshore | Likely encounter frequency in 14C and seasonality in parentheses | IUCN Conservation status |
|---|---|---|---|---|
| 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 |
| | *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 |

| Marine Mammal hearing group (Southall *et al.* 2019) | Species | Shelf/Offshore | Likely encounter frequency in 14C and seasonality in parentheses | IUCN Conservation status |
|---|---|---|---|---|
| | *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 |

## 7.2 Socio-economic and cultural character

The proposed prospecting activity would take place in the offshore marine environment at least 5km offshore by a survey vessel operating out of the Port of Cape Town or possibly Saldanha Bay. As a result, the local terrestrial socio-economic and cultural environment would not be affected, and residents would probably not even be aware of any prospecting activities underway. It is described here for regional context and the socio-economic characteristics of maritime users who may be affected by the proposed prospecting is described in Section 7.5. The cultural and socio-economic environment is largely dependent upon the regional, local and immediate communities present in the area. The proposed prospecting/survey activity falls within the regional West Coast District Municipality (WCDM) and local Matzikama Municipality. The nearest coastal towns include Doringbaai, Strandfontein and Papendorp, while the nearest inland towns are Ebenhaeser, Lutzville and Koekenaap.

The West Coast has a very rich cultural, heritage and history, with many of the towns being over a century old. The West Coast and local towns are also very popular tourist destinations, being renowned for their beaches, wildlife, hiking trails, whale watching locations, 4x4 routes and variety of holiday accommodations. The level of education in these towns are relatively low.

## 7.3 Regional Study Area

### 7.3.1 West Coast District Municipality

The West Coast District Municipality extends over an area of 31 099 km$^2$ and includes five local municipalities (Matzikama, Cederberg, Bergrivier, Saldanha Bay, and Swartland). It supports a total population of 464 056 inhabitants in 122 074 households (WCDM 2021). The population is 50.3% female and 49.7% male, with three predominant population groups: Coloured (66.58%), Black African

(16.36%), and White (15.71%) communities. Most of the populations' first language is Afrikaans (83.67%), followed by IsiXhosa (8.58%), English (3.98%) and other indigenous languages (IsiNdebele, Sesotho, and Setswana). The WCDM population dependency ratio is quite high (45.9%) with 68% in the working age group (15–64), followed by the young (25%, 0–14) and the elderly group (7%, 65+), which puts significant strain on the workforce, social systems and the delivery of basic services. Level of education is relatively low (79.1%) compared to the Western Cape (87.2%) and South Africa as a whole (80.9%). In 2019, the WCDM experienced a loss of 389 jobs, which is expected to have a significant impact on the economy should this trend continue. In 2018, the agriculture, forestry and fishing sector were the primary source of employment, creating 70 060 jobs and contributing towards 38.1% of the total employment.

### 7.3.2 Matzikama municipality

The Matzikama Municipality is situated on the north-west coast of the Western Cape and borders the Northern Cape Province, the Atlantic Ocean on the west, and the Western Cape (Cederberg Municipality) in the south (WCDM 2021). The municipality consist of 18 towns, with three coastal settlements (Doringbaai, Papendorp and Strandfontein) and several small inland towns (Ebenhaeser, Lutzville and Koekenaap) which serves as agriculture service centres (MM 2019; WCGPT 2018). The area is defined by an arid environment with a natural irrigation system sustained by the Olifants River. This irrigation system comprises 237 km of canals and is essential to the surrounding towns as it supplies them with water for domestic, industrial and agricultural use (DWS 2019). The river and in particular the estuary are important fishing grounds for many subsistence fisherman. Vredendal is the largest town and supports the majority of economic activities (WCGPT 2018). The agriculture sector (viniculture) followed by the forestry and fishing sector were the largest contributors towards the municipal GDP and employment in 2018 (Mayson et al. 2020; MM 2019). It is estimated that the Matzikama municipality experienced a large decline of 2.5% in its annual GDP growth rate in 2019 due to the COVID-19 pandemic (MM 2020; IDP 2021/22; WCDM 2021). Should this pandemic continue, it is expected to lead to a further decline in municipal revenue, employment and the local economy (IDP 2021/22).

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. Economic growth trends are vital for guiding investment opportunities and job creation for certain industries. Investing into sectors that have not shown any growth over the last years should be considered as this could facilitate greater growth and employment opportunities in these sectors. The Matzikama Municipality contributed approximately 14% to the West Coast District Municipality GDP (~R4 billion) and employed about 15.8% of the WCDMs labour force. The three largest sectors that contribute to the municipality's GDP are agriculture, forestry and fishing (24.5%), wholesale and retail trade, catering and accommodation (16.3%) and manufacturing (13.6%). Sectors that contributed least to the primary, secondary and tertiary sectors of the WCDMs GDP (and should be considered for investment) include mining and quarrying (4.8%), construction (4.9%), and finance, insurance, real estate, and business services (9.6%).

#### *7.3.2.1 Doringbaai*

Doringbaai (31.81 S, 18.2388 E) is a small west coast fishing village situated approximately 50 km from Vredendal. It has a population of 1 700, consisting of 303 households (Table 4 1). The primary language is Afrikaans (96,4%), with some English, IsiNdebele, IsiXhosa and IsiZulu speaking inhabitants. Most of the population is of Coloured descent (90.2%), followed by Black African (2.7%), Indian/Asian (0.1%), White (6.9%) and other (0.2%).

The level of education in Doringbaai is relatively low with 4.4% of the adult population having a higher education, 18.6% being educated to matric level, 2.7% having no schooling, while the remaining population has some schooling. The low levels of education result in an underdeveloped skilled labour workforce and is reflected in the low average household income which falls within three ranges: no income (10.2%), R1-R9 600 (9%) and R9 601-R76 400 (57%) per annum. Similar average household income is observed in neighbouring coastal communities such as Strandfontein and Lamberts Bay. In addition, the dependency ratio (the number of dependents aged zero to 14 and over the age of 65) in an area such as Doringbaai is high and has shown to lead to increased levels of poverty (Vijayakumar 2013).

The Doringbaai local economy has been characterised as vulnerable after the closing of the Oceana factory in 2006. The local community is heavily constrained by economic opportunities which has been exacerbated due to the declining fishing industry (Mayson et al. 2020; DGES 2013). The decrease in living standards has further been aggravated by expensive transport and limited access to employment opportunities and formal education outside of Doringbaai (DGES 2013). The community currently receives financial support from several sources including government grants, from family member outside of Doringbaai, small-scale fishing activities, and home-based businesses (DGES 2013). The development of sectors such as the aquaculture, agriculture and tourism industry could potentially improve economic growth in Doringbaai and the WCDM (WCDM 2021) and decrease unemployment rate (Meyer et al. 2020; MM 2016/17).

#### *7.3.2.2 Papendorp & Ebenhaeser*

Papendorp (31.6984° S, 18.2116° E) is a small coastal fishing settlement while Ebenhaeser (31.6292° S, 18.2615° E) is a smaller inland and mostly agricultural town. Both settlements are fall within Ward 2 of the Matzikama Municipality and are located along the Olifants River Estuary. These towns support very few economic activities other than farming, fishing in the Olifants River and Estuary and other subsistence related activities. The unemployment rate in Ward 2 is over 50% with more than 500 people being on the low-cost housing waiting list. Very little information exists on these settlements, but the IDP suggests that if the housing and buildings are upgraded, it could be marketed as a tourist destination.

### 7.3.3 Cederberg Local Municipality

The Cederberg Local Municipality is approximately 200 km from Cape Town. It is considered the least populated in the WCDM with a population of 59 382 people and 16 488 households. Approximately 86.2% of inhabitants have access to formal housing and 8.4% to informal housing, which is the second

highest in the district. Access to basic services such as water, toilets and electricity are also above the district averages. The local municipality has the lowest unemployment rate across the WCDM. The agriculture, forestry, and fishing sector contributes the largest percentage of formal (42.5%) and informal employment opportunities (33.6%) within the Cederberg Municipal region (42.5%).

#### *7.3.3.1 Lamberts Bay*

Lamberts Bay is situated about 280 km north of Cape Town. It is a small fishing town and considered "the diamond of the west coast", because of its pristine white beaches and wildlife. This town is home to about 6 120 people with a large proportion of the population designated as coloured (74.52%) with the remainder classified as White (15.89%), Black African (8.97%) and Other (0.37%). Just over a quarter of the population is employed (28.3%), while a similar proportion is considered economically inactive (26.63%). The rate of unemployment (7.87%) and discouraged work-seekers (1.95%) are relatively low. Lamberts Bay has many subsistence fishers and an active recreational and commercial West coast rock lobster fisheries. The harbour hosts a finite number of small fishing vessels where activities are centred around the line-fishing, west coast rock lobster, hake and pelagic fishing sector.

## 7.4 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 with at least 2,500 shipwrecks reported since the 1500s. 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.

### 7.4.1 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 (The Nautical Magazine and Naval Chronicle 1855: 297-303; Ingpen 1979). The West Coast, known for its dangerous currents, coastal fogs and a rocky shoreline, has claimed many vessels over the years. However, shipwrecks are a difficult cultural resource to pin to a specific area and the Underwater Heritage Impact Assessment (UHIA) therefore covered a broader area than the designated area.

### 7.4.2 Maritime History in Concession area 14C

In Sea Concession 14C there may be 44 shipwrecks, dating from the 1500s through to modern times (Figure 7.4). The Shipwreck Database uses several conventions to assess the impact of projects on heritage resources. The one used for the purpose of this study is "Certainty of prediction":

- Definite: More than 90% sure of a particular fact. Substantial supportive data to verify assessment.
- Probable: More than 70% sure of a particular fact, or of the likelihood of that impact occurring.
- Possible: More than 40% sure of a particular fact, or of the likelihood of an impact occurring.
- Unlikely: Less than 40% sure of a particular fact, or the likelihood of an impact occurring.

According to the shipwreck databases (see Appendix 4), there is DEFINITELY one modern wreck, within the area, i.e., the MV Oceana Sapphire (Table 7-4). This could be verified after the geophysical survey. Five modern wrecks were reported as being lost near the concession and could POSSIBLY be within Sea Concession 14C (Table 7-5). The remaining 38 shipwrecks are vessels that either disappeared between two ports or were abandoned mid-ocean, although they are UNLIKELY to be within the concession area. There is always the possibility of an early unknown wreck being found, as happened in Oranjemund when the Bom Jesus (1533) was discovered in 2008 during diamond mining operations (Alves 2011).

The significance of most of these wrecks are low or medium. There are, however, a few that may have a high significance factor. These include very old ships, war-time losses, and other vessels with a specific national or international significance. The eight that have been identified during the UHIA include *Abberkerk, Aegeus, Cabral Fleet, Columbine, Discovery, Honcoop / Hencoop, Nortun* and the *U-179*. 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.

At the time of writing this report, no geophysical data for the area was available. 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).

**Table 7-4. Shipwrecks definitely in 14C.**

| # | Name | Events | Nation | Date | History | Location | Significance |
|---|---|---|---|---|---|---|---|
| 1 | *MV Oceana Sapphire* | Sank | RSA | 2002-03 | This 22 m long fishing vessel of 99 tons was built by Swafil in Lüderitz, Namibia in 1973/4. It has a wooden hull.<br>  <br>Oceana Sapphire (SA Trawler Heritage) | 31 54.64S<br>17 30.77E<br>146 m depth<br>Coordinates van den Bosch | Low |

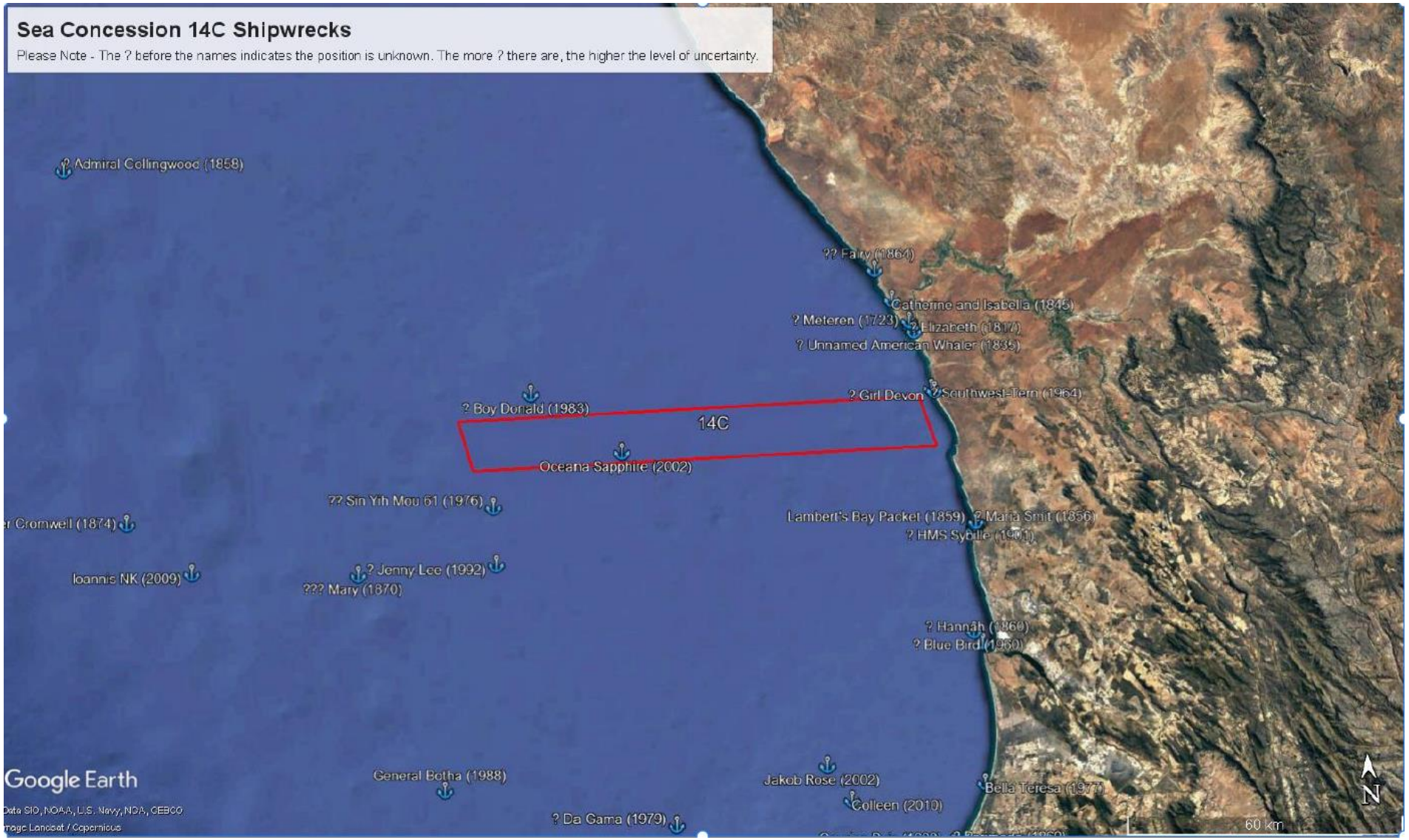



**Figure 7.4. Shipwrecks in and around Sea Concession 14C (Google Earth 2022; SLR 2018; Turner 1988; Levine 1989; van den Bosch 2009; SAHRIS 2017; Reocities 2017; Maitland 2022; u-boat.net 2017).**

**Table 7-5. Shipwrecks possibly in 14C.**

| # | Name | Events | Nation | Date | History | Location | Significance |
|---|---|---|---|---|---|---|---|
| 2 | *Boy Donald* | Sank | RSA | 1983-03-22 | This 20 m long fishing vessel was built in 1961 and owned by the Lamberts Bay Fishing Company. The boat was under Capt J. Hunter when it foundered. At least five of the crew were rescued. It sank rapidly and the search was concentrated in an area 55 miles northwest of Lamberts Bay. This vessel may be in the concession area. | Offshore | None |
| 3 | *Girl Devon* | Sank | RSA | 1971-01-14 | Under Capt. P. Muggel, this cutter sank near Doring Bay. | Near Doring Bay | None |
| 4 | *Ioannis NK* | Sank | Panama | 2009-07-23 | This bulk carrier, laden with sugar sank at the coordinates given. The crew were rescued by the South African Airforce. These coordinates are from the SAN charts and are likely correct. The wreck is to the west of the concession. | West of 14 C (32 05.60S 16 31.20E) | None |
| 5 | *Jenny-Lee* | | RSA | 1992-02-18 | This tuna fishing vessel under Capt F. da Luz was sunk after being swamped by a giant wave, approximately 52 NM west of Lamberts Bay. It may be in the concession area. | Offshore | None |
| 6 | *Southwest Tern* | Disabled, aground, broke up | Namibia / RSA | 1964-09-13 | Mr A.R. Shooter had recently purchased this vessel from South West Fishing Industries. This 14.5 m long rock lobster fishing boat was built in 1951, by F. Nieswandt of Lüderitz. The Southwest Tern (L-14) was on its way to Cape Town from Luderitz when it became disabled, the radio broke and the boat drifted for three days. She eventually grounded near a beach, 32 km north of Lamberts Bay, and broke up. All four crew members made it ashore safely. | East of 14 C Doring Bay | None |

### 7.4.3 Submerged Prehistory

In addition to shipwrecks, a much larger part of South Africa's cultural heritage encompasses pre-colonial history. The following description of the potential submerged prehistory in the vicinity of the concession area is drawn from previous reports and comments provided by John Gribble (Gribble 2021a and 2021b) and John Pether (Pether 2021b). Historically, large parts (as much as 80 000 km$^2$ in extent) of the continental shelf were exposed as dry land. The figure below (Figure 7.5) illustrates the possible extent of continental shelf exposure during the second to last glaciation (MIS 6).

This 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.

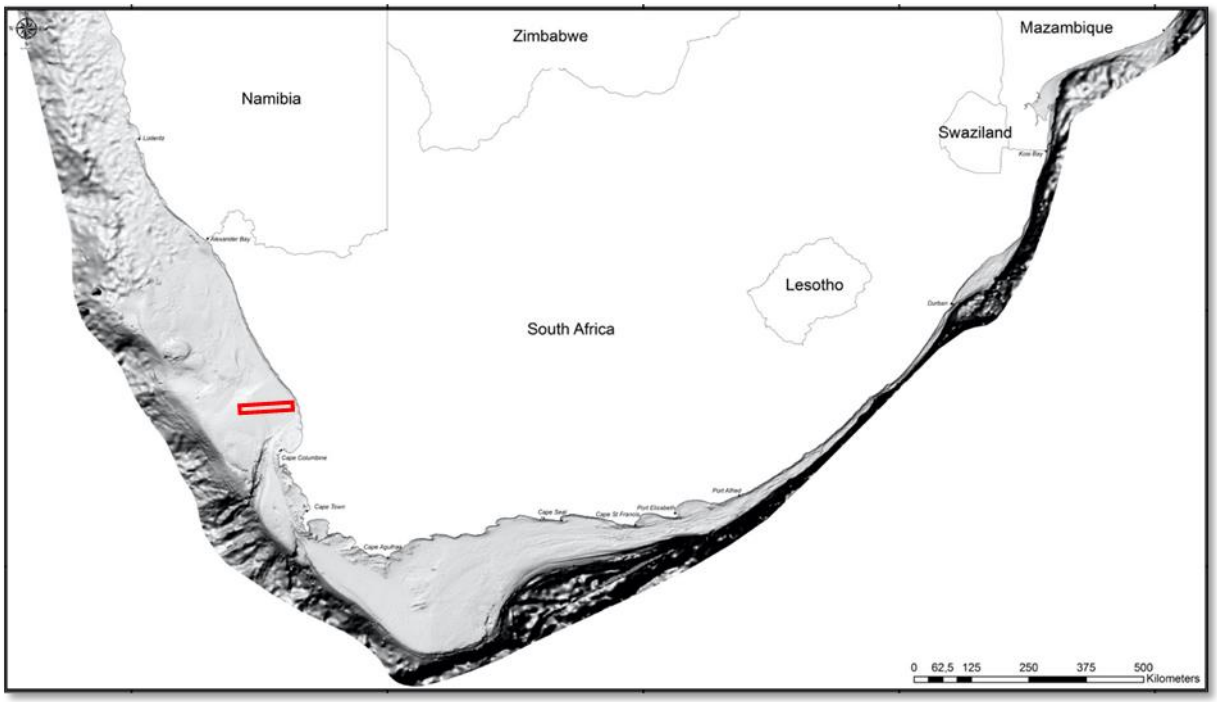



**Figure 7.5. Shaded relief map showing the entire extent of the South African continental shelf. The approximate location of Concession Area 14C is marked by the red box (After De Wet 2012:106).**

Since Concession 14C extends from about 70-200 m depth, only a part of the area could potentially hold such prehistoric evidence. 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.

## 7.5 Description of the current user groups of the sea area

The main users of the sea space in Concession 14C are the commercial shipping, diamond mining, oil and gas, marine research and fishing industries. No impacts are expected on marine research, the demersal trawl commercial fishing sector, the demersal hake longline commercial fishing sector, the large pelagic longline commercial fishing sector, the West Coast Rock Lobster fisheries (including commercial and interim relief nearshore), small scale fishers (including interim relief west coast rock lobster and linefish right holders), kelp harvesting or abalone aquaculture and ranching. Possible spatial overlap with the small pelagic, traditional linefish and tuna pole fisheries was, however, identified.

### 7.5.1 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*. This fishery has the largest catch volume for any of the South African fishery sectors and has the second largest annual catch value, estimated at around R2.164 billion in 2017, which is approximately one fifth of the combined value of South African Fisheries (Japp & Wilkinson 2021). At this time, the industry supported around 4 500 full time staff, 2 500 seasonal staff and more than 700 fishers. The support industries contribute an estimated further 2 400 jobs.

The small pelagic purse-seine fishery operates between the Orange River and East London mostly in nearshore waters (within 10 km of the coast). The 14C Concession Area does overlap with identified priority fishing areas for anchovy and with the sardine directed fishing ground (Figure 7.6) (Norman *et al.* 2018). Small pelagic fishing activity in the vicinity of 14C takes place in the late summer mainly during the months of February to July (SAPFIA pers. comm).

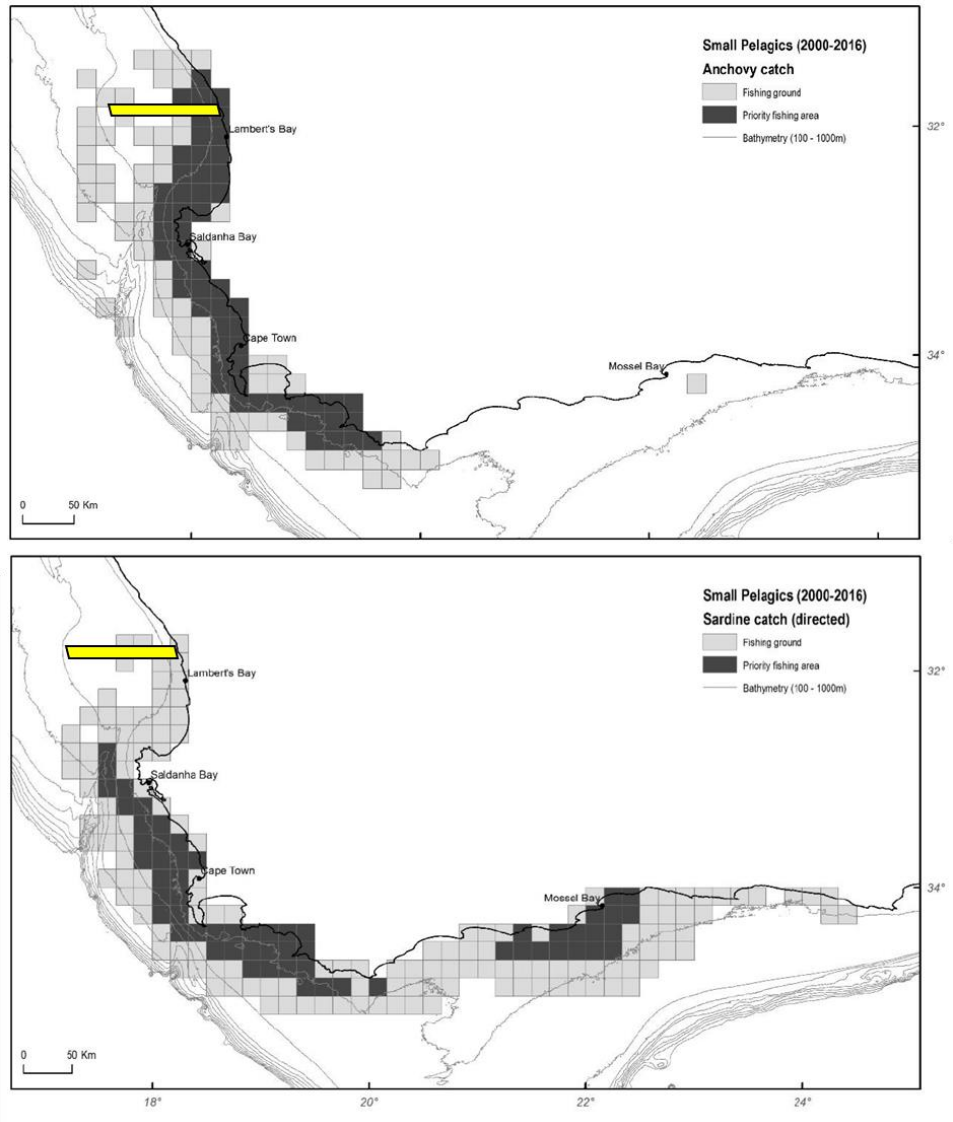



**Figure 7.6. Spatial distribution of anchovy (top) and sardine (bottom) purse seine catch (2000-2016) with identified priority fishing areas (Source: Norman *et al.* 2018).**

Commercial catch return data (all small pelagic species combined for the period 2006-2011) shows that Concession Area 14C partially overlaps with catch areas (Figure 7.7). The area of direct overlap will account for average annual catches of approximately 1 700 tonnes within concession 14C, equivalent to ~ 0.26 % of the average national total for this period (Figure 7.7). This is not considered a substantial proportion of the national catch, but potential impacts of prospecting within this important small pelagic fishing area may be significantly negative at the individual vessel or right holder level. However, the target species are pelagic, and their distribution is variable, so the fishery as a whole is unlikely to be significantly negatively affected by small temporary closures/exclusion zones around survey vessels and geotechnical survey sites.

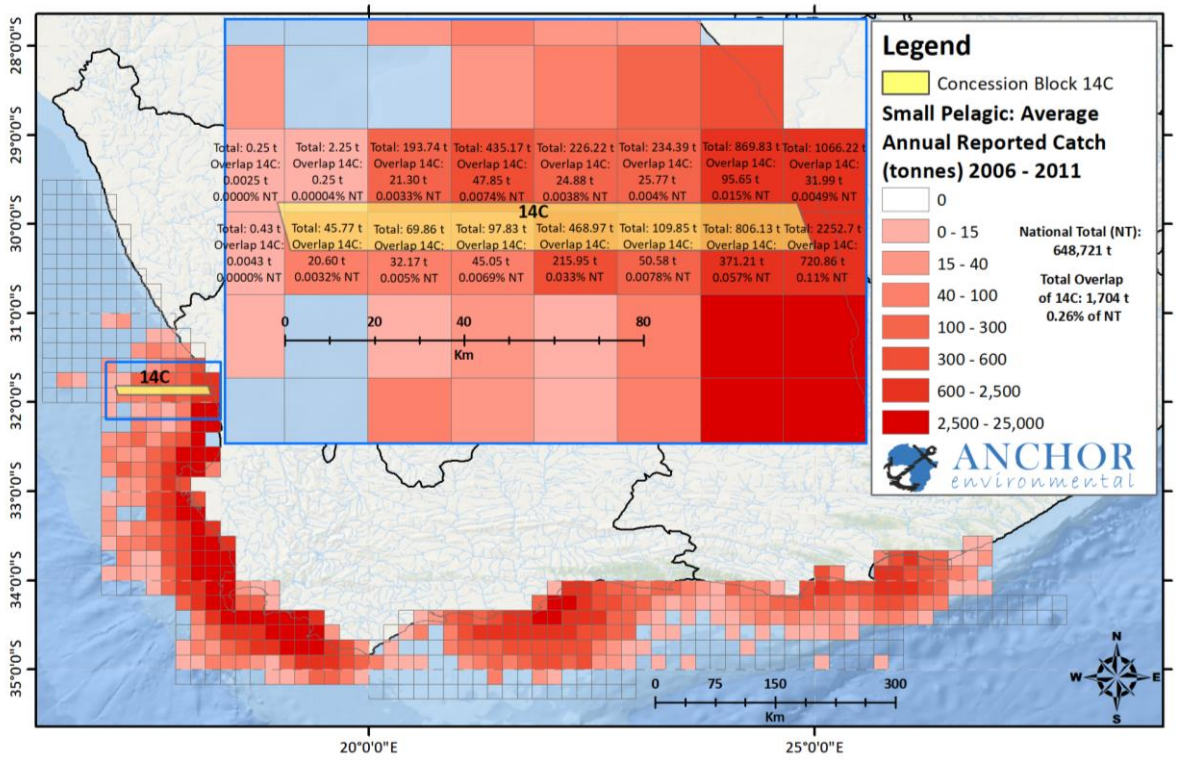



**Figure 7.7. Average annual reported small pelagic catch 2006-2011 (tonnes) and the calculated proportion of the average national total catch made within Concession Area 14C (Data source: DFFE).**

The 14C Concession Area does lie within an important west coast nursery ground that is utilised by several small pelagic fish species including sardine *Sardinops sagax*, horse mackerel *Trachurus capensis* and anchovy *Engraulis capensis* (Hutchings *et al.* 2002). The greatest abundance of juvenile small pelagic fish would be present in the West Coast nursery grounds from December to May (Hutchings et al 2002). The area around the 14C concession also overlaps with one of several areas of high juvenile anchovy abundance, with much of the west coast between St Helena Bay and Port Nolloth constituting the anchovy recruit habitat (Figure 7.8).

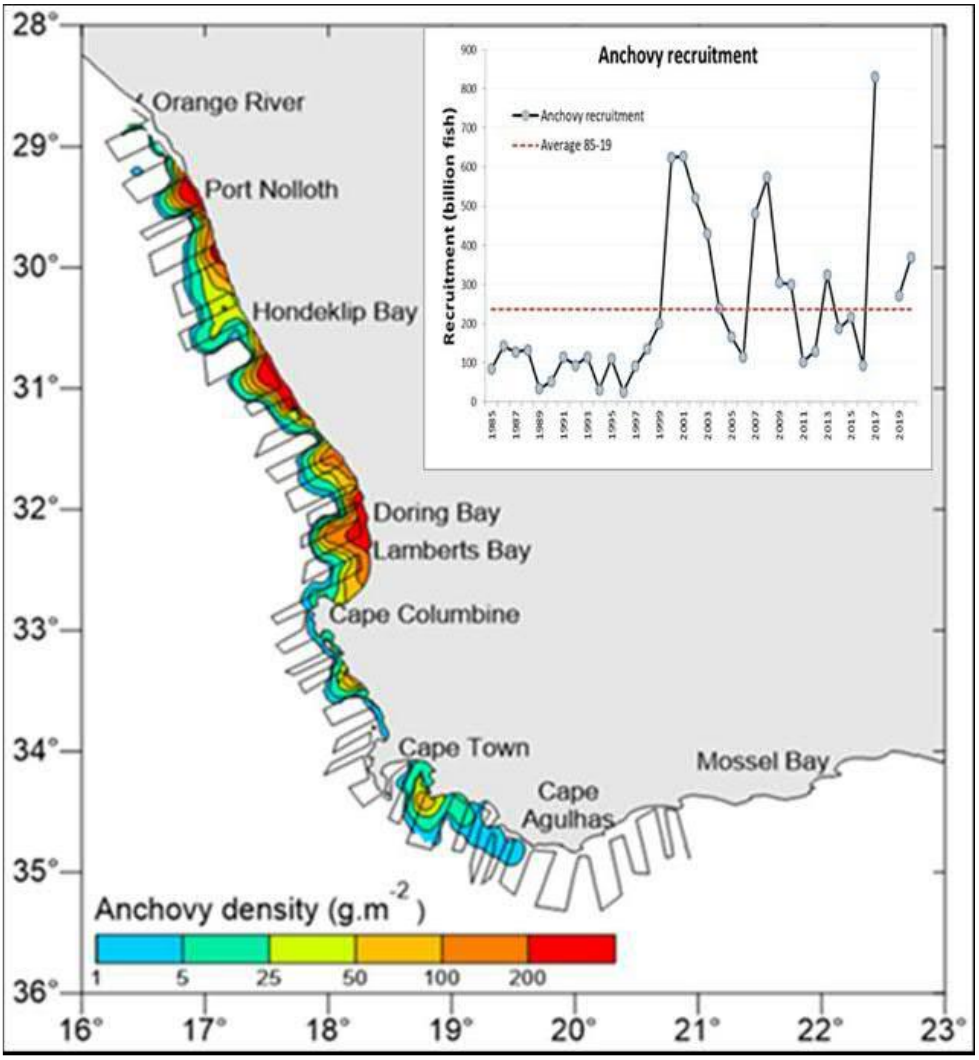



**Figure 7.8.** **Recruitment survey results (May 2020) for anchovy and recruitment trend (inset). The red dotted line is the running average level of recruitment since 1985 (information and figure provided by J. Coetzee and D. Merkel of DFFE; Source: SLR 2021).**

### 7.5.2 Tuna pole and line

The South African tuna pole and line (TPL) sector targets lonin 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. The tuna pole fleet consists of approximately 100 vessels ranging from small outboard powered skiboats (7-9 m Length) to inboard diesel-powered deck boats (6-25m length). The reported longfin tuna catch in 2018 was 2 471 tonnes, with a wholesale value of R124 Million, or 1.2% of the total South African commercial fisheries value (Japp & Wilkinson 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). Some effort does take place further up the west coast, although this is mostly offshore of, or to the south of concession

area 14C. Over the period 2003-2016 there was moderate-high (average of 100-500 boat days/year) reported TPL fishing effort in the reporting grid block that partially overlaps with concession 14C (Figure 7.9). 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).

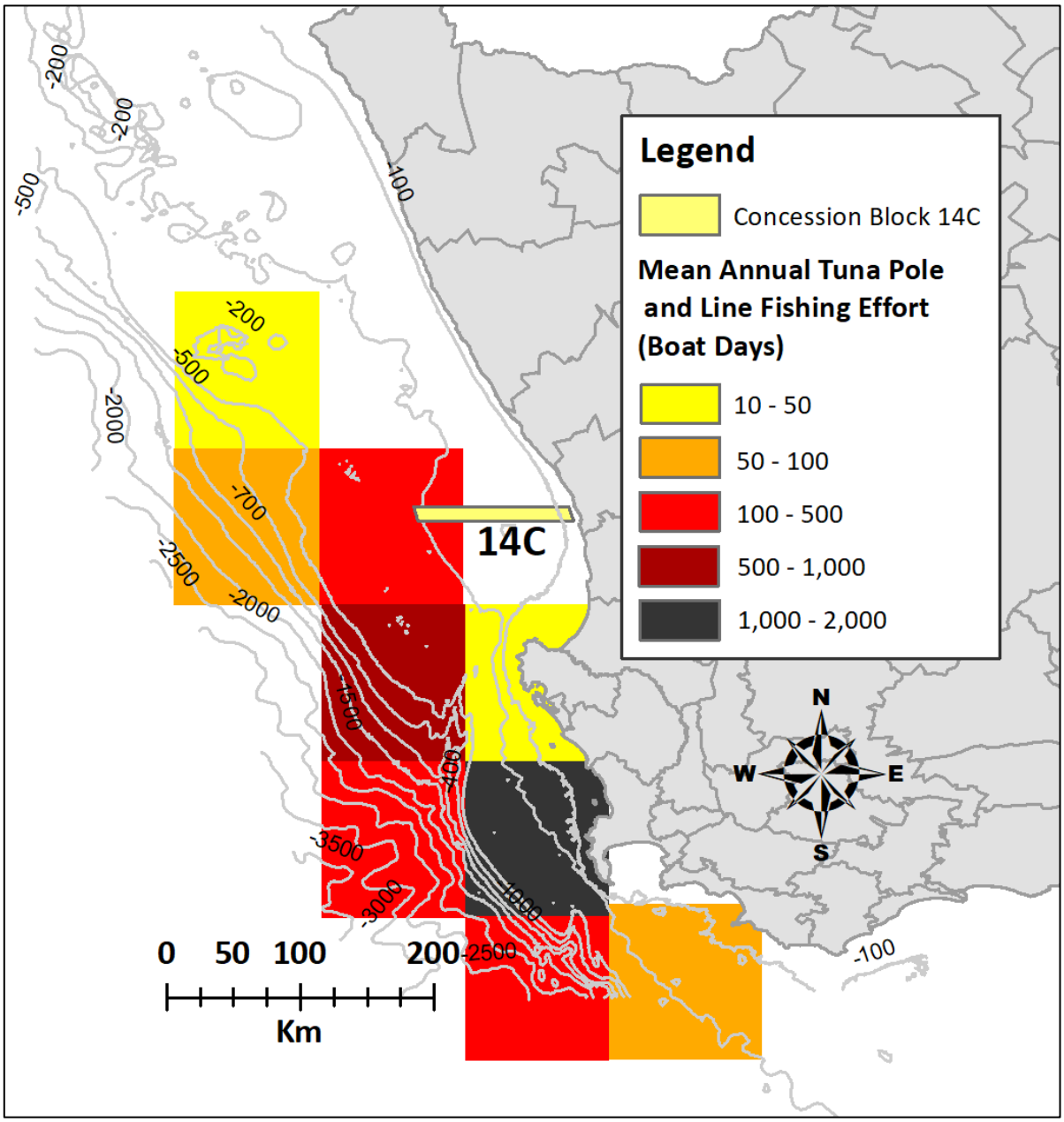



**Figure 7.9.** **Mean annual tuna pole and linefishing effort (boat days) in relation to concession 14C (Source: Norman *et al.* 2018).**

### 7.5.3 Traditional Linefish

Commercial, recreational and subsistence linefishers target up to 200 different fish species, both from boats and the shore. 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 14 C is however relatively far offshore in water that is mostly deeper than 100m, and far from suitable launch sites. A spatial analysis of the reported commercial linefish catch data does show some limited overlap with traditional linefishing activity on the inner margin of the 14C concession (Figure 7.10).

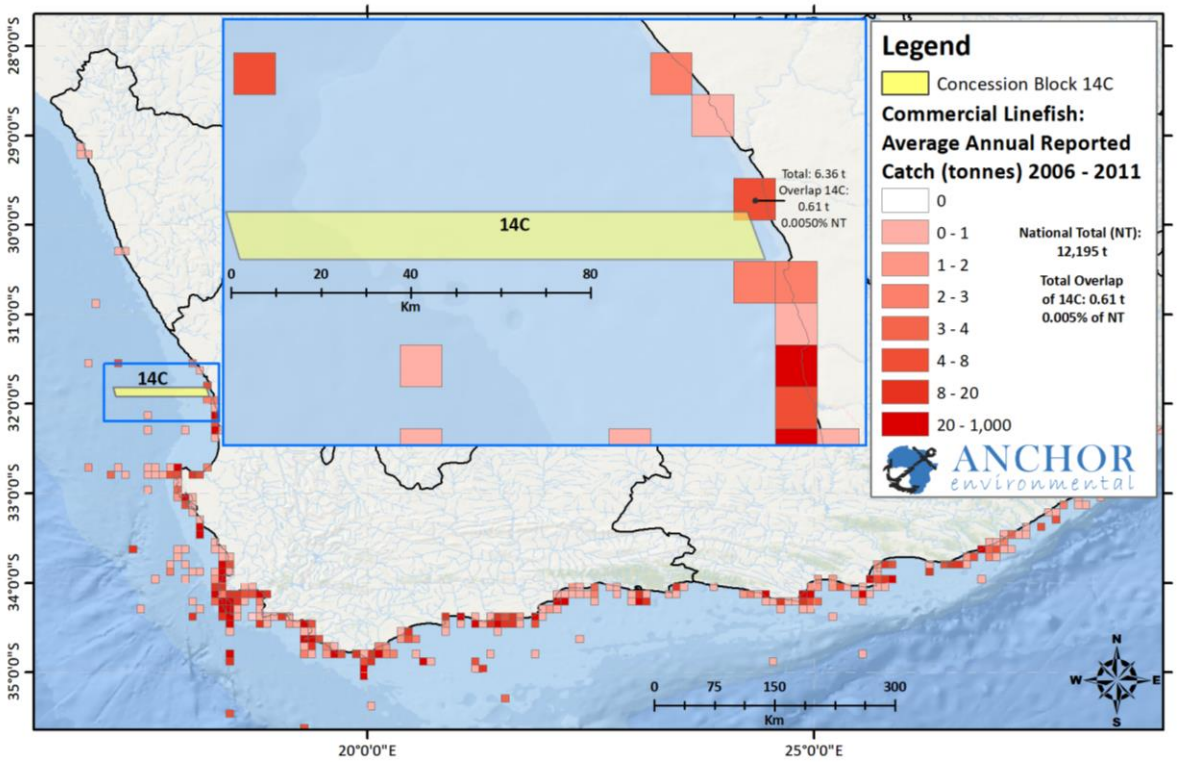



**Figure 7.10. Reported annual commercial linefishing catch the calculated proportion of the average national total catch made within Concession Area 14C (Data source: DFFE).**

### 7.5.4 Shipping

The majority of shipping traffic is located on the outer edge of the continental shelf, which is offshore of the outer edge of Concession Area 14C (Figure 7.11). 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.

### 7.5.5 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 14C is expected.

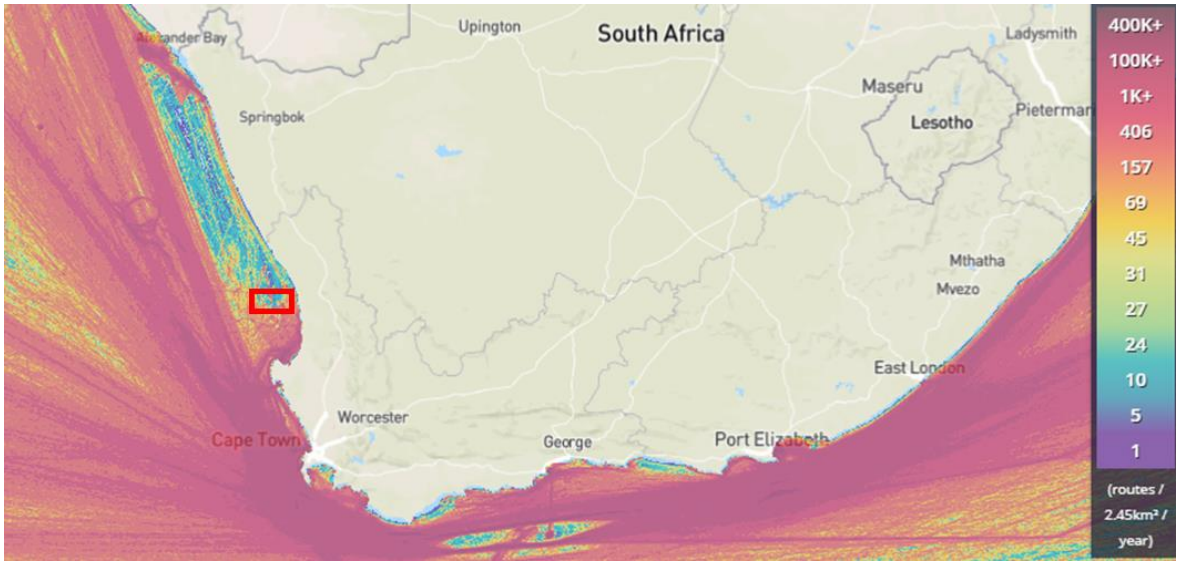



**Figure 7.11. Commercial shipping traffic in relation to Concession Area 14C. The red block indicates the approximate location of the 14C concession area (Source: www.marinetraffic.com, accessed 16 July 2021).**

### 7.5.6 Marine Research

Marine research activities that may interact with the proposed prospecting on Concession Area 14C 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 14C, 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).

### 7.5.7 Other fisheries, ranching and harvesting activities

The demersal trawl, demersal hake longline (Figure 7.12) and large pelagic longline commercial fishing sectors that are active along the west coast, all operate well offshore of the 14C Concession Area, whilst the West Coast Rock Lobster commercial and interim relief nearshore and fishery operates inshore, in water shallower (15-30 m) than the concession area (DEFF 2020, Norman *et al.* 2018). Prospecting activities are therefore unlikely to have an impact on these activities.

Small scale fishers including interim relief west coast rock lobster and linefish right holders may, on rare occasions fish within the inshore areas of concession 14C, but almost all the small-scale fishing effort is expected to be within 3 NM (5.5 km) of the coast. Due to the very low probability of interaction with small scale fishers, the low intensity, small spatial scale (only inshore margin of 14C) and the very short duration the proposed prospecting activities are expected to have NO impact on small scale fishers. The gill net fishery that targets mullet *Chelon richardsonii* also takes place in near shore waters (<50 m depth) and are therefore not expected to be impacted by prospecting activities.

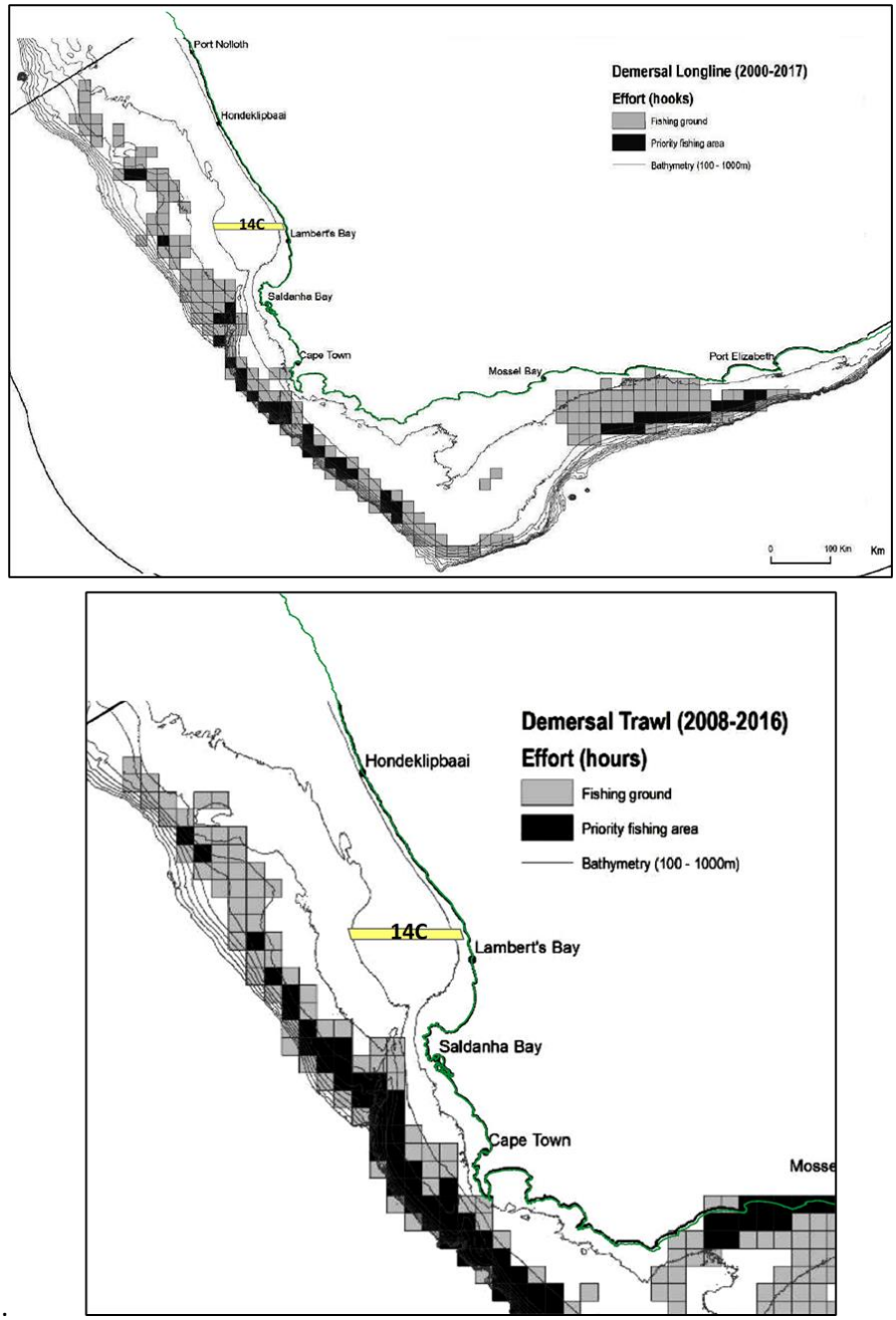



**Figure 7.12 Distribution of demersal longline (top) and trawl (bottom) fishing effort in relation concession area 14C. (Source: Norman *et al.* 2018).**

A land-based abalone farm operates in Doringbaai harbour and an application for an abalone ranching right in the area from Doringbaai to Strandfontein has been submitted. Prospecting activities within concession 14C are not expected to have any impacts on abalone aquaculture and ranching in the area. 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 14C 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. As prospecting activities are unlikely to have an impact on these fisheries and activities, impacts of prospecting on these activities were screened out of impact assessment.

## 7.6 Description of specific environmental features and infrastructure on the site

### 7.6.1 Sensitivity and significance of the system: Ecosystem threat status

The 2018 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 14C is classified as "Least Concern" (Figure 7.13).

In terms of the SANBI Ecosystem Threat Status layer, the 14C concession block is not identified as part of a National Marine Protected Area (MPA), although it does fall within the Benguela Upwelling System Ecological and Biologically Significant Area (EBSA; Figure 7.14). 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".

The Benguela Upwelling System (BUS) is one of the four major eastern boundary upwelling systems in the world (Bakun 1996). The proposed 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; Figure 7.15). 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 proposed 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 area to be impacted in 14C is 0.75 ha ($1.51 \times 10^{-8}$ % or 0.000000015 % of the entire EBSA; Figure 7.15). Numerous anthropogenic activities take place within the BUS EBSA that encompasses the entire South African west coast. The proportion of the EBSA represented by 14C is extremely small and it is anticipated that the impacts of the proposed exploration and prospecting activities on the EBSA as a whole are virtually negligible.

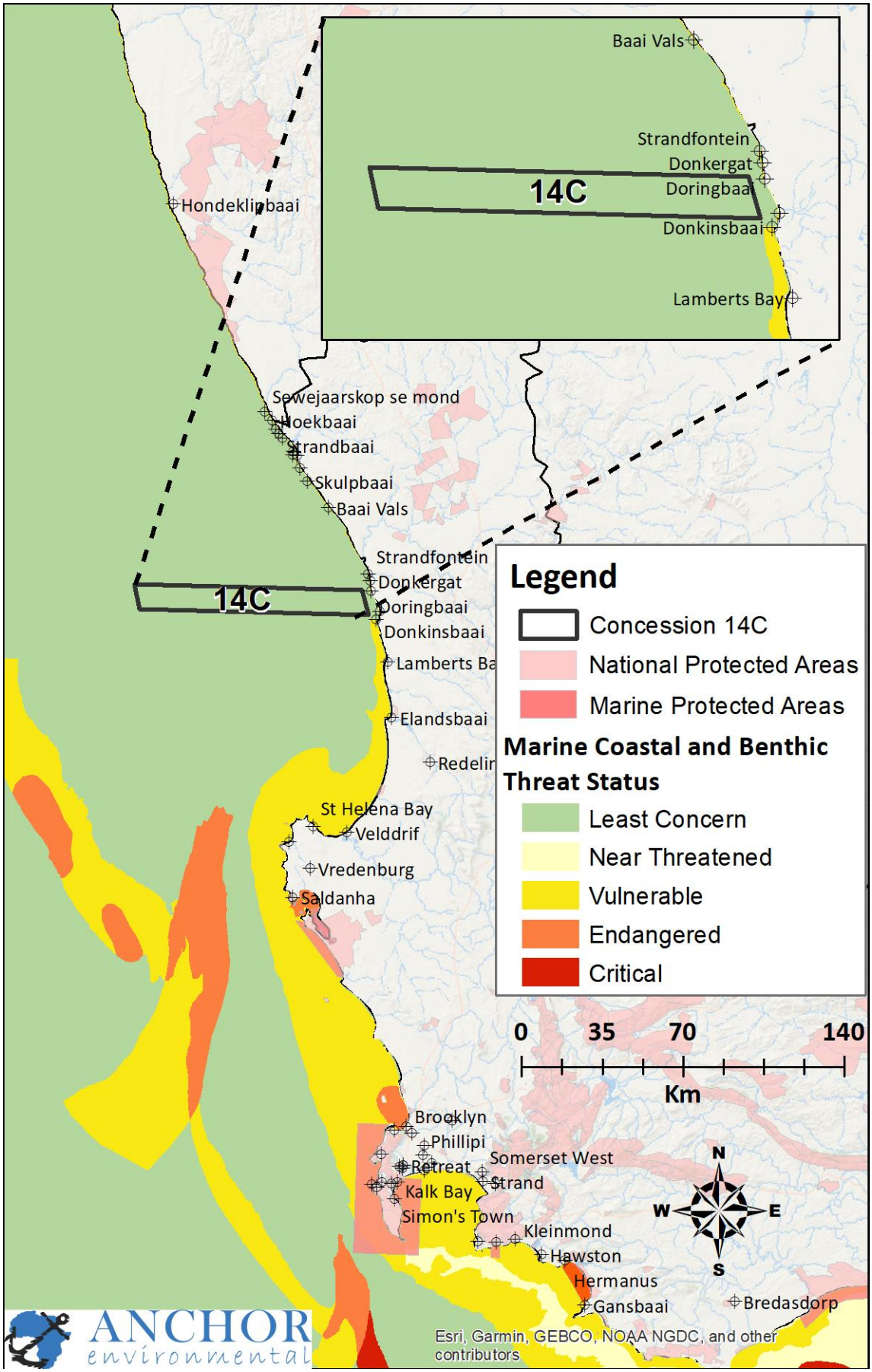



**Figure 7.13. SANBI Ecosystem Threat Status and location of Concession Area 14C. Source: https://bgis.sanbi.org/**

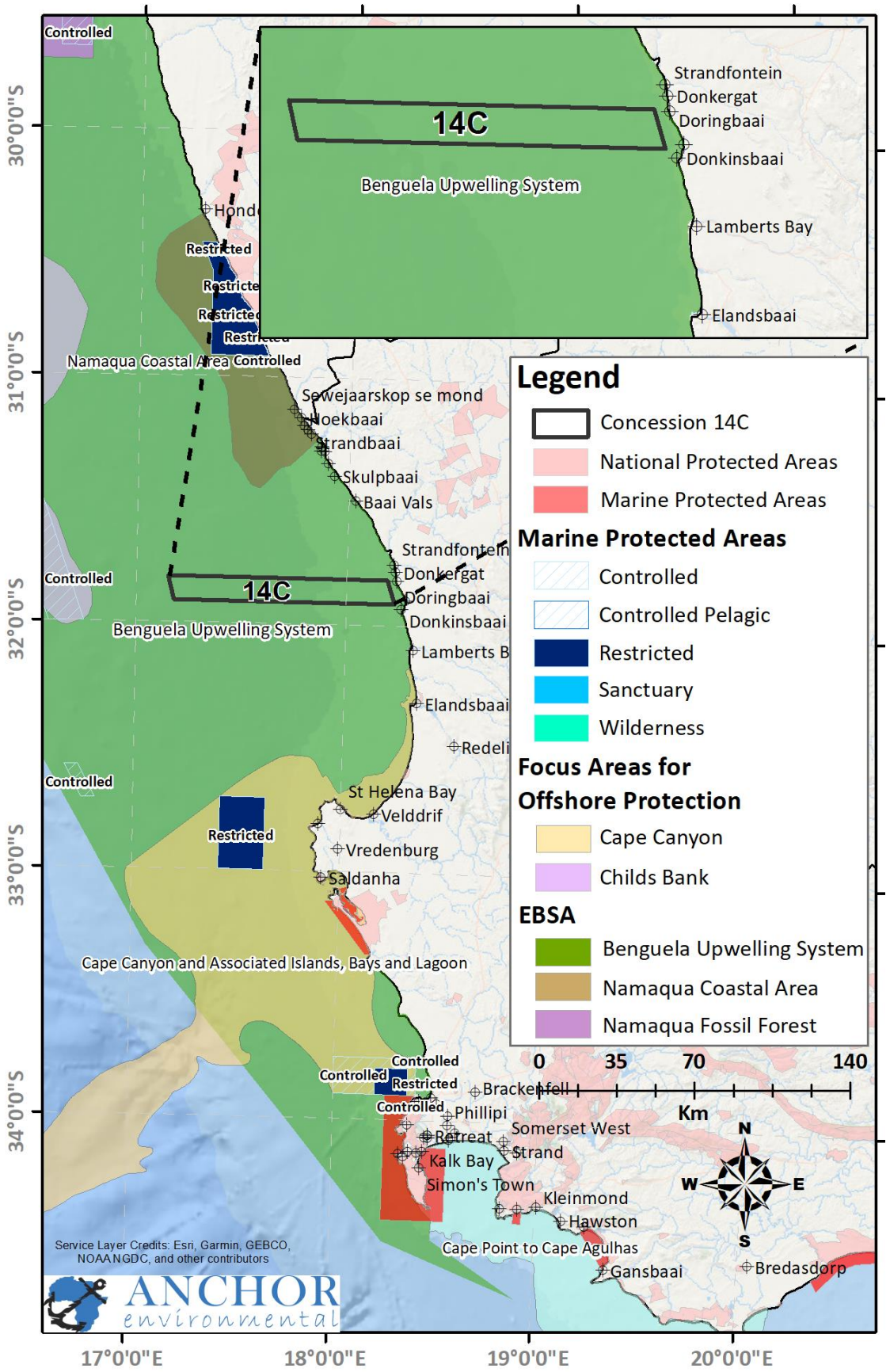



**Figure 7.14.** **Marine Protected Areas (dark blue), proposed Ecological and Biologically Significant Areas (EBSA's) and the location of Concession Area 14C. Source: https://bgis.sanbi.org/.**

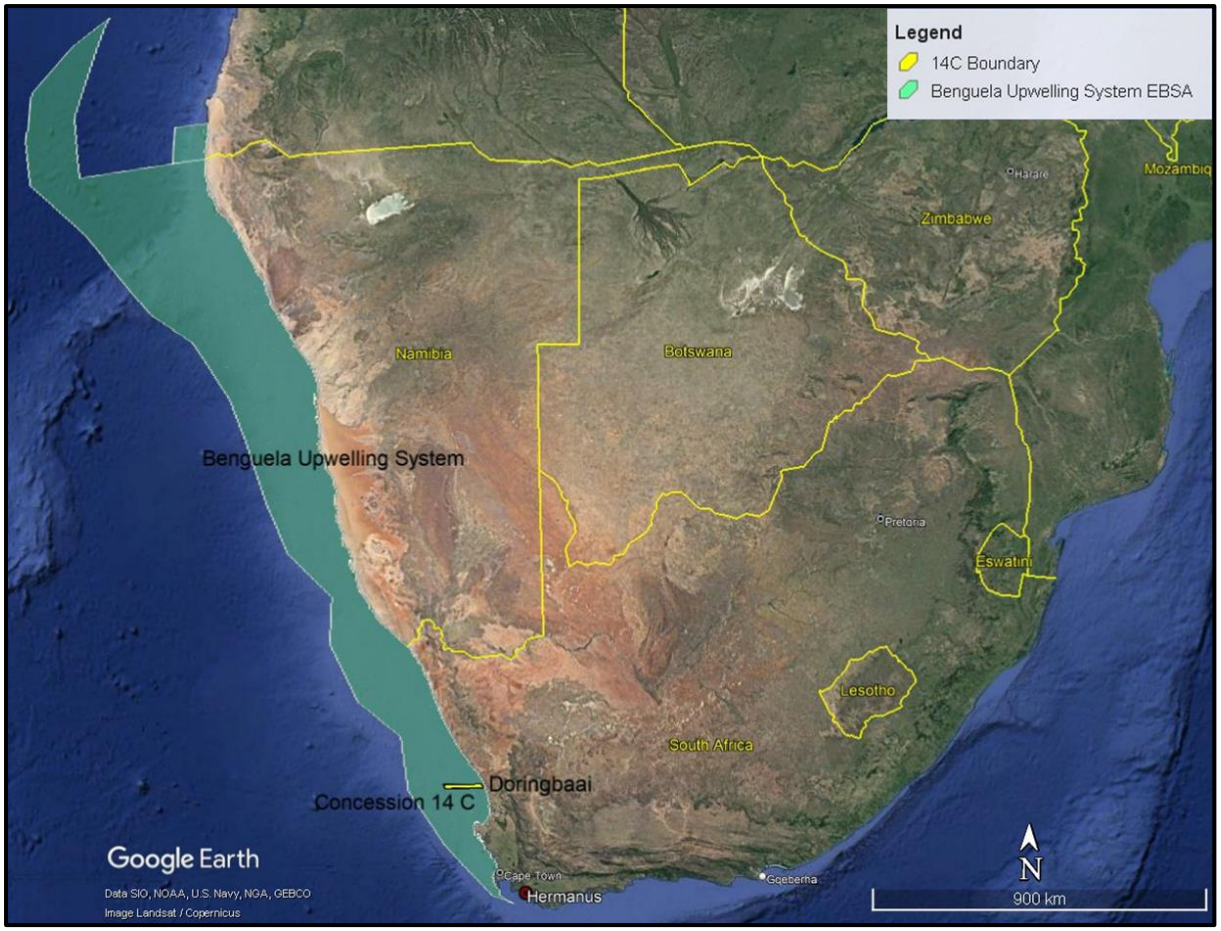



**Figure 7.15. The location of Concession Area 14C (yellow) within the Benguela Upwelling System (light green). Source: https://www.benguelacc.org/.**

## 7.7 Environmental and current land use maps

See Section 6.2 (Figure 6.1, Figure 6.2, Figure 6.3, Figure 6.10, and Figure 6.11), Section 7.5 (Figure 7.6 and Figure 7.12) and Figure 8.2.

# 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 Environmental Screening Tool was used in accordance with NEMA and the EIA Regulations to assess the environmental sensitivity of the concession area (Appendix 2). The tool 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. The current concession area does not coincide with any environmental sensitivities for any of the themes. However, the screening tool did identify the following list of specialist assessments that need to be considered for inclusion in the assessment report:

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

It is the responsibility of the Environmental Assessment Practitioner (EAP) to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist studies including the provision of photographic evidence of the site situation. However, as the concession area is located 5 km offshore, it is not possible to assess these themes using photographic evidence. Therefore, the motivation for exclusion of themes is based on the EAPs own expertise and consultation with other specialists.

Based on the EAP assessment, 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; and (2) Archaeological and Cultural Heritage. In addition to these, the EAP commissioned a study to consider the potential impacts of prospecting on Marine Socio-Economic Resources. 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).

Palaeontological, Noise and Radioactivity Impacts, although important, are considered to be less significant than the impacts subjected to a full specialist assessment. 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), these impacts may be reviewed by the EAP in the

form of a Compliance Statement, rather than being subjected to a comprehensive specialist impact assessment. Visual impacts and impacts on Shipping activities and Scientific Research were also assessed in the form of Compliance Statements (located at the end of this section of the report). 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 8.7.

## 8.2 Specialist studies

### 8.2.1 Marine Ecology and Fisheries Impact Assessment

Potential impacts to the marine environment as a result of exploration and prospecting were identified based on available literature, previous EIA and monitoring reports, 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. 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;
- 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 trawl commercial fishing sector, the demersal hake longline commercial fishing sector, the large pelagic longline commercial fishing sector, the West Coast Rock Lobster fisheries (including commercial and interim relief nearshore), small scale fishers (including interim relief west coast rock lobster and linefish right holders), kelp harvesting nor abalone aquaculture and ranching. Impacts on these activities were therefore screened out of the impact assessment.

#### *8.2.1.1 Underwater noise disturbance to marine fauna*

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.

#### *8.2.1.1.1 Impacts 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 impacts of the acoustic survey (as proposed in this prospecting study) on zooplankton is therefore anticipated to be negligible. The overall impact of seismic disturbance to marine invertebrates in concession 14C is assessed to be INSIGNIFICANT and no mitigation is considered necessary (Table 8-1).

**Table 8-1. Seismic disturbance to invertebrates.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local<br>1 | Low<br>1 | Short-term<br>1 | Very low<br>3 | Possible | **INSIGNIFICANT** | -ve | Medium |
| **Mitigation measures:**<br>• No essential or potential mitigation measures identified | | | | | | | | |

#### *8.2.1.1.2 Impacts 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. 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. Seismic disturbance to 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 |
| **Mitigation measures:** • No essential or potential mitigation measures identified | | | | | | | | |

#### *8.2.1.1.3 Impacts 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 in close proximity to 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. Of the proposed acoustic survey activities, the Topas sub-bottom profiler system 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* and Heaviside's dolphins *Cephalorhynchus heavisidii*).

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. It is recommended that the timing of seismic survey activity in concession 14C 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).

It is likely that cape fur seals *Arctocephalus pusillis pusillis* will be encountered during seismic exploration and sampling/prospecting activities in Concession Area 14C. 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.

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 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. Seals are not expected to be severely impacted and are only likely to suffer significant injury if they are diving directly below the vessel 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).

**Table 8-3. Underwater noise disturbance to marine mammals.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Regional<br>2 | High<br>3 | Short-term<br>1 | Medium<br>6 | Probable | **MEDIUM** | -ve | Medium |
| **Essential mitigation measures:**<br>• A designated onboard Marine Mammal and Seabird Observer (MMSO) to ensure compliance with mitigation measures during geophysical surveying.<br>• 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.<br>• "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.
- It is recommended that the timing of seismic survey activity in concession 14C 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. 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.
- 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 |

#### *8.2.1.1.4 Impacts on marine birds*

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 14C. 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 14C, are not included as part of the impact assessment. The overall impact is assessed to be of LOW risk and with the implementation of mitigation is reduced to INSIGNIFICANT (Table 8-4).

**Table 8-4. Underwater noise disturbance to seabirds.**

| | **Extent** | **Intensity** | **Duration** | **Consequence** | **Probability** | **Significance** | **Status** | **Confidence** |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | High 3 | Short-term 1 | Low 5 | Probable | **LOW** | -ve | High |

**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 sound source before resuming with survey (initiate soft start procedure when resuming 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 acoustic 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 |

#### *8.2.1.1.5 Impacts on turtles*

Turtles may be affected by seismic noise as they only detect seismic survey equipment at close range (<10 m) and are not sufficiently mobile to move away the sound source. 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 14C. 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 14C. The overall impact is therefore assessed to be INSIGNIFICANT with no mitigation required (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. Underwater noise disturbance to 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:**<br>• A designated onboard Marine Mammal, Turtle and Seabird Observer (MMSO) to ensure compliance with mitigation measures during geophysical surveying<br>• MMSO to conduct pre-survey visual scans of at least 30 minutes for the presence of feeding seabirds in the survey area<br>• 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).<br>• Terminate the survey, if any turtles show affected behaviour within 500 m of the survey vessel or equipment, until they have vacated the area.<br>• Record incidences of encounters with marine life (seabirds, turtles, seals, fish) their behaviour and response to seismic survey activity.<br>• 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. The potential for collision is directly proportional to the vessel speed and the abundance and behaviour of cetaceans in the area. The 14C 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:**<br>• 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.<br>• Avoid 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.<br>• 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. | | | | | | | | |
| With mitigation | Regional 2 | Low 1 | Short term 1 | Very Low 4 | Improbable | **INSIGNIFICANT** | -ve | High |

### *8.2.1.3 Seabed sampling and tailings disposal*

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 include habitat loss and smothering of the benthos at sites associated with tailings discard. Recolonisation 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). It is generally accepted that offshore disturbed areas take longer to recover than those in shallow water further inshore. 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 (Penney *et al.* 2007; Pulfrich 2017). The overall

consequence of this impact is considered to be low and is of LOW significance and no mitigation measures are required (Table 8-7).

**Table 8-7. Benthic Impact of Seabed sampling and tailings disposal.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Medium 2 | Medium-term 2 | Low 5 | Definite | **LOW** | -ve | High |
| **Best practise mitigation measures:**<br>• Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats | | | | | | | | |

### *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 reduce 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 14C Concession Area does overlap with the west coast nursery area utilised by several commercially important fish species (particularly anchovy). However, 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 is assessed as very low.

Sampling activities in the 14C Concession Area 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 limited spatial scale, temporary nature of operations and low volume of any sediment plumes generated during sampling are not anticipated to have noticeable impacts on the environment and marine biota, including small pelagic fish recruitment. Impacts are therefore expected to be INSIGNIFICANT (Table 8-8). No direct mitigation

is feasible as tailings disposal is an integral part of this mining method. However, tailings disposal must be done in a designated area with no reefs or sensitive habitat (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 | Low 1 | Short-term 1 | Very low 3 | Definite | **VERY LOW** | -ve | High |

**Best practise mitigation measures:**

- Tailings disposal must be done in a designated area with no reefs or sensitive habitat.
- No essential mitigation measures identified.

### *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 |

### 8.2.2 Impacts on fisheries

According to the International Regulations for Preventing Collisions at Sea, vessels engaged in seismic surveys are recognised as vessels limited in their ability to manoeuvre and as such, vessel engaged in other activities (such as fishing) are obliged to give way (Colregs 1972). Furthermore, the implementation of a safety (exclusion) zone around the seismic vessel will 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). In this case, the size of the footprint can be expected to be around 500 m in extent. Exclusion of fishing vessels from fishing areas, possible altered behaviour of fish due to seismic activities and interference with shipping could have (indirect) socio-economic implications for the affected industries. Fisheries might be affected by target species avoiding seismic survey areas for several days after the survey has terminated or the vessel has moved on (Mason 2017). Fisheries can also be indirectly impacted should prospecting activities negatively impact fish reproduction and recruitment, e.g., impairment of egg or larval survival due to increased turbidity in the water column resulting from sediment plumes generated by sampling activities. Fisheries sectors operating within Concession Area 14C that could be impacted include those listed in Section 7.5 (small pelagic purse seine, tuna pole and line, and traditional linefish). Overlap with each of these sectors is shown in Figure 7.6 to Figure 7.12. The catches from these sectors made within the Concession Area 14C are all 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 14C with fisheries and fish nursery areas, the impact is assessed to be VERY LOW and INSIGNIFICANT with implementation of mitigation to avoid fishing seasons and inform key stakeholders from the potentially affected Small pelagic, Tuna Pole and line, and Traditional Linefish sectors (Table 8-10).

**Table 8-10. Impact on fisheries.**

| | **Extent** | **Intensity** | **Duration** | **Consequence** | **Probability** | **Significance** | **Status** | **Confidence** |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Medium 2 | Short-term | Very Low 4 | Probable | **VERY LOW** | -ve | High |

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| | | | 1 | | | | | |
| **Essential mitigation measures:**<br>• Prior to survey commencement, key stakeholders (see below) should be consulted and informed of the proposed survey activity and the likely implications thereof:<br>o Fishing industry / associations (contactable via liaison@fishsa.org):<br>o SA Marine Linefish Management Association (SAMLMA);<br>o South African Pelagic Fishing Industry Association (SAPFIA);<br>o South African Tuna Association (SATA);<br>o South African Tuna Longline Association (SATLA);<br>o Large Pelagic Small Medium & Micro Enterprises Association (LPSMME); and<br>o Local fishing communities.<br>• Other associations and organs of state:<br>o DFFE;<br>o SAMSA;<br>o South African Navy Hydrographic office; and<br>o Overlapping and neighbouring right holders.<br>• 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.<br>• 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. | | | | | | | | |
| With mitigation | Local 1 | Medium 2 | Short-term 1 | Very Low 4 | Possible | **INSIGNIFICANT** | -ve | High |

### 8.2.3 Potential impacts on marine heritage resources

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 and Maritime heritage material that are associated with the coring and drilling prospecting activities were assessed.

#### *8.2.3.1 Cultural heritage and artefacts*

The physical intrusion of collecting samples from the seabed is considered small and in the instance of Concession Area 14C, the impact 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 medium, given that there will be physical intrusion into or disturbance of the seabed of the coring.

The probability of occurrence is, however, improbable (Table 8-11). The significance of the impact is assessed to be LOW but where impacts do occur their effects will be negative (Table 8-11). However, implementation of mitigation to allow access to such samples for archaeological assessment may offset the potential impacts of invasive sampling and would result in the changing of the impact status from negative to positive because of the potential benefit to archaeological research and knowledge that could accrue from access to such information (Table 8-11).

**Table 8-11. Impacts of invasive sampling on cultural heritage and artefacts.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Medium 2 | Long-term 3 | Medium 6 | Improbable | **LOW** | – ve | Medium |
| **Essential mitigation measures:**<br>• Retain samples for assessment by an archaeologist and palaeontologist for the presence of important material.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would possibly identify wrecks and wreck debris.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these Maritime and Underwater Cultural Heritage (MUCH) resources. | | | | | | | | |
| With mitigation | Local 1 | Medium 2 | Long-term 3 | Medium 6 | Improbable | **LOW** | + ve | Medium |

### *8.2.3.2 Maritime heritage*

The West Coast, known for its dangerous currents, coastal fogs and a rocky shoreline, has claimed many vessels over the years. In Concession Area 14C there may be some 44 shipwrecks, dating from the 1500's through to modern times. According to the shipwreck databases (Appendix 4), there is definitely one modern wreck, within the area, i.e., the *MV Oceana Sapphire* (Table 7-4). Five modern wrecks were reported as being lost near the concession and could POSSIBLY be within Concession Area 14C. The remaining 38 shipwrecks are vessels that either disappeared between two ports or were abandoned mid-ocean, although they are UNLIKELY to be within the concession area. The historical significance of most of these wrecks are low or medium. There are, however, a few that may have a high significance factor. These include very old ships, war-time losses, and other vessels with a specific national or international significance. The eight that have been identified during the UHIA include *Abberkerk, Aegeus, Cabral Fleet, Columbine, Discovery, Honcoop / Hencoop, Nortun* and the *U-179*. 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. No geophysical data for this area is currently available. 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. Potential impacts of invasive sampling on these resources are assessed below (Table 8-12 to Table 8-17).

**Table 8-12. Assessment of impacts of invasive sampling on shipwrecks DEFINITELY present in 14C.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Definite | **LOW** | – ve | High |
| **Essential mitigation measures:**<br>• There is currently no heritage significance for these ships.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Definite | LOW | + ve | High |

**Table 8-13. Assessment of impacts of invasive sampling on shipwrecks POSSIBLY present in 14C.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Possible | **VERY LOW** | – ve | Medium |
| **Essential mitigation measures:**<br>• There is currently no heritage significance for these ships.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Possible | **VERY LOW** | + ve | Medium |

**Table 8-14. Assessment of impacts of invasive sampling on shipwrecks which are IMPROBABLE to be present in 14C - shipwrecks with NO heritage significance.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Improbable | **VERY LOW** | – ve | Medium |
| **Essential mitigation measures:**<br>• There is currently no heritage significance for these ships. | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| • Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Improbable | **VERY LOW** | + ve | Medium |

**Table 8-15. Assessment of impacts of invasive sampling on shipwrecks which are IMPROBABLE to be present in 14C - shipwrecks with LOW heritage significance.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Improbable | **VERY LOW** | – ve | Medium |
| **Essential mitigation measures:**<br>• There is currently no heritage significance for these ships.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Probable | **LOW** | + ve | Medium |

**Table 8-16. Assessment of impacts of invasive sampling on shipwrecks which are IMPROBABLE to be present in 14C - shipwrecks with MEDIUM heritage significance.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Medium 2 | Long-term 3 | Medium 6 | Improbable | **LOW** | – ve | Medium |
| **Essential mitigation measures:**<br>• There is currently no heritage significance for these ships.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local 1 | Medium 2 | Long-term 3 | Medium 6 | Possible | **LOW** | + ve | Medium |

**Table 8-17. Assessment of impacts of invasive sampling on shipwrecks which are IMPROBABLE to be present in 14C - shipwrecks with HIGH heritage significance.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | High 3 | Long-term 3 | High 7 | Improbable | **MEDIUM** | – ve | Medium |
| **Essential mitigation measures:**<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local 1 | High 3 | Long-term 3 | High 7 | Possible | **MEDIUM** | + ve | Medium |

### 8.2.4 Potential socio-economic impacts

A total of seven negative socio-economic impacts were identified as potentially being associated with the proposed survey/prospecting activities. These included:

1. Temporary disturbance of the Tuna Pole and Linefish sector;
2. Temporary disturbance of Traditional Linefish Sector;
3. Temporary disturbance of Small Pelagic Purse Seine Fisheries sector;
4. Reduction in fishing success of local households reliant on fishing for subsistence and income;
5. Impact on local tourism and businesses;
6. Impact on and sense of place, health and wellbeing; and,
7. An increase in local crime.

Potential impacts will result mainly from temporary 1) disturbance to marine resources; 2) exclusion of fishing vessels from the Concession Area 14C; and 3) degradation of water quality in the area. The significance of these impacts are considered in detail below along with potential positive impacts on the local and regional economies in Sections 8.2.4.1 and 8.2.4.2 below.

Most of the potential negative impacts were assessed to either be INSIGNIFICANT or could be reduced to INSIGNIFICANT after mitigation (where required). Positive impacts might include local and regional socio-economic benefits.

#### *8.2.4.1 Potential negative impacts*

Within the Matzikama Municipality, agriculture, forestry, and fishing is considered the largest sector and contributor to GDP and employment, having contributed R 999 million to the GDP and employed approximately 11 661 people in 2018 (MM 2020). The South African fisheries sector has an estimated value of R6 billion (DAFF 2021), which contributes 0.1% to national GDP. Of the 22 commercial fisheries sectors, the economically most valuable are the demersal-trawl (hake) and small-pelagic sectors (pilchards, anchovy, and red-eye round herring) (Brick & Hasson 2016; SAG 2013/14). The Western Cape is estimated to account for most of the value of these sectors (90%), employment and

income, with the primary commercial fisheries (as well as main fisheries ports, and therefore associated industry services) concentrated along the west and south coasts of South Africa (Hara *et al*. 2008; Karaan & Rossouw 2004).

Three fishery sectors potentially overlap with Concession Area 14C have been identified. These include the Tuna Pole and Linefisheries, the Traditional Linefish Sector and the Small-Pelagic Purse Seine Fisheries. Consideration is also given to the Doringbaai aquaculture, i.e., Doring Bay Abalone Pty Ltd (Hutchings *et al*. 2022). In addition, to these fisheries, small-scale and subsistence fishers along the West Coast, particularly in Doringbaai, Strandfontein and Lamberts Bay, may potentially be impacted by the proposed prospecting activities in Concession Area 14C. The potential socio-economic impacts on these sectors are assessed below.

#### *8.2.4.1.1 Tuna Pole and Linefisheries*

The South African tuna pole and line sector (TPL) targets longfin tuna *Thunnus alalunga*, yellowfin tuna *Thunnus albacares*, bigeye tuna *Thunnus obesus* and skipjack tuna *Katsuwonus pelamis* between November and May. Due to the seasonality of the TPL fishery, fishers also have access to snoek (*Thyrsites atun*) and yellowtail (*Seriola lalandi*), which are also important targets of the traditional linefishery. The tuna pole fleet consists of approximately 100 vessels ranging from small outboard powered ski boats (7-9 m length) to inboard diesel-powered deck boats (6-25 m length). The reported longfin tuna catches in 2018 was 2 471 tonnes, with a wholesale value of R 124 Million, or 1.2% of the total South African commercial fisheries value (Japp & Wilkinson 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). Some effort does take place further up the West Coast, although this is mostly offshore of, or to the south of Concession Area 14C. Over the period 2003-2016, there was moderate-high (average of 100-500 boat days/year) reported TPL fishing effort in the reporting grid block that partially overlaps with Concession 14C. 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). Impacts on the TPL fleet due to the proposed prospecting activities within 14C are expected to be insignificant when prospecting activities are restricted between April to May (Table 8-18).

**Table 8-18. Impact of the prospecting activity on the Tuna Pole and Linefisheries.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local<br>1 | Low<br>1 | Short-term<br>1 | Very Low<br>4 | Possible | **INSIGNIFICANT** | -ve | High |
| **Essential mitigation measures:**<br>• Restrict prospecting activities between April and May | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| With mitigation | Local 1 | Low 1 | Short-term 1 | Very Low 3 | Improbable | **INSIGNIFICANT** | -ve | High |

#### *8.2.4.1.2 Traditional Linefish Sector*

Most (85%) subsistence fishers in South Africa employ traditional linefishing methods, which are generally considered labour intensive and associated with low revenue output (Brick & Hasson 2018). Traditional linefishers operate in shallow water (generally <100 m depth) and would potentially be negatively impacted by coastal and nearshore seismic exploration, prospecting and mining operations (particularly recreational, small-scale and subsistence shore fishing). Traditional linefishers use simple handheld lines or rod with no more than 10 baited hooks per line, whereas the commercial linefishers use motorised boats and is managed by Total Applied Effort (TAE) (DAFF 2013). The traditional linefishing sector targets multiple species (up to 200 species) of which 95 species are commercially and recreationally significant (DAFF 2013). The linefisheries along the west coast (Linefish management Zone A — Orange River to Cape Infanta) mostly target the nomadic coastal migrant species, snoek *Thyrsites atun* and yellowtail *Seriola lalandi*, as well as the reef dwelling Hottentot sea bream *Pachymetopn blochii*. Snoek typically contributes the greatest catch by weight in the commercial linefisheries (total landings of up to 5 800 tonnes) (Kerwath et al. 2017).

Concession Area 14C is, however, relatively far offshore in water that is mostly deeper than 100 m. A spatial analysis of the reported commercial linefish catch data does show some limited overlap with traditional linefishing activity on the inner margin of the 14C Concession Area. The proposed prospecting in Concession Area 14C is therefore expected to have a negligible socio-economic impact on the direct and indirect dependants from the traditional linefishing sector (Table 8-19).

**Table 8-19. Impact of the proposed prospecting activity 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 | Improbable | **INSIGNIFICANT** | -ve | High |
| **Mitigation measures:** No essential or potential mitigation measures identified. | | | | | | | | |

#### *8.2.4.1.3 Small Pelagic Purse Seine Fisheries*

The small pelagic purse seine fishery has the largest catch (volume) for any of the South African fishery sectors and had the second largest annual catch value estimated at around R2.164 billion in 2017. This is approximately one fifth of the combined value of South African Fisheries (Japp & Wilkinson 2021). The industry supports around 4 500 full time staff, 2 500 seasonal staff and more than 700 fishers. The supporting industries contribute an estimated additional 2 400 jobs.

The small pelagic purse seine fishery operates between the Orange River and East London mostly in

nearshore waters (within 10 km of the coast). Concession Area 14C lies within the important west coast nursery ground that is utilised by several small pelagic fish species and also partially overlaps with small pelagic purse seine fisheries. However, the target species are pelagic, and their distribution is variable, so the fishery as a whole is unlikely to be significantly negatively affected by small temporary closures/exclusion zones around survey vessels and geotechnical survey sites. The socio-economic impact is assessed as VERY LOW before, and INSIGNIFICANT after recommended mitigation measures (Table 8-20).

**Table 8-20. Impact of the prospecting activity on the Small Pelagic Purse Seine Fisheries.**

| | 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:**<br>• Undertake surveys when fishing effort is lower (preferably outside of fishing seasons).<br>• 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 advise on action to be taken in the event of encountering purse seine fishing vessels in the survey area. | | | | | | | | |
| With mitigation | Local 1 | Low 1 | Short term 1 | Very Low 3 | Possible | **INSIGNIFICANT** | -ve | High |

#### *8.2.4.1.4 Local households*

The Doringbaai community regards marine resources in the nearshore and offshore environment as extremely valuable both in terms of household income and livelihood. Communities reliant on marine resources could be negatively impacted should they be excluded from fishing grounds or have low fishing success due to prosecting activities. The impact on local households is considered VERY LOW with impacts likely to occur (> 70-90% chance of occurring). There are approximately 303 households in Doringbaai and more than half of the residents of working age (57%) earns between R9 601-R76 400 per annum. The potential impact on local households was assessed to be VERY LOW (Table 8-21). Although no mitigation measures are identified, compensating households reliant on fishing for subsistence and income should be considered, should prospecting activities prove to negatively impact fishing success, income and livelihood.

**Table 8-21. Impact of proposed prospecting on local households.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | High 3 | Short-term 1 | Low 5 | Improbable | **VERY LOW** | -ve | High |

**Mitigation measures:**

No essential or potential mitigation measures identified although suggestions regarding compensation have been made.

#### *8.2.4.1.5 Local tourism and businesses*

The establishment of the Doring Bay Abalone Pty Ltd (DBA) aquaculture facility in 2014 has empowered the local community through creating employment opportunities, concurrently uplifting the social economic standards (Hutchings *et al*. 2019). The success of this project is not only critical for the livelihoods for over 50 local staff members employed by DBA, but to the lasting economic sustainability of Doringbaai (Hutchings *et al*. 2019).

The proposed prospecting activity could cause fine sediment plumes and increased turbidity which are likely to degrade water quality (e.g., reduced oxygen due to sedimentation; WDFW 2009) in Concession Area 14C in a localised and temporary manner. Fine sediment plumes can become trapped in the surf zone or carried alongshore with coastal processes such as rip currents, extreme wave action, and wind driven currents, transporting plumes along the coast. This could become a concern for DBA.

Several strategic tourism objectives are currently underway in Doringbaai are and include the development of the Doringbaai-Ebenhaeser tourism route and homestays; Tour guide training; alien clearing initiatives (optimal use and manage local resources), and marketing of the Matzikama Municipality as an eco/adventure/heritage region (de Jager 2019). Between 2012 and 2020, the tourism sector in Doringbaai grew significantly with Doringbaai now having several tourism assets such as a cellar, restaurant and several festivals and events (e.g. Doringbaai perlemoen festival).

There is potential for local economic growth through the development of Doringbaai's tourism sector. Prospecting in Concession Area 14C could lead to potential impacts on the tourism sector due to degraded water quality resulting in an aesthetically unpleasing view for visiting tourists. Many of the residents, guesthouses, and popular restaurants (such as Fryers' Cove) are situated next to harbour and coastline. However, the impact on the tourism industry can be avoided through restricting the Trans Atlantic Diamonds project to the section of the concession area where prospecting vessels are not visible form the coastline, and during important tourism events and seasons such as the proposed perlemoen festival, the school holidays and summer months. Due to the local and temporary nature of the proposed prospecting, the potential impact of the proposed prospecting activity on DBAs operational success and the tourism industry is VERY LOW and can be reduced to INSIGNIFICANT after mitigation measures are applied (Table 8-22).

**Table 8-22. Impact of proposed prospecting on tourism and small businesses.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local<br>1 | Medium<br>2 | Short-term<br>1 | Very Low<br>4 | Probable | **VERY LOW** | -ve | Medium |
| **Essential mitigation measures:**<br>• Avoid prospecting activity surrounding the seawater intake points. | | | | | | | | |

- Ensure compliance with the International Convention for the Prevention of Pollution from Ships (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 always in place 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 to minimise the volume of contaminants washing off decks.
- Monitor water-quality surrounding the sediment plumes.
- Restrict prospecting activities during important tourism events and seasons (i.e., during the perlemoen festival, the school holidays and summer months).
- Restricting operational activities to the section of the concession area out of visible sight from the shore.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| With mitigation | Local 1 | Low 1 | Short term 1 | Very Low 3 | Improbable | **INSIGNIFICANT** | -ve | Medium |

### *8.2.4.1.6 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 residents and community in Doringbaai have a spiritual connection to the ocean and have used this region for fishing for generations. The impact of the prospecting vessels may negatively impact all visible receptors (community and tourists) in Doringbaai, affecting the unique character of the harbour and bay which is currently one of the key features that attract tourists. Due to the location and temporary nature of the proposed prospecting, however, the potential impact of the proposed prospecting activity is insignificant with no mitigation measures required (Table 8-23).

**Table 8-23. Impact of proposed prospecting on 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 | Improbable | **INSIGNIFICANT** | - | High |
| **Mitigation measures:** No essential or potential mitigation measures. | | | | | | | | |

### *8.2.4.1.7 Local crime*

The Matzikama municipality crime statistics showed that drug related crime and residential burglaries decreased from 2019 to 2020, unlike murder and driving under the influence (MM 2020). The overall safety and security of the municipality buildings experience theft, burglary and vandalism which is largely exacerbated over the weekends and evenings (MM 2020). The proposed project will occur approximately 5 km offshore on a vessel. The vessel will never dock near Doringbaai and not will Concession Area 14C be accessed from the shore. Prospecting in this area will therefore not have any impact on local criminal activity or crime rates in the Doringbaai community (Table 8-24).

**Table 8-24. Impact of proposed prospecting on local crime.**

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

### *8.2.4.2 Potential positive impacts*

Mining is economically important as it can create broadscale employment opportunities and boost the national and local economy. Previous offshore diamond mining operations in Doringbaai did not, however, employ many local community members (SU 2013), which leads to poor community support. Trans Atlantic Diamond will incorporate codes of good practice on Broad Based Black Economic Empowerment issued under the Section 9 of the Broad Based Black Economic Empowerment Act, Act 53 of 2003, as amended by Act 46 of 2013. Contributions towards economic income during the Trans Atlantic Diamonds prospecting project will be made through the provision of 30 employment opportunities in the local Doringbaai community (Table 8-25). Training opportunities will be available for people with different types and levels of skills. The potential impact on the socio-economic performance is likely to be insignificant on a local scale (i.e., in Doringbaai community, Table 7 8). Conversely, investment from Trans Atlantic Diamonds in South Africa will have a greater positive impact on the regional economy. Trans Atlantic Diamonds 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.

**Table 8-25. Personnel requirement for the operational phase of the Trans Atlantic Diamonds prospecting 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 |

| Personnel requirements | Department | Position | Community Sourced | Training |
|---|---|---|---|---|
| | | Assistant Cook | 2 | 2 |
| | | Steward(ess) | 4 | 4 |
| Operation Crew | Plant | Plante 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** |

Therefore, the following resource support aims are recommended:

- At least 25% of cost of sales excluding labour cost and depreciation will be procured from local producers or local suppliers in South Africa.
- Job creation, with 50% of jobs created reserved for persons of colour and B-BBEE measurements must be maintained. Employment opportunities that will be created through this project include:
    - Employment of local security companies.
    - Employment allocated to port duties.
    - If feasible, employment of local small-scale fisher vessels as support vessels during survey operations.
    - Employment of local or national Geologists, a vessel manager, captain, crew members, scientists, Marine Mammal and Seabird Observers (MMSOs), 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 cost will be paid to South African employees by service industry organisations, including:
    - Prospecting equipment, where and if possible, will be sourced within South Africa or neighbouring communities.
    - Support for operational activities will be sourced from local Doringbaai services for e.g., refuelling, general supplies, and possible equipment repair).
- Skills transfer and training opportunities will be created, and will include environmental officers, Health and Safety Officers, MMSOs and Passive Acoustic Monitoring (PAM) operators, General crew/ deck member and commercial divers to help with surveys.
- Additional compensation and resource support measurements were identified by communities to reduce the severity of the impacts on the socio-economic performance (SU 2013; Nthane *et al.* 2015). These will be implemented by Trans Atlantic Diamonds and include:
    - Skills Development though training programs and formal education opportunities such as financial management skills.

- Support of local initiatives, investments, and entrepreneurship (e.g., communal vegetable garden and opening of the jetty restaurant in Doringbaai).
- Support the development of a local fisheries and businesses and assist in the export of fish locally and internationally. In addition, assist partnership between local fisheries and retail markets.
- Assist local communities in navigating new Small-Scale Fisheries Policy structures.
- Assist in the development of a streamlined communication platform between local community, community representatives, stakeholders, and government officials.
- Support the establishment of an annual abalone festival in Doringbaai.

As the employees will be sourced within South Africa, prospecting is expected to provide regional benefits. In addition, the equipment and technology used in mining/ prospecting vessels are usually sourced and installed in South Africa, further supporting local vendors and artisans. Local vendors and businesses that will also be supported include fueling stations, general supply stores, equipment repair companies, scientific laboratories for analysing sediment samples, environmental consultancies for analysing benthic biological samples, etc. Many of the benefits and positive impacts discussed above will, however, only be achieved during mining. **The benefits associated with prospecting activities are considered to be much less as prospecting is a research phase with no economic gain**. The potential local and regional socio-economic benefits of prospecting were therefore assessed to by INSIGNIFICANT (Table 8-26).

**Table 8-26. 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 |
| **Mitigation measures:** No essential or potential mitigation measures. | | | | | | | | |

## 8.3 Less significant impacts

### 8.3.1 Impacts on palaeontological resources

Impacts of the proposed invasive activities within Concession Area 14C 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 coring. The probability of this impact occurring is possible. The significance of the impact is assessed to be VERY LOW (Table 8-27). 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. 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.

**Table 8-27. Assessment of impacts of invasive 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:**<br>• 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.<br>• Induction must be held for site managers on archaeological site and artefact recognition.<br>• 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 | Lon-term 3 | Low 5 | Possible | VERY LOW | +ve | Low |

### 8.3.2 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. The town closest to Concession Area 14C is that of Doringbaai, which is situated approximately 5 km to the east. It is unlikely that the survey vessel or prospecting activities will generate any noise that could be heard from the shoreline. The entire survey phase is also expected to only take approximately one month (over the next 5 years) to complete. 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 8-28).

**Table 8-28. Potential noise impacts associated with prospecting.**

| | 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:**<br>No essential or potential mitigation measures. | | | | | | | | |

### 8.3.3 Impacts associated with prospecting radioactive material

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 8-29). 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 8-29).

**Table 8-29. Potential impacts associated with prospecting radioactive material.**

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

### 8.3.4 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 14C (Figure 8.1). 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. The impact on shipping traffic is localised, of low intensity and short-term. The significance of this impact was therefore assessed to be INSIGNIFICANT with and without mitigation (Table 8-30).

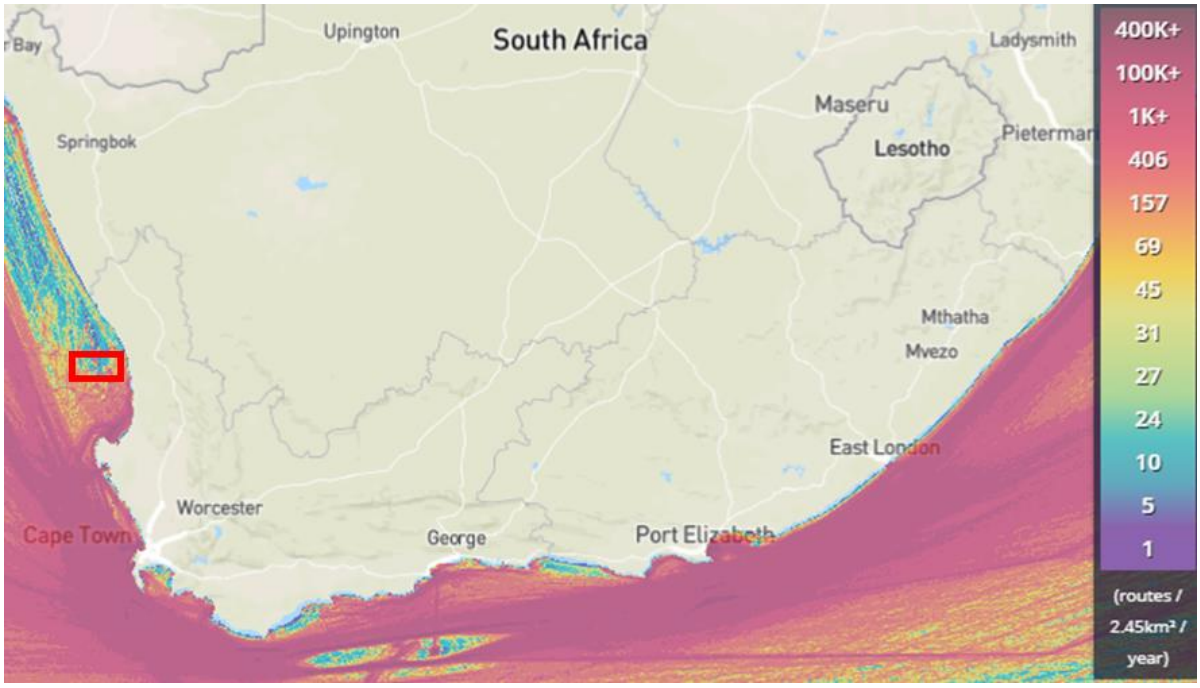



**Figure 8.1.** **Commercial shipping traffic in relation to Concession Area 14C. The concession area is indicated by the red block on the map. Source: https://www.marinetraffic.com/en/ais/home/centerx:16.4/centery:-32.5/zoom:7. Accessed 16 July 2021.**

**Table 8-30.** **Assessment of impacts pertaining to interaction with other vessels.**

| | 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. | | | | | | | | |

### 8.3.5 Visual Impacts

The town closest to Concession Area 14C, i.e., Doringbaai, is situated approximately 5 km east of this concession area. It is unlikely that the survey vessel will be visible from the shoreline. The vessel is also not considered to be more conspicuous than any other vessel (such as fishing vessels) already visiting the area. As the entire survey phase is also expected to only take approximately two months (over the next 5 years) to complete, the vessel and activity in Concession Area are expected to have negligible impacts on the visual integrity of the area (Table 8-31).

**Table 8-31.** **Impacts on 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.

### 8.3.6 Impacts on science

Soil and biological samples will be collected during the prospecting activities using a clamshell bucket instrument called a Van Veen Grab. These samples will then be sent to an independent environmental consultancy for analysis to establish a baseline of environmental data. This comprises analysing sediment composition and determining the composition and abundance of benthic species in the sediment. Data collected during the acoustic survey can be used to map important features such as reefs that may be present in the area. 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 8-32).

**Table 8-32. Potential impact of prospecting on science.**

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

## 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 8.2) 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. In the vicinity of the 14C Concession Area, Trans Atlantic Diamonds has also submitted applications for prospecting rights for concessions 14A 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 8-33). 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.

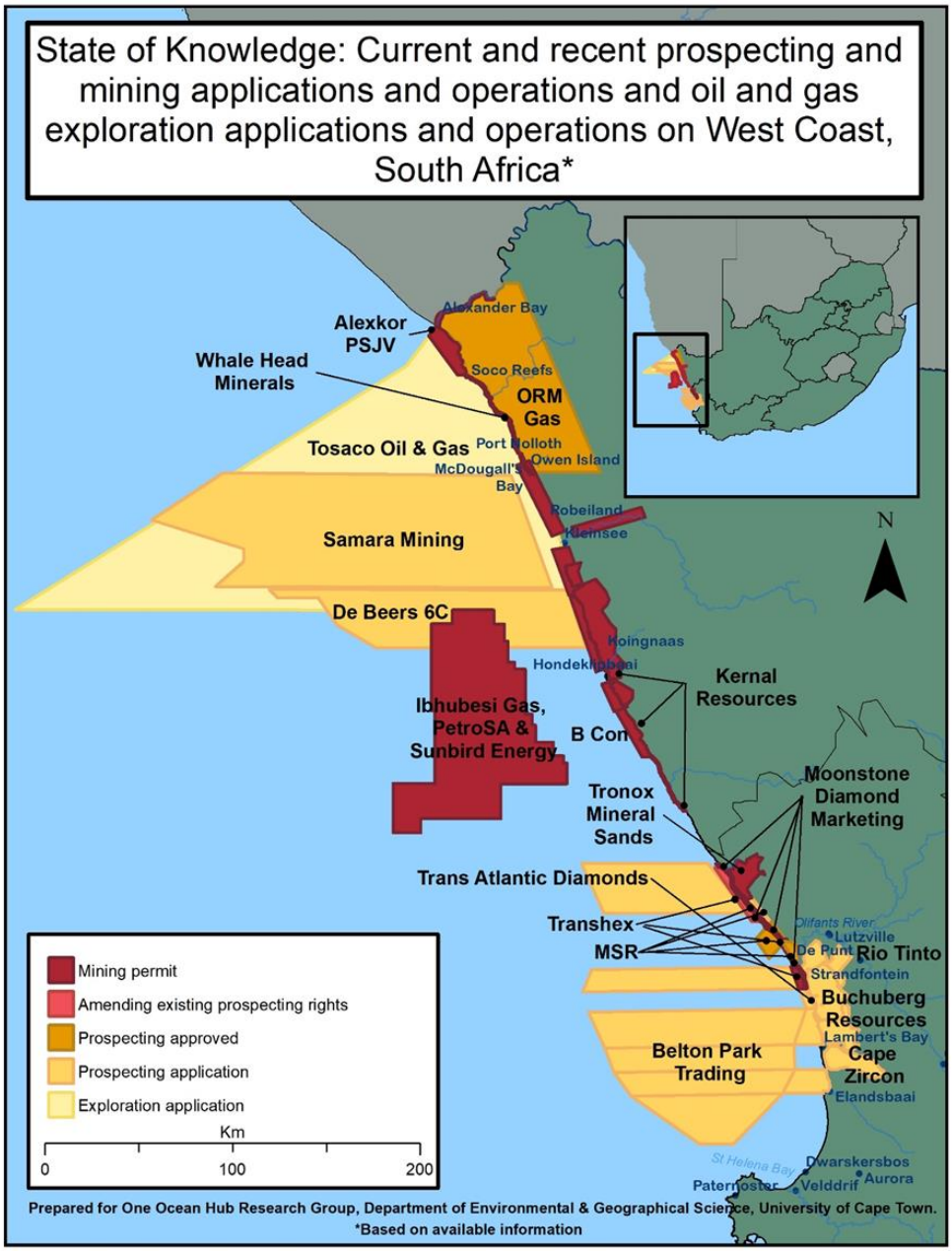



**Figure 8.2.** **Extent of prospecting and mining applications and operations along South Africa's West Coast (Source: Compiled by R. Button for the One Ocean Hub Research Group, Department of Environmental & Geographical Science, University of Cape Town).**

**Table 8-33. 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 | Possible | **LOW** | -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 | Possible | **LOW** | -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:** Impact on fisheries | Regional 2 | Medium 2 | Long-term 1 | Low 5 | Probable | **LOW** | -ve | Low |
| **IMPACTS ON SOCIO-ECONOMIC REOURCES** | | | | | | | | |
| **Impact 18:** Impacts on Tuna pole and linefisheries | Regional 2 | Low 1 | Long-term 3 | Medium 6 | Possible | **LOW** | -ve | Low |
| **Impact 19:** Impacts on Traditional linefish Sector | Regional | Low | Long-term | Medium | Improbable | **LOW** | -ve | Low |

| CUMULATIVE IMPACT | EXTENT | INTENSITY | DURATION | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|---|---|---|
| | 2 | 1 | 3 | 6 | | | | |
| **Impact 20:** Impacts on Small Pelagic Purse Seine Fisheries | Regional 2 | Low 1 | Long-term 3 | Medium 6 | Probable | **MEDIUM** | -ve | Low |
| **Impact 21:** Local households | Regional 2 | Medium 2 | Long-term 3 | High 7 | Probable | **HIGH** | -ve | Low |
| **Impact 22:** Local tourism and businesses | Regional 2 | Low 1 | Long-term 3 | Medium 6 | Possible | **LOW** | -ve | Low |
| **Impact 23:** Sense of place, health and wellbeing | Regional 2 | Low 1 | Long-term 3 | Medium 6 | Improbable | **LOW** | -ve | Low |
| **Impact 24:** Local crime | Regional 2 | Low 1 | Long-term 3 | Medium 6 | Improbable | **LOW** | -ve | Low |
| **Impact 25:** Local and regional socio-economic performance | Regional 2 | Medium 2 | Long-term 3 | High 7 | Possible | **MEDIUM** | +ve | Low |
| **LESS SIGNIFICANT IMPACTS** | | | | | | | | |
| **Impact 26:** Impacts on palaeontological resources | Regional 2 | Low 1 | Long-term 3 | Medium 6 | Probable | **MEDIUM** | +ve | Low |
| **Impact 27:** Noise impacts associated with prospecting | Regional 2 | Low 1 | Medium-term 2 | Low 5 | Possible | **VERY LOW** | -ve | Low |
| **Impact 28:** Impacts associated with prospecting radioactive material | Regional 2 | Low 1 | Long term 3 | Medium 6 | Possible | **LOW** | -ve | Low |
| **Impact 29:** Potential interference with commercial shipping traffic | Regional 2 | Low 1 | Long-term 3 | Medium 6 | Probable | **MEDIUM** | -ve | Low |
| **Impact 30:** Impacts on the visual integrity of the area. | Regional 2 | Low 1 | Long-term 3 | Medium 6 | Probable | **MEDIUM** | -ve | Low |
| **Impact 31:** Impacts on Science | Regional 2 | Low 1 | Long-term 3 | Medium 6 | Definite | **MEDIUM** | +ve | Low |

## 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 14C off the West Coast of South Africa;
- Prevention of any socio-economic benefits associated with the continuation of prospecting activities;
- Lost economic opportunities; 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 8-34). 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 8-35).

**Table 8-34. 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 |
| **Mitigation measures:** No essential or potential mitigation measures. | | | | | | | | |

**Table 8-35. 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 |
| **Mitigation measures:** No essential or potential mitigation measures. | | | | | | | | |

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## 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 8-36. Potential impacts associated with prospecting in Concession area 14C, as identified during the Basic Assessment Process, before and after mitigation.**

| POTENTIAL IMPACT | | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|---|
| **IMPACTS ON MARINE AND FISHERIES RESOURCES** | | | | | | |
| **Impact 1** | Underwater noise disturbance to invertebrates | Very low | Possible | **INSIGNIFICANT** | -ve | Medium |
| | No mitigation | | | | | |
| **Impact 2** | Underwater noise disturbance to fish | Very low | Possible | **INSIGNIFICANT** | -ve | Medium |
| | No mitigation | | | | | |
| **Impact 3** | Underwater noise disturbance to marine mammals | Medium | Probable | **MEDIUM** | -ve | Medium |
| | With mitigation | Low | Improbable | **VERY LOW** | -ve | Medium |

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| POTENTIAL IMPACT | | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|---|
| Impact 4 | Underwater noise disturbance to seabirds | Low | Probable | **LOW** | -ve | High |
| | With mitigation | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| Impact 5 | Underwater noise disturbance to turtles | Very low | Improbable | **INSIGNIFICANT** | -ve | High |
| | With mitigation | Very low | Improbable | **INSIGNIFICANT** | -ve | High |
| Impact 6 | Marine megafauna collisions with survey vessels | Low | Possible | **VERY LOW** | -ve | High |
| | With mitigation | Very low | Improbable | **INSIGNIFICANT** | -ve | High |
| Impact 7 | Offshore based seabed sampling and tailings disposal | Low | Definite | **LOW** | -ve | High |
| | No mitigation | | | | | |
| Impact 8 | Fine sediment plumes | Very low | Definite | **VERY LOW** | -ve | High |
| | No mitigation | | | | | |
| Impact 9 | Waste discharges during vessel operations | Very low | Probable | **VERY LOW** | -ve | High |
| | With mitigation | Very low | Improbable | **INSIGNIFICANT** | -ve | High |
| Impact 10 | Impact on fisheries | Very Low | Probable | **VERY LOW** | -ve | High |
| | With mitigation | Very Low | Possible | **INSIGNIFICANT** | -ve | High |

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| POTENTIAL IMPACT | | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|---|
| **MARINE HERITAGE RESOURCES IMPACTS** | | | | | | |
| **Impact 11** | Cultural heritage and artefacts | Medium | Improbable | **LOW** | -ve | Medium |
| | With Mitigation | Medium | Improbable | **LOW** | +ve | Medium |
| **Impact 12** | Impacts on Maritime Heritage - shipwrecks DEFINITELY present | Low | Definite | **LOW** | -ve | High |
| | With Mitigation | Low | Definite | **LOW** | +ve | High |
| **Impact 13** | Impacts on Maritime Heritage - shipwrecks POSSIBLY present | Low | Possible | **VERY LOW** | -ve | Medium |
| | With mitigation | Low | Possible | **VERY LOW** | +ve | Medium |
| **Impact 14** | Impacts on Maritime Heritage - shipwrecks IMPROBABLE to be present with NO heritage significance | Low | Improbable | **VERY LOW** | -ve | Medium |
| | With mitigation | Low | Improbable | **VERY LOW** | +ve | Medium |
| **Impact 15** | Impacts on Maritime Heritage - shipwrecks IMPROBABLE to be present with LOW heritage significance | Low | Improbable | **VERY LOW** | -ve | Medium |
| | With mitigation | Low | Improbable | **VERY LOW** | +ve | Medium |
| **Impact 16** | Impacts on Maritime Heritage - shipwrecks IMPROBABLE to be present with MEDIUM heritage significance | Medium | Improbable | **LOW** | -ve | Medium |
| | With mitigation | Medium | Improbable | **LOW** | +ve | Medium |
| **Impact 17** | Impacts on Maritime Heritage - shipwrecks IMPROBABLE to be present with HIGH heritage significance | High | Improbable | **MEDIUM** | -ve | Medium |
| | With mitigation | High | Improbable | **MEDIUM** | +ve | Medium |

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| POTENTIAL IMPACT | | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|---|
| **SOCIO-ECONOMIC IMPACTS** | | | | | | |
| **Impact 18** | Impacts on Tuna pole and linefisheries | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| | With mitigation | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| **Impact 19** | Impacts on Traditional linefish Sector | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| | No mitigation | | | | | |
| **Impact 20** | Impacts on Small Pelagic Purse Seine Fisheries | Very Low | Probable | **VERY LOW** | -ve | High |
| | With mitigation | Very Low | Possible | **INSIGNIFICANT** | -ve | High |
| **Impact 21** | Local households | Low | Improbable | **VERY LOW** | -ve | High |
| | No mitigation | | | | | |
| **Impact 22** | Local tourism and businesses | Very Low | Probable | **VERY LOW** | -ve | Medium |
| | With mitigation | Very Low | Improbable | **INSIGNIFICANT** | -ve | Medium |
| **Impact 23** | Sense of place, health and wellbeing | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| | No mitigation | | | | | |
| **Impact 24** | Local crime | Very Low | Improbable | **INSIGNIFICANT** | -ve | High |
| | No mitigation | | | | | |

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| POTENTIAL IMPACT | | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|---|
| Impact 25 | Local and regional socio-economic performance | Very Low | Possible | **INSIGNIFICANT** | +ve | Medium |
| | No mitigation | | | | | |
| **LESS SIGNIFICANT IMPACTS** | | | | | | |
| Impact 26 | Impacts on palaeontological resources | Low | Possible | **VERY LOW** | -ve | Low |
| | With mitigation | Low | Possible | **VERY LOW** | +ve | Low |
| Impact 27 | Noise impacts associated with prospecting | Low | Possible | **INSIGNIFICANT** | -ve | High |
| | No mitigation | | | | | |
| Impact 28 | Impacts associated with prospecting radioactive material | Medium | Improbable | **LOW** | -ve | Low |
| | With mitigation | Very Low | Possible | **INSIGNIFICANT** | -ve | High |
| Impact 29 | Potential interference with commercial shipping traffic | Very Low | Possible | **INSIGNIFICANT** | -ve | Low |
| | No mitigation | | | | | |
| Impact 30 | Impacts on the visual integrity of the area. | Very Low | Possible | **INSIGNIFICANT** | -ve | Medium |
| | No mitigation | | | | | |
| Impact 31 | Impacts on Science | Low | Definite | **LOW** | +ve | High |
| | No mitigation | | | | | |

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**Table 8-37. 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 | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|
| **IMPACTS ON MARINE AND FISHERIES RESOURCES** | | | | | |
| **Impact 1**: Underwater noise disturbance to invertebrates | Medium | Possible | **LOW** | -ve | LOW |
| **Impact 2:** Underwater noise disturbance to fish | Medium | Possible | **LOW** | -ve | Low |
| **Impact 3:** Underwater noise disturbance to marine mammals | High | Improbable | **MEDIUM** | -ve | Low |
| **Impact 4:** Underwater noise disturbance to seabirds | High | Improbable | **MEDIUM** | -ve | Low |
| **Impact 5:** Underwater noise disturbance to turtles | Medium | Improbable | **LOW** | -ve | Low |
| **Marine 6:** megafauna collisions with survey vessels | Medium | Possible | **LOW** | -ve | Low |
| **Impact 7:** Offshore based seabed sampling and tailings disposal | Medium | Possible | **LOW** | -ve | Low |
| **Impact 8:** Fine sediment plumes | Very low | Definite | **VERY LOW** | -ve | Low |
| **Impact 9:** Waste discharge during vessel operations | Low | Improbable | **VERY LOW** | -ve | Low |
| **Impact 10:** Impact on fisheries | Low | Probable | **LOW** | -ve | Low |
| **SOCIO-ECONOMIC IMPACTS** | | | | | |
| **Impact 18:** Impacts on Tuna pole and linefisheries | Medium | Possible | **LOW** | -ve | Low |
| **Impact 19:** Impacts on Traditional linefish Sector | Medium | Improbable | **LOW** | -ve | Low |
| **Impact 20:** Impacts on Small Pelagic Purse Seine Fisheries | Medium | Probable | **MEDIUM** | -ve | Low |
| **Impact 21:** Local households | High | Probable | **HIGH** | -ve | Low |
| **Impact 22:** Local tourism and businesses | Medium | Possible | **LOW** | -ve | Low |
| **Impact 23:** Sense of place, health and wellbeing | Medium | Improbable | **LOW** | -ve | Low |
| **Impact 24:** Local crime | Medium | Improbable | **LOW** | -ve | Low |
| **Impact 25:** Local and regional socio-economic performance | High | Possible | **MEDIUM** | +ve | Low |
| **LESS SIGNIFICANT IMPACTS** | | | | | |
| **Impact 26:** Impacts on palaeontological resources | Medium | Probable | **MEDIUM** | +ve | Low |

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| CUMULATIVE IMPACT | CONSEQUENCE | PROBABILITY | SIGNIFICANCE | STATUS | CONFIDENCE |
|---|---|---|---|---|---|
| **Impact 27:** Noise impacts associated with prospecting | Low | Possible | **VERY LOW** | -ve | Low |
| **Impact 28:** Impacts associated with prospecting radioactive material | Medium | Possible | **LOW** | -ve | Low |
| **Impact 29:** Potential interference with commercial shipping traffic | Medium | Probable | **MEDIUM** | -ve | Low |
| **Impact 30:** Impacts on the visual integrity of the area. | Medium | Probable | **MEDIUM** | -ve | Low |
| **Impact 31:** Impacts on Science | Medium | Definite | **MEDIUM** | +ve | Low |

## 8.7 Methodology used in determining, assessing and ranking impacts

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

The National Environmental Screening Tool was used to assess terrestrial habitat adjacent to Concession Area 14C. 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 |

**Example 1:**

| **Extent** | **Intensity** | **Duration** | **Consequence** |
|---|---|---|---|
| Regional<br>2 | Medium<br>2 | Long-term<br>3 | High<br>7 |

**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 |

**Example 2:**

| **Extent** | **Intensity** | **Duration** | **Consequence** | **Probability** |
|---|---|---|---|---|
| Regional<br>2 | Medium<br>2 | Long-term<br>3 | High<br>7 | Probable |

**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** |

**Example 3:**

| **Extent** | **Intensity** | **Duration** | **Consequence** | **Probability** | **Significance** |
|---|---|---|---|---|---|
| Regional<br>2 | Medium<br>2 | Long-term<br>3 | High<br>7 | Probable | HIGH |

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

**Example 4:**

| Extent | Intensity | Duration | Consequence | Probability | Significance | Status |
|---|---|---|---|---|---|---|
| Regional<br>2 | Medium<br>2 | Long-term<br>3 | High<br>7 | Probable | HIGH | – ve |

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

Impacts are also considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering impacts status and confidence (in assessment) is laid out in the table below. 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 |

**Example 5:**

| Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|
| Regional<br>2 | Medium<br>2 | Long-term<br>3 | High<br>7 | Probable | HIGH | – ve | 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 6: 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 |

**Step 7 – Prepare a summary table of** all impact significance ratings as follows:

| **Impact** | ***Consequence*** | ***Probability*** | **Significance** | ***Status*** | ***Confidence*** |
|---|---|---|---|---|---|
| Impact 1: XXXX | Medium | Improbable | LOW | –ve | High |
| With Mitigation | Low | Improbable | VERY LOW | | High |
| Impact 2: XXXX | Very Low | Definite | VERY LOW | –ve | Medium |
| With Mitigation: | *Not applicable* | | | | |

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.

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

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

Refer to Section 8.1 above for a comprehensive discussion relating to the positive and negative impacts of prospecting in Concession Area 14C. 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 assessment of the impacts of prospecting on the marine ecological environment, fisheries, socio-economic status, marine heritage, shipping, tourism, sense of place, visual integrity, crime rates and science, identified 29 potential negative impacts ranging from MEDIUM to INSIGNIFICANT and two potential positive impacts ranging from LOW to INSIGNIFICANT. 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, and the community of Doringbaai. Mechanisms include disturbance by means of physical sampling activities, acoustic surveys or vessel movement and noise. These impacts have the potential to result in the loss of environmental integrity, social values and economic opportunities. It should, however, be noted that most of these impacts were assessed to be either INSIGNIFICANT or VERY LOW. Marine mammals and shipwrecks of high heritage significance are expected to be the most significantly affected by the prospecting activities. For mammals, this is due to the impacts that the acoustic surveys could have on their echolocation and hence behaviour and critical activities such as feeding.

For shipwrecks, this would be related to damage during invasive prospecting activities. However, this latter impact is not likely to occur as vessels of high significance are improbable to be present in Concession Area 14C and would be detected during the acoustic survey before invasive activities commence. The impact of prospecting on submerged cultural, prehistoric heritage and palaeontological resources is expected to be LOW or VERY LOW and would yield a positive outcome if samples and resources are retained for assessment and reported to the South African Heritage Resource Agency. Due to the location of the concession area relative to the nearest town and harbours (5 km offshore of Doringbaai) 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 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 14 C is considered to be situated in a suitable location where prospecting will have relatively low negative impacts and provide potential benefits.

## 8.9 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).

### 8.9.1 Marine ecology

**Essential mitigation measures for impacts to marine megafauna**

- 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.
- 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, including any attraction of predatory seabirds and incidents of 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).
- 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.

- 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.
- 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 current 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.

**Best Practice Mitigation (Recommended) for impacts related to spills and waste generated by vessels:**

- Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats.
- Inform & empower all staff 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.

- 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.

### 8.9.2 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 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;
    - 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.

**Best Practice Mitigation (Recommended):**

- Appoint a fisheries liaison officer (FLO) 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.

- 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 (e.g., communal vegetable garden and opening of the jetty restaurant in Doringbaai).
- Prospecting activities should be restricted during important tourism events and seasons (i.e., during the perlemoen festival, the school holidays and summer months).
- 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.

### 8.9.3 Heritage resources

**Essential mitigation measures**

- Areas where shipwreck sites are identified during the geophysical surveys must be excluded prior to undertaking sampling activities.
- 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.
- 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.

**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.

### 8.9.4 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.

## 8.10 Motivation where no alternative sites were considered.

Trans Atlantic Diamonds (Pty) Ltd has applied for a right to prospect for diamonds in Sea Area Concession 14C in terms of the Mineral and Petroleum Resources Development Act, 2002, subject to Environmental Authorisation. The concession holder does not have the right to prospect in any other areas. No alternatives sites were therefore considered in this Basic Assessment Process. The applicant has, however, also applied for prospecting rights in Concession Area 14A and 11C. In addition, the concession area is targeted as it is known to contain kimberlite pipes which is a source of diamonds and other mineral deposits. Please also refer to Section 6.8.

## 8.11 Statement motivating the alternative development location within the overall site

Areas of conservation concern will be avoided to preserve the integrity of these environments. Furthermore, reef areas will also be avoided 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. The information collected during the acoustic survey will be reviewed by both the geologist and the Environmental Control Officer/ Scientific Officer to identify any areas that need to be avoided during sampling. The preferred alternative within the site is thus subject to change pending results from the geophysical survey.

## 8.12 Assessment of each identified potentially significant impact and risk

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

**Table 8-38. Summary of all identified impacts of prospecting in Concession Area 14C**

| NAME OF ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE in which impact is anticipated | SIGNIFICANCE if not mitigated | MITIGATION TYPE | SIGNIFICANCE if mitigated |
|---|---|---|---|---|---|---|
| (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route) | (Including the potential impacts for cumulative impacts) (dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution) | | (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure) | | (modify, remedy, control, or stop) through (e.g. noise control measures, stormwater control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. ) E.g. Modify through alternative method. Control through noise control. Control through management and monitoring through rehabilitation. | |
| Planning Phase | N/A | N/A | Planning Phase – Phase 1 | N/A | N/A | N/A |
| Stakeholder consultation | N/A | Consultation with communities | Planning Phase – Phase 1 | N/A | N/A | N/A |
| Geophysical acoustic survey and seafloor mapping | Noise disturbance | Benthic invertebrates | Operational Phase – Phase 1 | Insignificant | N/A | Insignificant |
| Geophysical acoustic survey and seafloor mapping | Noise disturbance | Fish | Operational Phase – Phase 1 | Insignificant | N/A | Insignificant |
| Geophysical acoustic survey and seafloor mapping | Noise disturbance | Marine mammals | Operational Phase – Phase 1 | Medium | • Control through noise control;<br>• Control and modify activities through avoidance in terms of time and space;<br>• Stop impacts through avoidance and terminating activities;<br>• Remedy through design measures and noise control of survey equipment;<br>• Control through management such as through use of an independent Marine Mammal Observer;. | Very Low |

| NAME OF ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE in which impact is anticipated | SIGNIFICANCE if not mitigated | MITIGATION TYPE | SIGNIFICANCE if mitigated |
|---|---|---|---|---|---|---|
| | | | | | Remedy through suspending activities. | |
| Geophysical acoustic survey and seafloor mapping | Noise disturbance | Seabirds | Operational Phase – Phase 1 | Low | Same as above | Insignificant |
| Geophysical acoustic survey and seafloor mapping | Noise disturbance | Turtles | Operational Phase – Phase 1 | Insignificant | N/A | Insignificant |
| All activities including acoustic surveys, core, grab and drill sampling | Injury or death due to collision with survey vessels | Megafauna such as whales | Operational Phase – Phase 1, 2 and 3 | Very Low | • Control and modify activities through avoidance in terms of time and space;<br>• Stop impacts through avoidance and terminating activities;<br>• Remedy through design measures and noise control of survey equipment;<br>• Control through management such as through use of an independent Marine Mammal Observer;.<br>• Remedy through suspending activities.<br>• Control through modifying activities such as vessel speed | Insignificant |
| Seabed sampling and tailings disposal | Disturbance and sediment plumes | Benthic macrofauna | Operational Phase – Phase 3 | Low | • No essential or potential mitigation measures identified<br>• Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats | N/A |
| Vessel and equipment operation during all activities including acoustic surveys, core, grab and drill sampling | Discharge of fine sediment plumes | Phytoplankton and consumers such as fish and invertebrates | Operational Phase – Phase 1, 2 and 3 | Very Low | N/A | N/A |
| Vessel and equipment operation during all activities including | Waste discharges and pollution – deteriorating water quality | The marine environment and ecosystem functions | Operational Phase – Phase 1, 2 and 3 | Very Low | • Management through informing staff;<br>• Management through compliance with relevant standards and protocols; | Insignificant |

| NAME OF ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE in which impact is anticipated | SIGNIFICANCE if not mitigated | MITIGATION TYPE | SIGNIFICANCE if mitigated |
|---|---|---|---|---|---|---|
| acoustic surveys, core, grab and drill sampling | | | | | • Control and modify activities;<br>• Stop impacts through avoidance and terminating activities;<br>• Remedy through design measures;<br>• Control through management such as through use of an independent Marine Mammal Observer;.<br>• Remedy through suspending activities. | |
| Vessel and equipment operation during all activities including acoustic surveys, core, grab and drill sampling | Noise and physical disturbance | Fishing operations, South African fishing sectors dependent upon these resources and species targeted during fishing | Operational Phase – Phase 1, 2 and 3 | Very Low | • Control and modify activities through avoidance in terms of time and space such as undertake surveys when fishing effort is lowest;<br>• Stop impacts through avoidance and terminating activities;<br>• Remedy through design measures and noise control of survey equipment;<br>• Control through management such as appointing fisheries liaison officer to facilitate communication with affected fishing sectors.<br>• Remedy through suspending activities. | Insignificant |
| Core, drill and grab sampling | Disturbance, destruction and loss of Prehistoric Heritage Resources | Prehistoric Heritage Resources | Operational Phase – Phase 2 and 3 | Low | • Avoidance of certain sites<br>• Remedy through collection and preservation of samples | Low positive |
| Core, drill and grab sampling | Disturbance, destruction and loss of Maritime archaeological resources | Maritime archaeological resources, particularly historical shipwrecks | Operational Phase – Phase 2 and 3 | Ranges from Medium to Very Low | See above | Ranges from Medium to Very Low positive |
| Core, drill and grab sampling | Disturbance, destruction and loss of palaeontological resources | Fossils | Operational Phase – Phase 2 and 3 | Very Low | See above | Very Low positive |

| NAME OF ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE in which impact is anticipated | SIGNIFICANCE if not mitigated | MITIGATION TYPE | SIGNIFICANCE if mitigated |
|---|---|---|---|---|---|---|
| Vessel and equipment operation during all activities including acoustic surveys, core, grab and drill sampling | Reduction in fishing success and decline in socio-economic conditions | South African fishing sectors dependent upon these resources and local economy | Operational Phase – Phase 1, 2 and 3 | Very Low to Insignificant | • Control and modify activities through avoidance in terms of time and space such as undertake surveys when fishing effort is lowest;<br>• Stop impacts through avoidance and terminating activities;<br>• Remedy through design measures and noise control of survey equipment;<br>• Control through management such as appointing fisheries liaison officer to facilitate communication with fishing communities.<br>• Remedy through suspending activities. | Very Low to Insignificant |
| Prospecting activities | Increase in local economic and regional opportunities and socio-economic values | Local communities, WCDM and South African economy | Operational Phase – Phase 1, 2 and 3 | Insignificant positive | N/A | N/A |
| Prospecting activities | Tourism and small businesses | Local communities, WCDM and South African economy | Operational Phase – Phase 1, 2 and 3 | Very Low | • Avoid prospecting activity surrounding the seawater intake points.<br>• Ensure compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL) standards.<br>• Develop a waste management plan using waste hierarchy.<br>• A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be always in place during operations.<br>• Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm).<br>• All process areas should be bunded to ensure drainage water flows into the closed drainage system. | Insignificant |

| NAME OF ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE in which impact is anticipated | SIGNIFICANCE if not mitigated | MITIGATION TYPE | SIGNIFICANCE if mitigated |
|---|---|---|---|---|---|---|
| | | | | | • 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.<br>• Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages.<br>• All hydraulic systems should be adequately maintained, and hydraulic hoses should be frequently inspected.<br>• • 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 to minimise the volume of contaminants washing off decks. | |
| Prospecting activities | Sense of place, health and wellbeing | Local communities and WCDM | Operational Phase – Phase 1, 2 and 3 | Insignificant | N/A | Insignificant |
| Acoustic survey and grab samples | Positive contribution to scientific knowledge and baseline environmental data in the area | Scientific knowledge | Operational Phase — Phase 1 and 2 | Low positive | N/A | N/A |
| Vessel operation and physical presence | Disturbance | Vessels and shipping | Operational Phase – Phase 1, 2 and 3 | Insignificant | N/A | Insignificant |
| Physical presence of vessel | Decrease in visual integrity of the area | Sense of place and communities in the area | Operational Phase – Phase 1, 2 and 3 | Insignificant | N/A | Insignificant |

The supporting impact assessment conducted by the EAP is included as part of this BAR.

The four sampling phases are shown in Table 8-39 below.

**Table 8-39. 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 |

## i) Summary of specialist reports.

**Table 8-40. Summary of all specialist reports completed and used informed the impact assessment and final site layout process.**

| LIST OF STUDIES UNDERTAKEN | RECOMMENDATIONS OF SPECIALIST REPORTS | SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with X where applicable) | REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED. |
|---|---|---|---|
| Marine and Fisheries Specialist Study | • It is recommended that an MMSO be on duty during acoustic survey activities and that the listed mitigation measures (halting the survey when cetaceans if cetacean approach within close proximity to the survey vessel and using soft start procedures, etc.) are followed.<br>• For larger migratory cetaceans, acoustic surveying should be confined to seasons when they are scarce to ensure minimal disturbance.<br>• Passive Acoustic Monitoring (PAM) must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility (night-time or mist).<br>• It is recommended that important fishing grounds be identified in consultation with stakeholders so that effective and mutually acceptable mitigation measures can be implemented during acoustic survey, prospecting and future mining phase activities.<br>• Reefs are considered sensitive habitat and it is recommended that they be visually assessed (by means of drop camera deployments or diver surveys) during the baseline environmental survey with regular repeat surveys in the event of future mining operations in the area<br>• Ensure compliance with relevant MARPOL standards to prevent or mitigate pollution.<br>• Conduct the survey outside of the main fishing season in this area (i.e. Conduct prospecting during August – December, avoiding the small pelagic fishing during January-July and snoek line fishing peak during April- May). | X | Section 8.2.1, 8.2.2; 8.9.1; 8.14; 12 |
| Underwater Heritage Specialist Study | • Any core samples which contain alluvial material, particularly where organic remains are present, must be retained for paleo-environmental assessment; and<br>• Any samples of the coarser fraction (i.e. gravel and stone bigger than c. 20 mm) of sorted core sediment should be retained for assessment by an archaeologist for the presence of prehistoric lithic material.<br>• Should maritime resources be encountered during the Geophysical surveys, this should be reported to SAHRA | X | Section8.2.3; 8.14; 12 |
| Socio-economic study | • Stakeholders should be consulted throughout the project life to ensure that their livelihoods and socio-economic conditions are not negatively affected. | X | Section 8.2.4; 8.14; 12 |

| | | | |
|---|---|---|---|
| | • The applicant must adhere to the conditions of their Preferential Procurement and Development policy<br>• Additional compensation and resource support measurements to reduce the severity of the impacts on the socio-economic performance<br>• Skills Development though training programs and formal education opportunities such as financial management skills .<br>• Support of local initiatives, investments, and entrepreneurship (e.g., communal vegetable garden and opening of the jetty restaurant in Doringbaai).<br>• Restrict prospecting activities during important tourism events and seasons (i.e., during the perlemoen festival, the school holidays and summer months).<br>• Assist local communities in navigating new Small Scale Fisheries Policy structures.<br>• Assist in the development of a streamlined communication platform between local community, community representatives, stakeholders, and government officials. | | |

Specialist Reports are included as Appendices 3, 4 and 5.

## 8.13 Environmental impact statement

### 8.13.1 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

The potential positive and negative impacts associated with prospecting in Concession Area 14C 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 assessment identified 29 potential negative impacts ranging from MEDIUM to INSIGNIFICANT and two potential positive impacts ranging from LOW to INSIGNIFICANT. 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, and the community of Doringbaai. Mechanisms include disturbance by means of physical sampling activities, acoustic surveys or vessel movement and noise. These impacts have the potential to result in the loss of environmental integrity, social values and economic opportunities. It should, however, be noted that most of these impacts were assessed to be either INSIGNIFICANT or VERY LOW. Marine mammals and shipwrecks of high heritage significance are expected to be the most significantly affected by the prospecting activities. For mammals, this is due to the impacts that the acoustic surveys could have on their echolocation and hence behaviour and critical activities such as feeding. For shipwrecks, this would be related to damage during invasive prospecting activities. However, this latter impact is not likely to occur as vessels of high significance are improbable to be present in Concession Area 14C and would be detected during the acoustic survey before invasive activities commence. The impact of prospecting on submerged cultural, prehistoric heritage and palaeontological resources is expected to be LOW or VERY LOW and would yield a positive outcome if samples and resources are retained for assessment and reported to the South African Heritage Resource Agency. Due to the location of the concession area relative to the nearest town and harbours (5 km offshore of Doringbaai) 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 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 14 C is considered to be situated in a suitable location where prospecting will have relatively low negative impacts and provide potential benefits. A more detailed summary of the

potential impacts identified and assessed according to each major receptor is provided in Sections 1.3.2 to 1.3.11 below, and are summarised in Section 1.4.

### 8.13.2 Marine ecology and fisheries

Ten 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 seismic disturbance to marine fauna; 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; 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 seismic disturbance to marine mammals and was assessed as 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 on marine mammals arising from the proposed seismic survey activities in Concession 14C would be reduced to VERY LOW significance.

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 limited spatial scale, temporary nature of operations (approximately two months 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 worth noting 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.

### 8.13.3 Heritage

Prospecting activities in Concession Area 14C are likely to have an impact on any submerged Prehistoric Heritage, Marine Archaeological and Palaeontological Resources present within the concession area. The significance of prospecting-related impacts on such material was assessed to be LOW for Prehistoric Heritage and VERY LOW for Palaeontological Resources, while impacts on the

Marine Archaeological Resources were assessed to range from MEDIUM to VERY LOW. The significance will depend on the type of maritime resource discovered and whether and whether it has been damaged during prospecting. There is potential for the status of the potential impacts to be changed from negative to positive if core samples are retained for assessment of paleoenvironmental and prehistoric lithic material.

### 8.13.4 Socio-economics

Prospecting activities are anticipated to have potential negative impacts on several sectors and other aspects within Concession Area 14C . These include potential impacts to tuna pole and line, traditional linefish, small pelagic purse seine fishing sectors, local households, tourism and small businesses, sense of place, crime levels and noise levels. These impacts are related to the 1) the operation and physical presence of vessels in the area; 2) the temporary disturbance of marine resources; 3) exclusion of fishing vessels from the concession area 14C; and 4) the degradation of water quality. The impacts of all of these were assessed to be INSIFGNIFICANT, except for impacts on the small pelagic purse seine fishing, the local households and tourism, which were assessed to be VERY LOW. These are expected to be reduced to INSIGNIFICANT after the implementation of appropriate mitigation measures. Despite this very low impact rating, the poor economic performance of the coastal communities should still be taken into consideration due to their high dependence on marine resources to support their household income and livelihoods. 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.

### 8.13.5 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 also unlikely that any noise would be heard from the shoreline or from Doringbaai which is situated approximately 5 km to the east of the concession area. 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.

### 8.13.6 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.

### 8.13.7 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 14C. The impacts of prospecting activities within concession area 14C on shipping activities are therefore considered to be INSIGNIFICANT.

### 8.13.8 Impact on visual integrity of the ar*ea*

The town closest to Concession Area 14C, Doringbaai, is situated approximately 5 km east of this concession area. It is unlikely that the survey vessel will be visible from the shoreline. The vessel is will not be considered more conspicuous than any other vessel (such as fishing vessels) already visiting the area. As the entire survey phase is also expected to only take approximately two months (over the next 5 years) to complete, the vessel and activity in Concession Area are expected to have negligible impacts on the visual integrity of the area.

### 8.13.9 Contribution to science and research

Soil and biological samples will be collected during the prospecting activities using a clamshell bucket instrument called a Van Veen Grab. These samples will then be sent to an independent environmental consultancy for analysis to establish a baseline of environmental data. This comprises analysing sediment composition and determining the composition and abundance of benthic species in the sediment. Data collected during the acoustic survey can be used to map important features such as reefs that may be present in the area. 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.

### 8.13.10 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. The decision-making authority (DMRE) must take cognisance of this recommendation to do a strategic level Environmental Impact Assessment (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 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. 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.

### 8.13.11 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.

### 8.13.12 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 6.2 and Figure 6.2, Figure 6.3, Figure 6.10 and Figure 6.11 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.

## 8.14 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 are met. In addition, Trans Atlantic Diamonds 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.

### 8.14.1 Environmental sensitivities and awareness:

- Contractor personnel and staff should undergo environmental awareness training 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.
- 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.

### 8.14.2 Marine ecological resources:

- A dedicated onboard Marine Mammal and Seabird Observer (MMSO) should be employed to ensure compliance with mitigation measures during geophysical surveying.
- The vessel must be fitted with Passive Acoustic Monitoring (PAM) technology to be operated by a PAM operator, especially when surveying at night or during adverse weather conditions and thick fog and at all times over the period 1 June – 30 November.
- Restrict prospecting to water depths below 50 m and designate areas shallower than 50 m depth as a restricted zone.
- 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 and mitigation measures 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.

### 8.14.3 Heritage resources

- 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.
- 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 with on the site, unless under permit from SAHRA.

### 8.14.4 Shipping

- Prior to the commencement of activities, the vessel operator must notify relevant bodies including: DMR, DEA, SAMSA, the SAN Hydrographic Office, relevant Port Captains and DAFF: MRM, providing the navigational coordinates of the survey and/or sampling areas.
- 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 Notice to Mariners should provide the co-ordinates of the survey and/or sampling areas.

### 8.14.5 Socio-economics

- Avoid designated fishing spots and undertake surveys preferably out of fishing seasons or when fishing effort is lower.
- Landowners and land occupiers should be consulted at least 1 month before and 1 month after the start of the survey to record any concerns/ comments.
- 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.
- Additional compensation, resource support measurements, skills development and community investment should be considered to reduce the severity of the impacts on the socio-economic performance
- Restrict prospecting activities during important tourism events and seasons (i.e., during the perlemoen festival, the school holidays and summer months).

### 8.14.6 Disturbance management

- Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats.
- Avoid prospecting activity surrounding the seawater intake points.
- Ensure compliance with relevant MARPOL standards.
- Develop a waste management plan using waste hierarchy.

### 8.14.7 Waste management and water pollution:

- Contractor personnel and staff should undergo waste management and spill management training.
- 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.
- A water quality monitoring system should be developed and implemented

## 8.15 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.

# 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.
- There is currently no high-resolution bathymetry data available for Concession area 14C. 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 the acoustic surveys. After completion of the survey, information should be reviewed to determine if the EMPr needs to be amended.
- Due to the paucity of bathymetry data for this concession area, the exact location of the grab, core and drill samples are yet to be determined, pending the results of the acoustic surveys.
- It is assumed that the project description and activities will not change after the completion of this report.

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

### 9.2.1 Reasons why the activity should be authorised or not.

The EAP recommends that Environmental Authorisation for prospecting rights within sea Concession Area 14C 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 be of LOW significance to INSIGNIFICANT with the implementation of mitigation measures. The EAP also strongly 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.

### 9.2.2 Conditions that must be included in the authorisation

See Section 8.15 above.

## 9.3 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

## 9.4 Undertaking

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

An undertaking is provided at the end of this report. See Section 13.

# 10 FINANCIAL PROVISION

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

Approximately R16,787,220 is available to complete surveying, sampling and the feasibility study. An additional R335,000 for rehabilitation monitoring after the prospecting, and for emergencies and remediation. An additional R580,000.00 has been set aside to implement the EMPr as part of prospecting activities.

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.

## 10.1 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.**

| PHASE | ACTIVITY | Cost USD ($) | Cost ZAR (R) |
|---|---|---|---|
| **GEOPHYSICAL OPERATIONS** – DP Star | | | |
| **PHASE 1 -** | Acoustic survey: Survey data acquisition Phase 1 | 90,000 | |
| | Data interpretation by geological team | 7,200 | |
| | **Sub-total** | **97,200** | **1,479,345.12** |
| **PHASE 2** | Survey data acquisition Phase 2 | 135,000 | |
| | Data interpretation by geological team | 10,800 | |
| | **Sub-total** | **145,800** | **2,219,017.68** |
| | Survey deliverables (footwall DEM, SedT, contours, maps) | 6,000 | 91,317.60 |
| **DRILL SAMPLING OPERATIONS** – The Explorer | | | |
| **PHASE 3** | Sampling Planning | 6,000 | |
| | Sampling Execution | 835,000 | |
| | **Sub-total** | **841,000** | **12,799,683.60** |
| **MINING FEASIBILITY STUDY REPORT** | | | |
| **PHASE 4** | Cost of competent person (Geologist) | 13,000 | 197,854.80 |
| **TOTAL COST** | | **1,103,000.00** | **16,787,218.80** |

**Table 10-2. Potential costs related to the implementation of the EMPR, rehabilitation monitoring and in the event of an emergency.**

| REMEDIATION FINANCIAL PLAN AND EMERGENCY RESPONSES | | |
|---|---|---|
| **ACTIVITY** | **TASK** | **TOTAL COST** |
| **ANNUAL REHABILITATION SURVEY TOTAL** | | **R335,000.00** |
| **Microbiological monitoring** | Analysis and write-up | R30,000.00 |
| **Water quality monitoring** | Collection of samples analysis | R30,000.00 |
| | Analysis and write-up | |
| **Sediment quality monitoring** | Sample collection | R40,000.00 |
| | Laboratory analysis | |
| | Write-up | |
| **Annual biophysical monitoring** | Benthic macrofauna & Fish | R40,000.00 |
| | Sample collection | |
| | Laboratory analysis | |
| | Write-up | |
| **Impact assessment** | Analysis | R15,000.00 |
| **Preparation for any emergency that could result in an environmental impact (oil spill/vessel collision)** | Emergency services required (eg. Dedicated oil clean-up vessel) | R50 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 (see contents in Section 4.3.7). | |
| | NSRI Rescue | |
| | Use of helicopters for emergency services | |
| **Emergency Impact survey** | Sample collection | R50 000 |
| | Analysis and Write-up | |
| | Compilation of report | |
| **Reimbursement for damages** | | R80 000 |

| COSTS TO MEET EMPR REQUIREMENTS | | |
|---|---|---|
| **ACTIVITY** | **TASK** | **TOTAL COST** |
| **TOTAL COSTS** | | **R 580 000** |
| **Training** | Environmental awareness training & induction for archaeological heritage | R50 000 |
| **Pollution control and waste management** | Appointing contractor | R50 000 |
| **Auditing and compliance** | Appoint independent ECO auditor | R200 000 |
| | Appoint internal auditor | |

| COSTS TO MEET EMPR REQUIREMENTS | | |
|---|---|---|
| | Internal audits at the end of each survey/sampling campaign | |
| **Stakeholder consultation** | Appointing a FLO to consult with stakeholders and communities | R30 000 |
| **Baseline surveys** | Analysis of baseline sediment samples and reporting | R100 000 |
| **Protection of marine megafauna** | Appointment of MMSOs' and PAM operators. PAM equipment hiring | R150 000 |

## 10.2 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).

Funding will be provided though Trans Atlantic Diamonds (Pty) Ltd. The company is affiliated with more than one Financial Institution. They are financially in good standing and have more than the budgeted amount available to conduct the prospecting activities. 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 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

## 11.1 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):

### 11.1.1 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 statement has also been attached as Appendix 5.

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

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

The Heritage Impact Assessment Report has been attached as Appendix 4. The applicable mitigation measures have been included in the relevant sections. Prospecting activities could potentially have an impact on submerged Prehistoric Heritage, Marine Archaeological and Palaeontological Resources present within Concession Area 14C. The significance of prospecting-related impacts on such material was assessed to LOW and VERY LOW for Prehistoric Heritage and Palaeontological Resources, respectively, while that on the Marine Archaeological Resources were assessed to range from INSIGNIFICANT to MEDIUM. There is potential for the status of the potential impacts to be changed from negative to positive if core samples are retained for assessment of paleoenvironmental and prehistoric lithic material and shipwrecks reported to SAHRA. See impact tables Table 11-1 to Table 11-8 below.

**Table 11-1. Impacts of invasive sampling on cultural heritage and artefacts.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Medium 2 | Long-term 3 | Medium 6 | Improbable | **LOW** | – ve | Medium |
| **Essential mitigation measures:**<br>• Retain samples for assessment by an archaeologist and palaeontologist for the presence of important material.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would possibly identify wrecks and wreck debris. | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| • Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these Maritime and Underwater Cultural Heritage (MUCH) resources. | | | | | | | | |
| With mitigation | Local<br>1 | Medium<br>2 | Long-term<br>3 | Medium<br>6 | Improbable | **LOW** | + ve | Medium |

**Table 11-2. Assessment of impacts of invasive sampling on shipwrecks DEFINITELY present in 14C.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local<br>1 | Low<br>1 | Long-term<br>3 | Low<br>5 | Definite | **LOW** | – ve | High |
| **Essential mitigation measures:**<br>• There is currently no heritage significance for these ships.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local<br>1 | Low<br>1 | Long-term<br>3 | Low<br>5 | Definite | LOW | + ve | High |

**Table 11-3. Assessment of impacts of invasive sampling on shipwrecks POSSIBLY present in 14C.**

| | **Extent** | **Intensity** | **Duration** | **Consequence** | **Probability** | **Significance** | **Status** | **Confidence** |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local<br>1 | Low<br>1 | Long-term<br>3 | Low<br>5 | Possible | **VERY LOW** | – ve | Medium |
| **Essential mitigation measures:**<br>• There is currently no heritage significance for these ships.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local<br>1 | Low<br>1 | Long-term<br>3 | Low<br>5 | Possible | **VERY LOW** | + ve | Medium |

**Table 11-4. Assessment of impacts of invasive sampling on shipwrecks which are IMPROBABLE to be present in 14C - shipwrecks with NO heritage significance.**

| | **Extent** | **Intensity** | **Duration** | **Consequence** | **Probability** | **Significance** | **Status** | **Confidence** |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local<br>1 | Low<br>1 | Long-term | Low<br>5 | Improbable | **VERY LOW** | – ve | Medium |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 3 | | | | | |
| **Essential mitigation measures:**<br>• There is currently no heritage significance for these ships.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Improbable | **VERY LOW** | + ve | Medium |

**Table 11-5. Assessment of impacts of invasive sampling on shipwrecks which are IMPROBABLE to be present in 14C - shipwrecks with LOW heritage significance.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Improbable | **VERY LOW** | – ve | Medium |
| **Essential mitigation measures:**<br>• There is currently no heritage significance for these ships.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local 1 | Low 1 | Long-term 3 | Low 5 | Probable | **LOW** | + ve | Medium |

**Table 11-6. Assessment of impacts of invasive sampling on shipwrecks which are IMPROBABLE to be present in 14C - shipwrecks with MEDIUM heritage significance.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | Medium 2 | Long-term 3 | Medium 6 | Improbable | **LOW** | – ve | Medium |
| **Essential mitigation measures:**<br>• There is currently no heritage significance for these ships.<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local 1 | Medium 2 | Long-term 3 | Medium 6 | Possible | **LOW** | + ve | Medium |

**Table 11-7. Assessment of impacts of invasive sampling on shipwrecks which are IMPROBABLE to be present in 14C - shipwrecks with HIGH heritage significance.**

| | Extent | Intensity | Duration | Consequence | Probability | Significance | Status | Confidence |
|---|---|---|---|---|---|---|---|---|
| Without mitigation | Local 1 | High 3 | Long-term 3 | High 7 | Improbable | **MEDIUM** | – ve | Medium |
| **Essential mitigation measures:**<br>• Induction for site managers on archaeological site and artefact recognition.<br>• Geophysical surveys would pinpoint the wrecks to avoid damaging equipment.<br>• Reporting of sites to the heritage practitioner for assessment and evaluation.<br>• Avoiding the wrecks would preserve these MUCH resources for future generations. | | | | | | | | |
| With mitigation | Local 1 | High 3 | Long-term 3 | High 7 | Possible | **MEDIUM** | + ve | Medium |

**Table 11-8. Assessment of impacts of invasive 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:**<br>• 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.<br>• Induction must be held for site managers on archaeological site and artefact recognition.<br>• 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 | Lon-term 3 | Low 5 | Possible | VERY LOW | +ve | Low |

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

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

A motivation has been attached as Appendix 8.

# ENVIRONMENTAL MANAGEMENT PROGRAMME

Please note that the Environmental Management Programme (EMPr) for this project was prepared as a separate standalone document and is made available to stakeholders with the Final BAR and Appendices. The information presented below is a summary of this EMPr and should not be considered the Official document for implementation. Please refer to the Document: "Basic Assessment Process for the proposed prospecting in Sea Concession Area 14C by Trans Atlantic Diamonds (Pty) Ltd. Part B: Environmental Management Programme" for the Official EMPr.

## 12 SUMMARY ENVIRONMENTAL MANAGEMENT PROGRAMME

### 12.1 Details of the EAP

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

It is confirmed that the details of the EAP is included in Part A. The EAPs CV has also been attached as Appendix 1.

### 12.2 Description of the Aspects of the Activity.

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

It is confirmed that the aspects of the activity are included in Part A of this report.

### 12.3 Composite Map

(Provide a map (Attached as an Appendix 7) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers)

Refer to Section 6.2 and Figure 6.2, Figure 6.3, Figure 6.10 and Figure 6.11 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.

### 12.4 Description of Impact management objectives including management statements

#### 12.4.1 Determination of closure objectives.

(ensure that the closure objectives are informed by the type of environment described)

- 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 14C.
- 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. 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, Trans Atlantic Diamonds would have to apply for a closure certificate from the DMRE.

### 12.4.2 Volumes and rate of water use required for the operation.

No water use is required as this is an offshore application

### 12.4.3 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.

### 12.4.4 Impacts to be mitigated in their respective phases

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

**Table 12-1. Summary of the activities, impacts, mitigation measures and how these will comply with environmental management standards.**

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route) | (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure) | (Including the potential impacts for cumulative impacts) (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc) | | (modify, remedy, control, or stop) through (e.g. noise control measures, stormwater control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc). E.g. Modify through alternative method. Control through noise control. Control through management and monitoring through rehabilitation. | | |
| Planning and design Phase | Planning Phase – Phase 1 | N/A | 106 001 ha | N/A | N/A | Prior to commencement of operation |
| Desktop study and literature review | Planning Phase – Phase 1 | N/A | 106 001 ha | N/A | N/A | Prior to commencement of operation |
| Stakeholder consultation | Planning, Operational and Closure Phase – Phase 1 | N/A | N/A | N/A | N/A | Prior to commencement of operation and throughout the entire process |
| Geophysical acoustic survey | Operational Phase – Phase 1 | Noise disturbance impacting marine fauna | 106 001 ha | • Activity must be restricted to specific areas or a time of year<br>• Sound containment and improvement of current equipment used must be implemented<br>• 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.<br>• Implement “soft-starts” of at least 20 minutes duration.<br>• Employ on board independent observer(s) / MMSO(s) with experience in seabird, turtle and marine mammal | N/A | Approximately five days. . Should be completed within four months after the start of the programme. |

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| | | | | identification and observation techniques to carry out daylight observations.<br>• 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 (commonly encountered on the west coast of South Africa).<br>• 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.<br>• Terminate acoustic survey if mass mortalities of fish are observed.<br>• 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).<br>• Record incidences of encounters with marine life (seabirds, turtles, seals, fish) their behaviour and response to acoustic survey activity.<br>• Suspend operations if any obvious mortalities or injuries to marine life are observed.<br>• 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 | | |

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| | | | | commence for at least 20-minutes duration. Small cetacean behaviour during "soft starts" shall be monitored.<br>• Record seabird incidences and behaviour, including any attraction of predatory seabirds and incidents of feeding behaviour around the survey vessel.<br>• Ensure that MMOs compile a survey close–out report incorporating all recorded data to the relevant DFFE authorities.<br>• 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 | Operational Phase – Phase 1 | N/A | 106 001 ha | N/A | N/A | Directly after the acoustic survey. |
| Vessel operation | Operational Phase – Phase 1, 2 and 3 | Injury or death of Megafauna such as whales due to collision with survey vessels | 106 001 ha | • 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.<br>• Passive Acoustic Monitoring (PAM) must be incorporated into any survey programme and used to detect cetaceans, particularly during periods of low visibility.<br>• 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<br>• Vessel transit speed to not exceed 12 knots (22 km/hr), except within 25 km of the coast where it should be kept to | Standard vessel operation procedures | Throughout sampling activities |

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| | | | | less than 10 knots (18 km/hr) as well as when sensitive marine fauna are present in the vicinity | | |
| Grab sampling | Operational Phase – Phase 1 | Disturbance, destruction and loss of Prehistoric, Maritime and Heritage Resources | 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 by the 50 grab samples is estimated at 1.5 $m^3$, while the total surface area that will be disturbed is estimated to be 5 $m^2$ over the area of 106 001 ha | • 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.<br>• Any core samples are retained and subjected to assessment.<br>• If artefacts are found during the course of sampling in any of the concession areas, the following mitigation measure should be applied:<br>• 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;<br>• Take photographs, noting the date, time, location and types of artefacts found.<br>• Do not remove, disturb or, destroy the artefacts or site<br>• Areas where shipwreck sites are identified during the geophysical surveys must be excluded prior to undertaking sampling activities | Heritage Act; NEMA; EIA Regulations | • Approximately 2 to five days. |
| Core sampling | Operational Phase – Phase 2 | Disturbance, destruction and loss of Prehistoric, Maritime and Heritage Resources | Each core collects approximately 0.024 $m^3$ of sediment and will disturb a total surface | Same as above | Heritage Act; NEMA; EIA Regulations | Approximately 10 to 20 days and within six months after the acoustic surveys and grab sampling have been completed. |

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| | | | 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 $m^2$ over the area of 106 001 ha | | | |
| Drill sampling | Operational Phase – Phase 3 | Disturbance, destruction and loss of Prehistoric, Maritime and Heritage Resources | A total surface area of approximately 7 500 $m^2$ (or 0.75 ha) is estimated to be disturbed across the entire concession area of 106 001 ha. | Same as above | Heritage Act; NEMA; EIA Regulations | Approximately 50 days and within six months after the core sampling have been completed. |
| Grab sampling | Operational Phase – Phase 1 | Disturbance of marine fauna due to physical activities and sediment plumes | Each grab has a total volume of 0.03 $m^3$ and is anticipated to disturb an area | • Avoid reef and sensitive habitats | NEMA; EIA Regulations | Approximately 5 days. |

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| | | | covering approximately 0.1 $m^2$. The total volume of sediment that will be collected by the 50 grab samples is estimated at 1.5 $m^3$, while the total surface area that will be disturbed is estimated to be 5 $m^2$ over the area of 106 001 ha | | | |
| Core sampling | Operational Phase – Phase 2 | Disturbance of marine fauna due to physical activities and sediment plumes | 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 | • Avoid reef and sensitive habitats | NEMA; EIA Regulations | Approximately 10 – 20 days and within six months after the acoustic surveys and grab sampling have been completed. |

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| | | | $m^3$, while the total surface area that will be disturbed is estimated to be 1.57 $m^2$ over the area of 106 001 ha | | | |
| Drill sampling | Operational Phase – Phase 3 | Disturbance of marine fauna due to physical activities and sediment plumes | A total surface area of approximately 7 500 $m^2$ (or 0.75 ha) is estimated to be disturbed across the entire concession area of 106 001 ha. | • Avoid reef and sensitive habitats | NEMA; EIA Regulations | Approximately 50 days and within six months after the core sampling have been completed. |
| Tailings disposal | Operational Phase – Phase 3 | Disturbance of benthic macrofauna and due to physical activity and sediment plumes | A designated area should be assigned to dispose of tailings to ensure that sensitive habitats area avoided | • No essential or potential mitigation measures identified<br><br>**Best Practice:**<br>• Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats. | N/A | • During the drill sampling activities |
| Waste discharges | Operational Phase – Phase 1, 2 and 3 | Waste discharges and pollution, deteriorating water | Waste should not be disposed of in the sea. | • Inform & empower all staff about sensitive marine species & suitable disposal of waste;<br>• Ensure compliance with relevant MARPOL standards; | Adherence to South African Water | • While the vessel is operating in |

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| | | quality and disturbance | | • Develop a waste management plan using waste hierarchy;<br>• A Shipboard Oil Pollution Emergency Plan (SOPEP) must be prepared for all vessels and should be in place at all times during operations;<br>• Deck drainage should be routed to a separate drainage system (oily water catchment system) for treatment to ensure compliance with MARPOL (15 ppm);<br>• All process areas should be bunded to ensure drainage water flows into the closed drainage system;<br>• 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;<br>• Low-toxicity biodegradable detergents should be used in the cleaning of all deck spillages;<br>• All hydraulic systems should be adequately maintained and hydraulic hoses should be frequently inspected; and<br>• 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 | Quality Guidelines and MARPOL | the concession area. |
| Vessel operation and physical presence | Operational Phase – Phase 1, 2 and 3 | Disturbance to vessels and shipping | 106 001 ha | 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:<br>• A Marine Linefish Management Association (SAMLMA);<br>• South African Pelagic Fishing Industry Association (SAPFIA);<br>• South African Tuna Association (SATA);<br>• South African Tuna Longline Association (SATLA)<br>• Large Pelagic Small Medium & Micro Enterprises Association (LPSMME)<br>• Local fishing communities; | N/A | Throughout sampling activities |

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| | | | | • DFFE;<br>• SAMSA;<br>• South African Navy Hydrographic office; and<br>• Overlapping and neighbouring right holders | | |
| Vessel and equipment operation during all activities | Operational Phase – Phase 1, 2 and 3 | Reduction in fishing success and decline in socio-economic conditions community fishing sectors dependent upon these resources. | 106 001 ha | • Avoid designated fishing grounds and undertake surveys preferably out of fishing seasons or when fishing effort is lower<br>• Continuous consultation with stakeholders<br>• 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<br>• Best practice:<br>• 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:<br>• SA Marine Linefish Management Association (SAMLMA);<br>• South African Pelagic Fishing Industry Association (SAPFIA);<br>• South African Tuna Association (SATA);<br>• South African Tuna Longline Association (SATLA)<br>• Large Pelagic Small Medium & Micro Enterprises Association (LPSMME)<br>• Local fishing communities;<br>• DFFE;<br>• SAMSA;<br>• South African Navy Hydrographic office; and<br>• Overlapping and neighbouring right holders | N/A | Throughout sampling activities |

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| Physical presence of the vessel | Operational Phase – Phase 1, 2 and 3 | Visual impact potentially decreasing sense of place | N/A | • No essential or potential mitigation measures deemed necessary | N/A | Throughout sampling activities |
| Data acquisition and synthesis | N/A | N/A | 106 001 ha | N/A | N/A | Approximately three months |
| Feasibility study and resource estimation | N/A | N/A | 106 001 ha | N/A | N/A | Approximately six months |
| Decommissioning and Closure | Decommissioning Phase | N/A | N/A | N/A | NEMA and the EIA regulations. On completion of the prospecting activities, Trans Atlantic Diamonds would have to apply for a closure certificate from the DMRE. | Where the throughput of the activity has reduced by 90% or more over a period of 5 years |
| Rehabilitation | N/A | 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 | N/A | N/A |

| NAME OF ACTIVITY | PHASE IN WHICH IMPACT IS ANTICIPATED | POTENTIAL IMPACT | SIZE AND SCALE | MITIGATION MEASURE | COMPLIANCE | TIME |
|---|---|---|---|---|---|---|
| | | | | tailings are not discarded onto sensitive reef habitat, should be implemented | | |

## 12.5 Impact Management Outcomes

**Table 12-2. A description of impact management outcomes.**

| ACTIVITY (whether listed or not listed). | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | MITIGATION TYPE | STANDARD TO BE ACHIEVED |
|---|---|---|---|---|---|
| (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.). | (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air Pollution, etc) | | In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, postclosure | (modify, remedy, control, or stop) through (e.g. noise control measures, stormwater control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) •Modify through alternative method. •Control through noise control •Control through management and monitoring •Remedy through rehabilitation.. | (Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. |
| Planning and design Phase | N/A | N/A | Planning Phase – Phase 1 | N/A | Avoiding impacts |
| Desktop study and literature review | N/A | | Planning Phase – Phase 1 | N/A | Avoiding impacts |
| Stakeholder consultation | N/A | Local communities | Planning, Operational and Closure Phase | • Management | Avoiding and mitigating impacts. NEMA; EIA Regulations |
| Geophysical acoustic survey | Noise disturbance impacting marine fauna | Fish, Marine mammals, Marine mammals, Turtles | Operational Phase – Phase 1 | • Control through noise control;<br>• Control and modify activities through avoidance in terms of time and space;<br>• Stop impacts through avoidance and terminating activities; | Limit noise levels<br>Limit impacts, injury or death to animals;<br>SANS 10103 |

| ACTIVITY (whether listed or not listed). | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | MITIGATION TYPE | STANDARD TO BE ACHIEVED |
|---|---|---|---|---|---|
| | | | | • Remedy through design measures and noise control of survey equipment;<br>• Control through management such as through use of an independent Marine Mammal Observer;<br>• Remedy through suspending activities. | |
| Geological modelling | N/A | N/A | Operational Phase – Phase 1 | N/A | To limit impacts by means of selecting specific sites for drilling and avoiding sensitive sites |
| Vessel operation | Injury or death of Megafauna such as whales due to collision with survey vessels | Megafauna such as whales | Operational Phase – Phase 1, 2 and 3 | • Control and modify activities through avoidance in terms of time and space;<br>• Stop impacts through avoidance and terminating activities;<br>• Control through management such as through use of an independent Marine Mammal Observer;.<br>• Control through modifying activities such as vessel speed | Avoiding impacts such as injury or death to animals and damage to vessels |

| ACTIVITY (whether listed or not listed). | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | MITIGATION TYPE | STANDARD TO BE ACHIEVED |
|---|---|---|---|---|---|
| Grab sampling | Disturbance of marine fauna due to physical activities and sediment plumes | Benthic macrofauna | Operational Phase – Phase 1 | • Control and modify activities through avoidance in terms of time and space;<br>• Stop impacts through avoidance and terminating activities;<br>• Remedy through suspending activities. | Limit impacts and disturbance; |
| Core sampling | Disturbance of marine fauna due to physical activities and sediment plumes | Benthic macrofauna | Operational Phase – Phase 2 | See above | Limit impacts and disturbance |
| Drill sampling | Disturbance of marine fauna due to physical activities and sediment plumes | Benthic macrofauna | Operational Phase – Phase 3 | See above | Limit impacts and disturbance; Listing Notice 1 |
| Grab, core and drill sampling | Destruction and loss of Prehistoric Heritage, palaeontological and Maritime archaeological resources, particularly historical shipwrecks | Prehistoric Heritage, palaeontological (fossils) and Maritime archaeological resources, particularly historical shipwrecks | Operational Phase – Phase 2 and 3 | • Avoidance of certain sites<br>Remedy through collection and preservation of samples | Limit impacts and destruction of Prehistoric Heritage, palaeontological and Maritime archaeological resources;<br>Heritage Act |
| Tailings disposal | Disturbance of benthic macrofauna and due to physical activity and sediment plumes | Phytoplankton and consumers such as fish and invertebrates | Operational Phase – Phase 3 | No essential or potential mitigation measures identified<br>**Best Practice:**<br>Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats | To limit impacts by means of selecting specific sites for drilling and avoiding sensitive sites |

| ACTIVITY (whether listed or not listed). | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | MITIGATION TYPE | STANDARD TO BE ACHIEVED |
|---|---|---|---|---|---|
| Waste discharges | Waste discharges and pollution, deteriorating water quality and disturbance | The marine environment and ecosystem functions | Operational Phase – Phase 1, 2 and 3 | • Management through informing staff;<br>• Management through compliance with relevant waste standards and protocols;<br>• Control and modify activities;<br>• Stop impacts through avoidance and terminating activities;<br>• Remedy through design measures;. | Limit impacts; limit waste through management; NEM:WA. Adherence to South African Water Quality Guidelines and MARPOL |
| Vessel operation and physical presence | Disturbance to vessels, shipping activities and fishing activities | Vessels and shipping | Operational Phase – Phase 1, 2 and 3 | • Control and modify activities through avoidance in terms of time and space;<br>• Stop impacts through avoidance and terminating activities;<br>• Remedy through design measures and noise control of survey equipment;<br>• Control through management<br>• Remedy through suspending activities. | Limit disturbance |
| Physical presence of vessel | Visual impact | Visual integrity and sense of place | Operational Phase – Phase 1, 2 and 3 | NA | N/A |

| ACTIVITY (whether listed or not listed). | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | MITIGATION TYPE | STANDARD TO BE ACHIEVED |
|---|---|---|---|---|---|
| Vessel and equipment operation during all activities | Reduction in fishing success and decline in socio-economic conditions of Local fishing communities dependent upon these resources and local economy | Species targeted during fishing, fishing operations and local fishing communities dependent upon these resources | Operational Phase – Phase 1, 2 and 3 | See above | NEMA; EIA Regulations; Limit disturbance and impact on local communities |
| Grab, core and drill sampling | Destruction of Prehistoric Heritage, palaeontological and Maritime archaeological resources, particularly historical shipwrecks | Prehistoric Heritage, palaeontological (fossils) and Maritime archaeological resources, particularly historical shipwrecks | Operational Phase – Phase 1, 2 and 3 | • Avoidance of certain sites<br>• Remedy through collection and preservation of samples | Limit destruction of resources. Preservation of resources |
| Data acquisition and synthesis | N/A | N/A | Operational Phase – Phase 4 | N/A | N/A |
| Feasibility study and resource estimation | N/A | N/A | Operational Phase – Phase 4 | N/A | N/A |
| Decommissioning and Closure | N/A | N/A | Decommissioning Phase | N/A | Closure certificate; NEMA |
| Rehabilitation | N/A | N/A | Decommissioning Phase | N/A. | N/A |

## 12.6 Impact Management Actions

**Table 12-3. A description of impact management actions, identifying the manner in which the impact management objectives and outcomes will be achieved.**

| ACTIVITY whether listed or not listed. | POTENTIAL IMPACT | MITIGATION TYPE | TIME PERIOD FOR IMPLEMENTATION | COMPLIANCE WITH STANDARDS |
|---|---|---|---|---|
| (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.). | (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.) | (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)<br>•Modify through alternative method.<br>•Control through noise control<br>•Control through management and monitoring<br>•Remedy through rehabilitation. | Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required.<br>With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.<br>Upon cessation of the individual activity or.<br>Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be. | (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities) |
| Planning and design Phase | N/A | N/A | Prior to commencement | Avoiding impacts |
| Desktop study and literature review | N/A | N/A | Prior to commencement | Avoiding impacts |
| Stakeholder consultation | N/A | Management | Prior to commencement of operation and throughout the entire process | Avoiding and mitigating impacts.<br>NEMA; EIA Regulations |
| Geophysical acoustic survey | Noise disturbance impacting marine fauna | • Control through noise control;<br>• Control and modify activities through avoidance in terms of time and space;<br>• Stop impacts through avoidance and terminating activities;<br>• Remedy through design measures and noise control of survey equipment; | Throughout the acoustic survey operation | Limit noise levels<br>Limit impacts, injury or death to animals;<br>SANS 10103 |

| ACTIVITY whether listed or not listed. | POTENTIAL IMPACT | MITIGATION TYPE | TIME PERIOD FOR IMPLEMENTATION | COMPLIANCE WITH STANDARDS |
|---|---|---|---|---|
| | | • Control through management such as through use of an independent Marine Mammal Observer;.<br>Remedy through suspending activities. | | |
| Geological modelling | N/A | N/A | After the modelling, sites for drilling and sites for avoidance should be selected | To limit impacts by means of selecting specific sites for drilling and avoiding sensitive sites |
| Vessel operation | Injury or death of Megafauna such as whales due to collision with survey vessels | • Control and modify activities through avoidance in terms of time and space;<br>• Stop impacts through avoidance and terminating activities;<br>• Control through management such as through use of an independent Marine Mammal Observer;.<br>Control through modifying activities such as vessel speed | Throughout the entire prospecting survey during which the vessel is being operated | Avoiding impacts such as injury or death to animals and damage to vessels |
| Grab sampling | Disturbance of marine fauna due to physical activities and sediment plumes | • Control and modify activities through avoidance in terms of time and space;<br>• Stop impacts through avoidance and terminating activities;<br>Remedy through suspending activities. | During grab sampling | Limit impacts and disturbance; |
| Core sampling | Disturbance of marine fauna due to physical activities and sediment plumes | See above | During core sampling | Limit impacts and disturbance |

| ACTIVITY whether listed or not listed. | POTENTIAL IMPACT | MITIGATION TYPE | TIME PERIOD FOR IMPLEMENTATION | COMPLIANCE WITH STANDARDS |
|---|---|---|---|---|
| | | | | |
| Drill sampling | Disturbance of marine fauna due to physical activities and sediment plumes | See above | During drill sampling | Limit impacts and disturbance; Listing Notice 1 |
| Grab, core and drill sampling | Destruction and loss of Prehistoric Heritage, palaeontological and Maritime archaeological resources, particularly historical shipwrecks | • Avoidance of certain sites<br>Remedy through collection and preservation of samples | Before sampling commences and during | Limit impacts and destruction of Prehistoric Heritage, palaeontological and Maritime archaeological resources; Preservation of resources<br>Heritage Act |
| Tailings disposal | Disturbance of benthic macrofauna and due to physical activity and sediment plumes | No essential or potential mitigation measures identified<br>**Best Practice:**<br>Planning and management of potential discharges to ensure that tailings are not discarded onto potentially sensitive habitats | During the planning phase | To limit impacts by means of selecting specific sites for drilling and avoiding sensitive sites |
| Waste discharges | Waste discharges and pollution, deteriorating water quality and disturbance | • Management through informing staff;<br>• Management through compliance with relevant waste standards and protocols;<br>• Control and modify activities;<br>• Stop impacts through avoidance and terminating activities;<br>Remedy through design measures;. | Throughout the entire prospecting operation | Limit impacts; limit waste through management; NEM:WA |

| ACTIVITY whether listed or not listed. | POTENTIAL IMPACT | MITIGATION TYPE | TIME PERIOD FOR IMPLEMENTATION | COMPLIANCE WITH STANDARDS |
|---|---|---|---|---|
| Vessel operation and physical presence | Disturbance to vessels, shipping activities and fishing activities | • Control and modify activities through avoidance in terms of time and space;<br>• Stop impacts through avoidance and terminating activities;<br>• Remedy through design measures and noise control of survey equipment;<br>• Control through management<br>Remedy through suspending activities. | Throughout the entire prospecting survey during which the vessel is being operated | Limit disturbance |
| Physical vessel presence | Impact on visual integrity and sense of place | N/A | N/A | N/A |
| Vessel and equipment operation during all activities | Reduction in fishing success and decline in socio-economic conditions of Local fishing communities dependent upon these resources and local economy | See above | Planning phase and operational phase | NEMA; EIA Regulations; Limit disturbance and impact on local communities |
| Data acquisition and synthesis | N/A | N/A | N/A | N/A |
| Feasibility study and resource estimation | N/A | N/A | N/A | N/A |
| Decommissioning and Closure | N/A | N/A | Upon the cessation of prospecting | Closure certificate; NEMA |
| Rehabilitation | N/A | N/A. | N/A | N/A |

# 12.7 Financial Provision

## 12.7.1 Determination of the amount of Financial Provision.

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

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. 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 medium to long-term (i.e. 10 – 15 .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. Financial provision has been made for potential remediation and/ or rehabilitation.

On completion of the prospecting activities, Trans Atlantic Diamonds would have to apply for a closure certificate from the DMRE.

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.

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

This has been discussed with I&APs during the Public Participation Period.

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

No direct mitigation or rehabilitation 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. Approximately R16,787,220 is available to complete surveying, sampling and the feasibility study. An additional R335,000 for rehabilitation monitoring after the prospecting, and for emergencies and remediation. An additional R580,000.00 has been set aside to implement the EMPr as part of prospecting activities. See Table 10-2 for a list of potential activities that could form part of rehabilitation/ remediation.

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

It is generally accepted that no rehabilitation is deemed necessary within the marine environment as habitat recovery occurs naturally due to the dynamic physical processes such as currents and sediment refill.

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

No rehabilitation is expected, but should the remediation of any negative environmental impacts or damages become necessary, there is sufficient funds available for this.

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

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.

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

**g)** Monitoring of Impact Management Actions
**h)** Monitoring and reporting frequency
**i)** Responsible persons
**j)** Time period for implementing impact management actions
**k)** Mechanism for monitoring compliance

**Table 12-4. Mechanisms for monitoring compliance with and performance assessment against the EMPr.**

| SOURCE ACTIVITY | IMPACTS REQUIRING MONITORING PROGRAMMES | FUNCTIONAL REQUIREMENTS FOR MONITORING | ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES) | MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS |
|---|---|---|---|---|
| All prospecting activities | See below | Ensure that the Prospecting Work Programme, mitigation measures and conditions as set out in the EMPr, are being adhered to. | See below | Submit an annual prospecting progress report to DMRE. Undertake and submit an environmental performance audit every two years to DMRE. |
| Geophysical acoustic survey | Noise | Ensure that the Prospecting Work Programme, mitigation measures and conditions as set out in the EMPr, are being adhered to. | Geologist. Marine Mammal Observer (MMO); Environmental Control Officer; On-board Scientific Officer | Impact management actions should be implemented at all times during the activities or as per the EMPr. An environmental performance audit report should be submitted to the DMRE annually. Auditing should be done by an internal auditor (Scientific officer) on a monthly basis and by an independent external Environmental Control Officer (ECO) annually. |
| Vessel operation | Collision causing injury or death of Megafauna | See above | MMO, On-board Scientific Office, Captain | See above |

| | | | | |
|---|---|---|---|---|
| Grab sampling, core and drill sampling | Disturbance of marine fauna | See above | MMO, Geologist; Scientific Office | See above |
| Grab sampling, core and drill sampling | Sediment plumes | See above | Geologist; Scientific Office | See above |
| Grab, core and drill sampling | Destruction and loss of Prehistoric Heritage, palaeontological and Maritime archaeological resources, particularly historical shipwrecks | See above | Geologist and trained Trans Atlantic Diamonds heritage representative | See above |
| Tailings disposal | Disturbance and destruction | See above | Geologist, Scientific Office | See above |
| Waste discharges | Waste discharges and pollution, deteriorating water quality | See above & Implementation of effective waste management | Scientific Office | See above |
| Vessel operation and physical presence | Disturbance to vessels | See above | Captain | See above |
| Vessel and equipment operation during all activities | Reduction in fishing success and decline in socio-economic conditions | See above & Ensure stakeholders and regularly consulted and implement a stakeholder complaints register. | Fishing Liaison Officer, Scientific Officer | See above |

**l) Indicate the frequency of the submission of the performance assessment/ environmental audit report.**

An environmental performance audit report should be submitted to the DMRE annually. Auditing should be done by an internal auditor (Scientific officer) on a monthly basis and by an independent external Environmental Control Officer (ECO) annually.

**m) Environmental Awareness Plan**

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

Trans Atlantic Diamonds will have an induction process which will include, but is not limited to:

- Job specific training to ensure that staff can perform tasks;
- Health and safety training;
- Environmental awareness training for contractors and employees which will cover the risks and mitigation measures as set out in the EMPr;

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

This will be covered during the Environmental awareness training and will also be included in the EMPr.

**n) Specific information required by the Competent Authority**

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

Financial provision will be reviewed annually.

# 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:**

27 May 2022

**Date:**

-**END-**

# 14 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

## 14.1 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:

### 14.1.1 Identification of Stakeholders

I&APs for the towns of Doringbaai, Lutzville, Papendorp, Koekenaap, Ebenhaeser, Standfontein and Lambertsbaai were identified through the use of existing I&AP databases and by contacting various government departments, community representatives, fisheries trusts, etc. The DFFE also suggested that we liaise with the communities through the community representatives in these towns. The representatives were provided with the project details and information and asked to distribute it amongst the community members. See Appendix 9 for an example of one of the many email requests that were 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) The Local Municipality,
(ix) 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.

As we notices were distributed throughout Doringbaai and widely under the community members, any traditional authorities in this area would have been made aware of the project. The West Coast District Municipality and the Matzikama 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. Several community representatives have, however, been identified for the neighbouring communities where fishing communities are prevalent. These include the communities of Lutzville, Papendorp, Koekenaap, Ebenhaeser, Standfontein and Doringbaai. 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 are not anticipated to be severely negatively impacted by prospecting activities in the remote, offshore 14C concession. .

An extensive database of I&APs was compiled based on responses received (see Appendix 10 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 11 for Anchor Environmental Consultant's Statement regarding compliance with the POPI Act.

### 14.1.2 Lodge Application

A prospecting rights and environmental authorisation application were lodged with the DMRE. These applications were accepted by the DMRE on 21 February 2022. The DMRE informed Anchor about the acceptance of the application on 24 February 2022.

### 14.1.3 Registration Period, Initial Comment and Pre-Consultation Meeting

Individual stakeholders, community representatives, adjacent and non-adjacent communities and relevant government departments were contacted by means of phone and email on 3 and 4 March 2022 (within a 30-day Stakeholder consultation period) to inform them that the Prospecting Rights Application for Concession Area 14C has been accepted by the DMRE. They were also invited to register as Interested and Affected Parties (I&APs) and to provide initial comment during the Pre-consultation phase which extended from 4 March to 17 March 2022. A Draft Background Information Document (BID) and questionnaire was circulated (Appendix 12).

A pre-consultation meeting was held at Doringbaai on 11 March 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 was compiled together with the stakeholder questions and comments into a report and submitted to the Department of Mineral Resources and Energy (DMRE). See Appendix 13 for more details on the public meeting, including the presentation, attendance register and proceedings of the meeting.

### 14.1.4 Official Public Participation Process

Potential I&APs were notified of the start of the Public Participation Period, Public Participation Meeting and circulation of the Draft BAR by means of:

- Email notices that were sent out on 31 March 2022.
- Site and other notices that were placed at Doringbaai, Strandfontein, Papendorp, Ebenhaeser, Lutzville and Koekenaap at several shops, libraries and/ or information centres.

- As per the suggestion of the community, unemployed youth members were also employed to distribute these notices door to door in Doringbaai, Strandfontein, Papendorp, Ebenhaeser and Koekenaap.
- Placement of newspaper advertisements in a regional (Die Burger) and a local (Ons Kontrei) newspapers that were published on 31 March 2022. According to News 24, Ons Kontrei is very popular amongst the residents with thousands of copies being sold in these towns weekly.
- The EAP also visited the towns on 11 March 2022 to post notifications at the libraries, shops, information centres and other public places and hand out hard copies of the BID and questionnaires. The notices were made available in Afrikaans, isiXhosa and English, while the documents were made available in both Afrikaans and English.
- In addition to this, the EAP also approached various community members during this time to verbally provide details about the project, the meeting and how they could participate, especially in Doringbaai.

See Appendix 14 for these notices and proof that these notices were sent and placed at various locations. The Background Information Document and questionnaire (Appendix 12), specialist studies (Appendix 3, 4 and 5) and Draft BAR was made available on our website at https://anchorenvironmental.co.za/ and at the Doringbaai, Ebenhaeser and Lutzville Libraries and the Strandfontein Information Centre during the Public Participation Period.

Interested and Affected Parties were invited to register, review the draft BAR and provide comments on the application for prospecting rights and environmental authorisation during the Public Participation Period which extended from Monday 11 April 2022 to Wednesday 18 May 2022 until 23:59.

### 14.1.5 Public Participation Meeting

Public meetings were held on **11 April 2022 in Cape Town, 12 April 2022 in Doringbaai and 13 April 2022 in Ebenhaeser.** During these meetings, members of Anchor (the EAP) and Trans Atlantic Diamonds (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. See Appendix 15 for more details on the public meetings, including the presentation, attendance registers and proceedings of the meetings.

### 14.1.6 Phase 5: 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 30 May 2022.

### 14.1.7 Phase 6: 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 14C

## 14.2 Summary of issues raised by I&APs

Copies of the emails received from I&APs during the Public Participation Period have been included as Appendix 16. Responses sent to the I&APs by the EAP are included in Appendix 17. All comments and input received have been transcribed into the "comments and responses" table and included as Appendix 18 of this Final BAR.

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