PROPOSED 2AFRICA/GERA (EAST) SUBMARINE FIBRE OPTIC CABLE SYSTEM TO BE LANDED AT GQEBERHA (PORT ELIZABETH), SOUTH AFRICA

VODACOM (PTY) LTD (LANDING PARTNER)

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EIA REFERENCE: 14/12/16/3/3/2/2057

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT DISTRIBUTION

Please note that due to the Covid-19 National State of Disaster and Lockdown in the country, the Department of Environment, Forestry and Fisheries requires Environmental Assessment Practitioners to undertake public participation in innovative ways that respect social distancing and other measures to contain the spread of the Corona virus.

ACER has created a project domain on the company website (https://acerafrica.co.za/) where all documents (including this Final Environmental Impact Assessment Report (FEIAR)) pertaining to this environmental authorisation process have been uploaded for public review. In addition, ACER has or will undertake the following:

- ❑ Notification letters about the submission of the FEIAR to DFFE for decision making have been sent to all registered Interested & Affected Parties (I&APs) and community forums.
- ❑ All comments received on the Draft EIAR were incorporated into the FEIAR and were captured in a Comments and Response Report that will accompany the submission of the FEIAR to the Department of Forestry, Fisheries and the Environment (DFFE) for decision-making.

In addition to the above, the following authorities have been notified of the submission of the FEIAR and where these documents are available for review.

1. National Department of Forestry, Fisheries and the Environment
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11. Department of Environment, Forestry & Fisheries - Aquaculture Management & Development
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EXECUTIVE SUMMARY

Introduction

Submarine telecommunication cables are important for international telecommunication networks as they transport almost 100% of the trans-oceanic Internet traffic throughout the world. It is widely recognised that access to affordable international bandwidth is key to economic development in every country. As such, the improvement in Africa's information technology infrastructure via telecommunication cables will remove one of the current key inhibitors to development in Africa and support economic growth and opportunities on the continent.

Alcatel Submarine Networks (ASN) has been contracted to supply and install the proposed 2AFRICA/GERA (East) Cable System, which has three proposed landing points on the South African coast, viz. Amanzimtoti, Gqeberha (previously named Port Elizabeth[1]) and Duynefontein. This report deals with the proposed landing at Gqeberha, located within the Nelson Mandela Bay Metropolitan Municipality (NMBMM) on the Southeast coast. The cable landing at Gqeberha will be operated by Vodacom as the South African landing partner (Project Applicant).

The project requires environmental authorisation from the Department of Forestry, Fisheries and the Environment (DFFE[2]) in terms of the 2014 Environmental Impact Assessment (EIA) Regulations (as amended), published under the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended). ACER (Africa) Environmental Consultants (ACER) has been appointed as the independent Environmental Assessment Practitioner (EAP) to assist with the application for environmental authorisation as well as other environmental permitting/licensing requirements (including a Sea Shore Lease from the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)).

This Final EIA Report (FEIAR) and accompanying Environmental Management Programme (EMPr) have been prepared in accordance with the 2014 EIA Regulations.

Project Location and Scope

The project involves the proposed installation and operation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing), which comprises marine and terrestrial components. The marine cable component is the branch line that lands at Gqeberha on the south side of Algoa Bay. The marine cable extends from the main trunk line of the 2AFRICA/GERA (East) Cable to Pollock Beach in Summerstrand, Gqeberha. From the main cable trunk, located in the Indian Ocean approximately 100 km from the shoreline off Gqeberha, within South Africa's Exclusive Economic Zone (EEZ), the branch line enters South African Territorial Waters approximately 22 km (12 Nm) from the seashore and will link into a Beach Manhole (BMH) on shore.

On land, the BMH will be constructed at Summerstrand and the cable will link up to the Cable Landing Station (CLS) which will be accommodated within the existing Telkom SOC Limited (Telkom) Exchange Building located on the corner of Skegness and Bognor Streets in Summerstrand. A cable trench will be required for the front haul alignment from the BMH to the CLS site.

Note that the width of offshore corridor assessed for the marine cable was 500 m (250 m either side of the cable), although the cable footprint to be disturbed is only 6 m wide (the width of the sea plough) when cable burial takes place. The entire beach where the cable is to land was assessed; however, the construction corridor on the beach will be limited to 50 m each side of the cable. On land, the cable trench is less than 1 m in width, however a construction corridor of 10 m (5 m either side of the cable) will require approval.

[1] Note that the change of name is recent (23 February 2021) and will, therefore, not necessarily reflect in all of the mapping contained in this report.
[2] Previously named Department of Environment, Forestry and Fisheries (DEFF).

Relevant GPS co-ordinates (approximate) are provided below. Project activities are described further under the technical description.

GPS Co-ordinates (approximate) of the proposed infrastructure for the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)		
Location	**Latitude (S)**	**Longitude (E)**
Start of marine branch cable (at trunkline)	34°22.695′	27°35.789′
Mid-point of marine branch cable	34°10.976′	26°41.172′
Approximate length of marine branch cable	194 km	
Width of the offshore cable corridor to be authorised	0.5 km	
Width of the beach crossing corridor to be authorised	0,1 km	
Sea Earth Plate	33° 59.195’	25° 40.693’
Land based System Earth (if sea earth not used)	33° 59.252’	25° 40.688'
BMH at Pollock Beach (Alternative 1- preferred)	33 59.244 S	25°40.350′
Telkom exchange building housing the CLS	33°59.348′	25°39.980′
Mid-point of trench line for ducting from BMH to CLS.	33°59.109′	25°40.085′
Approximate length of trench line for ducting to CLS	Approximately 1,2 km	
Width of the land cable corridor to be authorised	0,01 km	

Legal Requirements

There are many legal requirements (International, National, Provincial and Local Government spheres) to which the project proponent must adhere for the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). These were detailed in the Final Scoping Report (ACER, 2021) and a summary of applicable legislation and guidelines is provided in Chapter 2 of this report.

In terms of the 2014 EIA Regulations (as amended 2017), the project potentially triggers activities in Listing Notices 1, 2 and 3, as shown in Table 2 of this report. The application for environmental authorisation, therefore, requires a full Scoping and Environmental Impact Assessment (EIA) process.

Technical Description

Marine fibre-optic cables range in diameter from 17 mm to 50 mm. They are essentially inert, as any heat emissions, electric or electro-magnetic emissions associated with the cable are of negligible magnitude. Cables are laid on the seabed surface in deep water and buried under the seabed where possible in waters shallower than approximately 1,500 m depth.

The proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) includes the following project components and activities:

- Pre-installation activities including cable route survey and route engineering. The Marine Cable Route Survey has already been undertaken to determine the suitability of the substrate and topography of the ocean floor. This included a geophysical survey using echosounders and sonar techniques and a geotechnical survey involving cone penetrometer tests and core sampling and analysis.
- Route clearance and Pre-Lay Grapnel Run (PLGR).
- Laying of the cable in the offshore environment (preceded by route clearance) and including cable burial to a water depth of approximately 1,500 m.
- Laying of the cable within the shallow water environment, which is likely to involve a direct shore end operation where the shore end of the subsea cable is installed directly from the main subsea cable installation vessel and floated to the beach landing point using buoys, assisted by small boats and divers.

- Cable burial in the seabed. The cable will be buried in sediment to a target depth of 2 m wherever possible and the route will be adjusted to avoid obvious visible rock up to a depth of 1,500 m Water Depth (WD). This burial is intended to provide protection to the cable from the hazards posed by ships' anchors, fishing trawls/lines and the like.
- Excavations within the intertidal zone, to bury the cable before it is anchored into a cable anchor block and BMH. Where cables cross outcropping rock, cables will be surface laid and clamped to the rock, where possible.
- Excavations within the intertidal zone and beach, to bury the sea earth cable and sea earth plate (System Earth).
- Note that for the cable landing at Gqeberha, substrate conditions on the beach and intertidal zone may not allow for standard excavation methods to sufficient depths, in which case alternative technologies (rock trenching or HDD) may be implemented, with the installation of a land based System Earth rather than a sea earth plate.
- The BMH and underground ducting to the existing Telkom Limited SOC (Telkom) Exchange Building housing the CLS will be constructed prior to the cable landing. (The BMH is a concrete utility vault where the marine portion of the subsea cable is connected to the terrestrial portion).

Once installed, marine telecommunications cables generally require little to no maintenance unless the cable is damaged by natural disasters or through human activities. A detailed description of the various project components and the proposed construction methods are provided in Chapter 4 of this report.

Project Alternatives

Various project alternatives were considered during Scoping. One preferred landing site, BMH site, fronthaul route and one marine cable route were taken forward for assessment in this EIA Report, as described in the project scope and technical description. The No Development Alternative formed the baseline against which all other options were assessed.

Need and Desirability

The need and desirability of a proposed development is a key consideration of an application for environmental authorisation and differs from the developer's aims and purpose of the development. The Guideline on Need and Desirability in terms of the EIA Regulations (DEA, 2017) states that *"consistent with national priorities, environmental authorities must support "increased economic growth and promote social inclusion" while ensuring that such growth is "ecologically sustainable"*. In essence, need and desirability are based on the principle of sustainability, viz. that a development is ecologically sustainable and socially and economically justifiable. Chapter 3 of this report deals with aspects of Need and Desirability, in terms of the Guideline.

Description of the Environment

The proposed construction and operation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) takes place within the marine and terrestrial environments, and, as such, a description of both environments is provided in Chapter 6 of this report.

Natural environment (terrestrial and marine)

Ecological drivers of relevance to the study area include ocean currents, the natural oceanic wave climate, wind, mobility of sand, nearshore sand circulation, and offshore sediment transport, the deposition and decomposition of organic material and colonisation of dunes by vegetation. These will have more of an influence on the cable, rather than the cable affecting the drivers.

Due to the transformed nature of the site, no sensitive ecosystems (or habitat) on land will be affected by the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). No Marine Protected Areas (MPA) will be affected. However, sections of the marine cable will traverse marine areas classified as Critical Biodiversity Areas (CBA1, CBA2) and Ecologically Sensitive Areas (ESA). The cable will cross the Algoa to Amathole Ecologically or Biologically Significant Area (EBSA) as well

as the proposed Alexandria coastal belt/Algoa Bay Islands Nature Reserve Marine Important Bird Area (IBA). While the alignment as far as possible avoids rocky substrates, the cable will cross a small portion of the inshore reef complex between Bird Rock and Cape Recife point. The majority of the cable, however, will disturb sandy substrates and the benthic organisms that live in it, due to cable burial. The larger and more mobile marine organisms in the water body, including fish, whales, dolphins, as well as seabirds and shorebirds, will be able to move out of the direct area of disturbance caused by cable survey and laying activities.

Due to the nature of the project and the dynamic nature of the environment (allowing for rapid recovery of organisms adapted to frequent disturbance), impacts on the biophysical environment are mainly site specific and short term, occurring during the installation phase.

Social/socio-economic environment
From a development planning perspective, this project aligns with the objectives of the New Partnership for Africa's Development (NEPAD) and the South African government's Strategic Infrastructure Project 15 (SIP 15: Expanding Access to Communication Technology), which is also compatible with district and local development plans.

The cable landing will take place at Summerstrand, an upmarket seaside residential suburb of Gceberha, with hotels, shops and other suburban facilities. The area is administered by the Nelson Mandela Bay Metropolitan Municipality. The coastal zone between the high-water mark of the sea and residential areas of Summerstrand is under the administration of the Department of Public Works. The Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) is a key role-player in this area with respect to biodiversity and conservation issues, as well as to obtain a Sea Shore Lease permit.

Algoa Bay has two ports and, thus, sees a high level of shipping activity. The bay is popular for recreational fishing and is a venue for yachting, scuba and other water sports. Offshore in the study area, there are a number of other economic interests and activities to be considered, including commercial fisheries (especially the inshore demersal trawl sector), Oil and Gas (O&G) exploration blocks and the planned Algoa1 Aquaculture Development[3] block on the seabed.

Cultural heritage
The are no identified land-based cultural heritage resources that will be affected and the likelihood of encountering them during construction is very low, due to the built up nature of the site. Although potentially present, submerged prehistoric archaeological resources in the marine environment are highly unlikely to be affected. Palaeontological features and fossil material are not anticipated to be present as the geology in the affected area comprises Nanaga Formation aeolianites (windblown sands). The general area is rich in maritime archaeological resources, with three identified shipwrecks occurring within 1 km of the cable alignment.

The Environmental Assessment Process and Methodology
The assessment process began with Scoping, which is a process designed to define the limits of the assessment, to elicit inputs from Interested and Affected Parties (I&APs), and to focus the scope of the assessment. The Impact Assessment process has followed Scoping, in accordance with the approved Plan of Study for Impact Assessment, with the main activities being:

- Focused scientific studies with contributions from specialists, engineers and the EAP team.
- Ongoing communication and participation with stakeholders.

[3] At the time of writing this report, the appeal against the environmental authorisation for this development was rejected and the project can now be implemented.

- Integration of the findings into an EIAR, inclusive of mitigation measures. The final assessment of the significance of impacts was undertaken by the EAP, in accordance with assessment conventions stipulated in GNR 326.
- Preparation of an Environmental Management Programme (EMPr).

Public Participation Process

The public participation process was designed to comply with the 2014 EIA Regulations (as amended) and NEMA and also taking into account Covid-19 restrictions. The project team has been available for communication with I&APs throughout Scoping and the Impact Assessment. Formal stages at which the public were notified, provided with information and given an opportunity to raise concerns and provide input were:

- Project Announcement, which included media adverts, a Background Information Document, on site notices and written correspondence (05 November 2020).
- Notifications by telephone.
- Posting of all relevant documents on ACER's website www.acerafrica.co.za.
- Circulation of the Draft Scoping Report for comment (12 March 2021 – 14 April 2021).
- Notification of submission of the Final Scoping Report (23 April 2021).
- Circulation of the DEIAR for comment (22 July- 23 August 2021).

Issues raised by I&APs and responses thereto, have been captured in Comments and Responses Reports (CRR) appended to this FEIAR. Where relevant, they have been addressed in this FEIAR. To date, the comments received from I&APs and relevant authorities relate to the following topics:

- Stakeholder registration.
- Requests for documents and mapping.
- Environmental authorisation application process requirements.
- Protection of the coastal environment and access to the coastal public property, in line with the Integrated Coastal Management Act (ICMA).
- Cultural Heritage, including maritime heritage.
- Data provision associated with the fibre optic cable.
- Effects on O&G Rights Holders.
- Impacts on commercial fishing operations including the squid industry, hake long line and deep-sea trawl.
- Participation of local Small Medium and Micro Enterprises (SMMEs).
- Noise pollution resulting from cable installation.
- Sasol pipelines.
- Effect on the planned Algoa 1 Aquaculture development.
- Effects on the local surfing community and the surfing spot known as Pipe, at Pollock Beach.
- Lease agreements and land development rights applications.
- Coastal Navigation Safety.

All relevant public participation documentation is appended to this report.

Summary of specialist findings

Ten specialist reports were compiled. The table below summarises the main conclusions of these specialist reports.

	Specialist Study	Organisation	Main conclusions
1	Terrestrial biodiversity and plant species compliance statement (Appendix B1a)	Environmental Assurance (Pty) Ltd	No natural features that are synonymous with the reference state, or of conservation importance, are present within the direct construction footprint of the proposed development. The area is considered to be of Low Sensitivity in terms of terrestrial biodiversity and plant species.
2	Aquatic biodiversity compliance statement (Appendix B1b)	Environmental Assurance (Pty) Ltd	There are no watercourses identified on site or within 500 m of the proposed development. No water use authorisations are required. The area is classified as Low Sensitivity in terms of the aquatic biodiversity theme.
3	Terrestrial animal species compliance statement (Appendix B1c)	Environmental Assurance (Pty) Ltd	The entirety of the proposed development footprint has been transformed in comparison to the reference state. The area is considered to be of Low Sensitivity in terms of terrestrial biodiversity and plant species. The likelihood of fauna of conservation significance occurring within the urbanised terrestrial environment is low.
4	Commercial Fisheries Specialist Study (Appendix B2)	Capricorn Marine Environmental (Pty) Ltd (CapMarine)	The causes of potential impacts of the project on the fishing industry were identified as noise emissions; temporary exclusion from fishing grounds from vessels during cable laying (up to 1.5 km) and long-term exclusion of anchoring and trawling 500 m either side of the cable. Various fishing sectors will be affected, but those most affected are the inshore demersal trawl. After mitigation (where applicable) the significance of all related impacts on fishing sectors (including squid jig) is assessed as very low or low.
5	Coastal Impact Assessment (beach and dunes) (Appendix B3)	SDP Ecological & Environmental Services	Eco-morphological processes have been disrupted in and around the cable landing point by urban infrastructure and artificial stabilisation interventions. The supra tidal dune cordon and back beach can be considered to be dysfunctional in terms of their influence and response to coastal processes. Thus, the establishment of a submarine telecommunications cable at Pollock Beach will have little impact on the eco-morphology of the sand sharing system and the coastline in general. Recommendations are made for rehabilitation of the affected area after installation. With mitigation, the significance of identified impacts is assessed as very low or low.
6	Marine Ecology Assessment (Appendix B4)	Pisces Environmental Services (Pty) Ltd	The report identifies various impacts resulting from vessels and other activities during geophysical survey, installation and operation of the cable. There will be impacts on marine benthic biota due to disturbance of the upper beach and intertidal and shallow subtidal sandy habitats, as well as the unconsolidated seabed beyond the surf-zone and across the shelf. There will also be impacts on marine biota including fish, marine mammals, seabirds and shorebirds. However, the significance of all these impacts is assessed as very low or low.
7	Marine benthic shallow water impact assessment (Appendix B5)	Aquatic Ecosystem Services	The cable footprint will affect 0.2 % of the existing inshore rocky reef complex between Bird Rock and Cape Recife point. No reef species identified had a distribution limited to the current study area. No macro benthic species identified are known to be Red

	Specialist Study	Organisation	Main conclusions
			Data listed, unique, sensitive or range restricted. Disturbance of reef biota by crushing or due to increased turbidity and/or smothering during installation is not anticipated to have a significant negative impact on the reef communities since the majority of species are well adapted to dynamic and turbid conditions and will recover quickly post installation. The cable pinned to the reef will be colonised with locally occurring species. All identified impacts on macro benthic communities during installation and operation are of low significance, post mitigation.
8	Heritage Impact Assessment (Appendix B6)	ACO Associates cc	The proposed installation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) raises no red flags, contains no fatal flaws and is unlikely to have any significant impact on heritage resources.
9	Submarine Telecommunications Cables Environmental Impact Assessment. Generic Avifaunal Impact Assessment (Appendix B7)	WildSkies Ecological Services (Pty) Ltd	In general, the significance of anticipated impacts of submarine telecommunications cables projects on seabirds and shorebirds is low, provided the cable avoids particularly sensitive bird areas such as MPAs, IBAs, sensitive onshore areas and any islands.
10	A review of the potential effects of submarine telecommunications cables on marine mammals in Southern Africa (Appendix B8)	Sea Search Research and Conservation	The main impacts which might affect marine mammals are: 1) avoidance of noise and masking of vocalisations by general ship noises and depth sounders and 2) potential startle responses of marine mammals to multi-beam echosounders, which could lead to mass stranding events. Mitigation options for these activities are limited. Entanglement of cetaceans in the cable is not regarded as a threat. There are concerns for the general impact of cable deployment operations on coastal species such as Heaviside's and humpback dolphins and southern right whales during work in the nearshore environment. The use of a suitably trained crew member as a Marine Mammal / Protected Species Observer (MMO/PSO) is recommended, and cable laying should take place outside of the main migration seasons for whales where possible.

Environmental Issues and Potential Impacts

The key issues identified during Scoping and carried through to the Impact Assessment were formulated as seven key questions:

- What are the potential social and socio-economic impacts associated with the construction and operation of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)[4]?
- What impacts will the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on terrestrial vegetation, wetlands and fauna?
- What potential impacts will the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on the marine environment?
- What impacts will the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on the fishing industry, in particular, the squid fishery?

[4] This was not in the Draft and Final Scoping Reports but has been added during the Impact Assessment as a key issue.

- What impacts will the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) Submarine Cable System (Gqeberha landing) have on the beach and dune cordon at Pollock Beach?
- What impacts will the construction of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on cultural and heritage resources, including any paleontological resources?
- What cumulative impacts will result from the construction of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)?

Potentially significant impacts associated with each of the above issues were discussed and assessed. Where relevant, significance ratings were assigned to impacts, both before mitigation, as well as after application of recommended mitigation measures.

Environmental Impact Statement

Taking the key issues and the assessment of associated potential impacts into account, a summary of the environmental impacts of the proposed activity, and their significance (after mitigation, where applicable) is provided below.

Social and socio-economic impacts

Overall, the project is expected to contribute positively to the goal of improving livelihoods for South Africans through the education and economic opportunities opened up as a result of access to improved telecommunications networks. While expanding access to communication technology will be done primarily through broadband infrastructure roll-out, this requires a national backbone connected to the rest of the world. In this case, the proposed 2AFRICA/GERA (East) Cable System supports SIP 15 via is international connectivity, capacity and speed. The significance of this positive impact is assessed as medium.

Operation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) will, however, render limited areas of the seabed unavailable to the Oil and Gas industry. Letters of No Objection and/or Co-operation Agreements between the cable developer/operator and affected O&G Rights Holders are required[5] and this is being dealt with directly by Vodacom outside of this EIA process. The cable overlaps with a limited area of seabed planned for the Algoa1 Aquaculture development; however, the alignment has been shifted to the outer edge of the development zone to minimise impacts following discussions with DFFE (DFFE is the project proponent for the ADZ). In addition to the discussions held to date Vodacom has joined a working forum organised by DFFE for the ADZ where regular updates and discussions will be held between interested and affected parties. The cable *in situ* is not expected to have any impact on the surf break for surfers, but during installation, the cable landing may potentially disrupt water based recreational and sporting events unless timeous communication and co-ordination with affected parties is undertaken. Other minor, short term disruption and nuisance impacts may arise during construction activities on the beach and inland. However, provided these negative social and socio-economic impacts are suitably managed, they will be of low significance.

Impacts on terrestrial ecosystems, vegetation, and fauna

The implementation of the project on land affects an area which is totally transformed by urban development and will not negatively impact any CBAs or terrestrial ecosystems of conservation value. No wetlands or freshwater habitat are present on site. Consequently, there will be negligible impact on terrestrial (non-marine) fauna.

[5] In terms of Section 53 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) (MPRDA), any person who intends to use the surface of any land in a manner which may be contrary to the objectives of the MPRDA or is likely to impede such objectives, must obtain consent from the rights holder and apply to the Minister for approval in the prescribed manner. Proof is required that no prospecting or mining right holders have objected to the proposed development based on its incompatibility with their interests.

Impacts on marine ecosystems, flora, fauna, and avifauna

The branch cable to Gqeberha traverses offshore habitats of varying conservation status, viz. Least Concern, Near Threatened and Vulnerable. It does not traverse any MPAs but does traverse the Algoa to Amathole EBSA and areas defined as CBA1, CBA2 and ESA. It will traverse inshore rocky reef between Bird Rock and Cape Recife point, affecting only 0.2% of this inshore reef complex. However, as confirmed by marine specialist studies, the residual impacts of the cable on the benthic environment (deep water and shallow water) will be of low significance. The potential negative impacts of the project on marine flora and fauna (small and large) on shore, nearshore and offshore, are all of low significance (after applying mitigation where feasible). Similarly, the impacts on seabirds and shorebirds will be of low significance.

The cable, once in place, will afford a section of the seabed long term protection due to the exclusion of anchoring and trawling 500 m either side of the cable, which is considered a positive impact of low to medium significance.

Impacts on fisheries

The cable alignment intersects with areas used by several fishing sectors, which may potentially be negatively affected by the project. A potential decline in catch rates due to temporary noise disturbance is assessed as being of low significance. The potential effect on fishing activities and decline in catch rates due to the temporary exclusion zones around the cable laying vessel is assessed as being of low significance. The long term effect on operational activities due to the permanent 500 m exclusion zone either side of the cable will negatively impact the inshore demersal trawl sector, as gear will have to be lifted when crossing the exclusion zone. The loss of inshore trawling ground is estimated to be 0.3% of the inshore trawl fishing grounds. Overall, the significance of the impact on fisheries is assessed as low. The potential for mitigation of identified impacts is very low.

The cable alignment also intersects with transects covered by DFFE bi-annual fishery research survey vessels. Provided there is sufficient co-ordination between the proponent and DFFE with regards to timing of their respective activities in the affected area, no significant impact on survey activities and results is anticipated.

Impacts on the beach and coastal dunes

The project will have little impact on the beach and coastal dunes. The significance of potential negative impacts on drivers of coastal processes, sediment transport and habitat/eco-morphology of the beach and dunes will be low, both before and after mitigation.

Impacts on cultural heritage

The likelihood of the project impacting on submerged pre-historic archaeological resources, palaeontological or fossil material is negligible. As the impacts would be non-reversable if they should occur, and the potential for mitigation is low, the significance of impacts on these cultural heritage resources is assessed as medium. While there are recorded shipwrecks within 1 km of the cable alignment, the likelihood of these being negatively impacted is low and, with mitigation, the significance of the impact is low.

Cumulative impacts

At present there are no subsea fibre-optic cables traversing Algoa Bay and landing at Gqeberha. In general, the positive and negative impacts resulting from the proposed 2AFRICA/GERA (East) Submarine Cable System, or future cables around the coast of South Africa, will have cumulative effects on the social and biophysical environment. Conflicts of interest may increase over time between the subsea fibre optic cable developers and the trawling industry, as increasing areas become excluded due to cables crossing trawling grounds. Similarly, conflicts of interest may increasingly arise between the subsea fibre optic cable developers and the O&G industry, particularly as offshore exploration activities ramp up and drilling plans materialise. Direct and early engagement between role-players will be required to ameliorate cumulative impacts. As the cable installation is once-off and of short duration, with a relatively quick recovery of the disturbed benthic habitat, no negative cumulative impacts are anticipated.

The No Development Alternative

The No-Development Alternative would avoid potential negative impacts on the natural environment and competing seabed users. However, it would preclude the positive impacts which improved telecommunications would have on the country's socio-economic environment and would fail to support the country's development goals. It is anticipated that, with required mitigation of negative impacts, the advantages of the project will outweigh the disadvantages. For this reason, the No-Development Alternative is not preferred.

Concluding Remarks

Based on the findings of the specialists and the assessment of key issues and associated impacts undertaken in this report, it is the professional opinion of the EAP that there are no fatal flaws associated with the proposed project and that the negative impacts resulting from the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) can be mitigated to acceptable levels. Therefore, the project should be granted environmental authorisation by DFFE, conditional on compliance with the mitigation measures as recommended in this report and contained within the EMPr.

The project components to be authorised are the installation and operation of the marine cable, along the alignment as proposed, with the shore landing at Pollock Beach to link to a new BMH at Summerstrand and on to the Telkom Exchange building via new underground ducting. The type of System Earth must be implemented as dictated by substrate conditions and the excavation method selected although the preferred system earth is a sea earth plate.

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DEFINITIONS

Alternatives - In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to –

i. The property on which or location where it is proposed to undertake the activity.
ii. The type of activity to be undertaken.
iii. The design or layout of the activity.
iv. The technology to be used in the activity.
v. The operational aspects of the activity.

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

Benthic - Referring to organisms living in, or on, the sediments of aquatic habitats (lakes, rivers, ponds, etc.).

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

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

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

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

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

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

Ecosystem - A community of plants, animals and organisms interacting with each other and with the non-living (physical and chemical) components of their environment.

Environment - The surroundings within which humans exist and that are made up of

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

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

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

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

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

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

Epifauna[6] - Organisms, which live at or on the sediment surface being either attached (sessile) or capable of movement.

Habitat - The place where a population (*.e.g.* animal, plant, micro-organism) lives and its surroundings, both living and non-living.

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

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

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

Infauna - Animals of any size living within the marine sediment. They move freely through interstitial spaces between sedimentary particles, or they build burrows or tubes.

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

Marine environment - Marine environment includes estuaries, coastal marine and nearshore zones, and open-ocean-deep-sea regions.

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

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

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

[6] Marine Ecology Report (Appendix 5.4).

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

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

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

Sediment - Unconsolidated mineral and organic particulate material that settles to the bottom of aquatic environment.

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

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

Species - A group of organisms that resemble each other to a greater degree than members of other groups and that form a reproductively isolated group that will not produce viable offspring if bred with members of another group.

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

Subtidal - The zone below the low-tide level, *i.e.* it is never exposed at low tide.

Surf-zone - Also referred to as the 'breaker zone' where water depths are less than half the wavelength of the incoming waves with the result that the orbital pattern of the waves collapses and breakers are formed.

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

Turbidity - Measure of the light-scattering properties of a volume of water, usually measured in nephelometric turbidity units.

ABBREVIATIONS AND ACRONYMS

ACER	ACER (Africa) Environmental Consultants
ASN	Alcatel Submarine Networks
BID	Background Information Document
BMH	Beach Manhole
°C	Degrees Centigrade
CA	Competent Authority
CBA	Critical Biodiversity Area
CITES	Convention on International Trade in Endangered Species
CLS	Cable Landing Station
CMS	Convention on Migratory Species
CPTs	Cone Penetrometer Tests
CRR	Comments and Responses Report
DEA	Department Environmental Affairs (national)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DEFF	Department of Environment, Forestry and Fisheries (now DFFE, as below)
DFFE	Department of Forestry, Fisheries and the Environment (previously DEFF, as above)
DEIAR	Draft Environmental Impact Assessment Report
DGPS	Differential Global Positioning System
DHSWS	Department of Human Settlements, Water and Sanitation
DSR	Draft Scoping Report
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
EBSA	Ecologically or Biologically Significant Area
ECPHRA	Eastern Cape Provincial Heritage Resources Authority
EEZ	Exclusive Economic Zone
EIAR	Environmental Impact Assessment Report
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
ESA	Ecologically Sensitive Area
Eskom	Eskom Holdings (SOC) Limited
FEIAR	Final Environmental Impact Assessment Report
FSR	Final Scoping Report
GN	Government Notice
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IBA	Important Bird Area
ICMA	Integrated Coastal Management Act (Act No. 24 of 2008)
ICPC	International Cable Protection Committee
IDP	Integrated Development Plan
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
LWM	Low Water Mark
MARISMA	Marine Spatial Management and Governance Programme (2014-2020)
MBES	Multi-beam echo sounder
MMO	Marine Mammal Observer
MoU	Memorandum of Understanding
MPAs	Marine Protected Area
MTN	MTN (Pty) Ltd
NAVTEX	Navigational Telex
NDP	National Development Plan
NEMA	National Environmental Management Act
NEPAD	New Partnership for Africa's Development
NHRA	National Heritage Resources Act

Nm	Nautical Mile
NMBMM	Nelson Mandela Bay Metropolitan Municipality
NOAA	National Oceanographic and Atmospheric Administration
OC	Department of Forestry, Fisheries and the Environmental – Oceans and Coasts
O&G	Oil and Gas
PAM	Passive acoustic monitoring
PASA	Petroleum Agency South Africa
PICC	Presidential Infrastructure Coordinating Commission
PIM	Particulate Inorganic Matter
PLGR	Pre-Lay Grapnel Run
POM	Particulate Organic Matter
PSO	Protected Species Observer
ROV	Remote Operated Vehicle
SADSTIA	South African Deep Sea Trawling Industry Association
SAFE	South Africa Far WEST Cable
SAHRA	South African Heritage Resources Agency
SAMSA	South African Maritime Safety Authority
SAN	South African Navy
SAT-3/WASC	South Atlantic 3/West Africa Submarine Cable
SDF	Spatial Development Framework
SIP	Strategic Infrastructure Project
Telkom	Telkom SA SOC Limited
TOPS	Threatened or Protected Species
UNCLOS	United Nations Convention on the Laws of the Sea
USBL	Ultra-short base line
WACS	West Africa Cable System

AUTHORS

The authors of this report are Ashleigh McKenzie and Giles Churchill of ACER (Africa) Environmental Consultants. An external review was conducted by ASN and Vodacom.

AFFIRMATION BY THE ENVIRONMENTAL IMPACT ASSESSMENT PRACTITIONER

AFFIRMATION BY THE ENVIRONMENTAL IMPACT ASSESSMENT PRACTITIONER

I, Giles Churchill, affirm that the information submitted for the purposes of this application is true and correct with respect to:

(i) the information provided (as drawn from information from multiple sources including the Client, specialists, design engineers, national provincial and metropolitan databases, Google Earth images, Interested and Affected Parties, observation form site visits, websites, publications and other referenced documentation which are assumed true and correct at the time of writing this report).

(ii) the inclusion of comments and inputs from stakeholders and I&APs.

(iii) the inclusion of inputs and recommendations from the specialist reports where relevant.

(iv) any 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.

(v) I further affirm that, the issues identified include those submitted by I&APs to date (as relevant to the assessment).

Signature of the Environmental Assessment Practitioner

ACER (AFRICA) ENVIRONMENTAL MANAGEMENT CONSULTANTS
Name of Company

23/08/2021
Date

Signature of the Commissioner of Oaths

23/08/2021
Date

SENZO EMMANUEL MABASO
EX OFFICIO COMMISSIONER OF OATHS
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ADHERANCE TO REGULATORY REQUIREMENTS

Table i Content of an EIA Report as per the 2014 EIA Regulations (GNR 326) published in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (as amended)

CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT AS PER THE 2014 EIA REGULATIONS (APPENDIX 3)		RELEVANT SECTION WITHIN THE EIA REPORT
(a)	Details of:	-
	(i) the EAP who prepared the report; and	Section 1.3
	(ii) the expertise of the EAP, including a curriculum vitae;	Section 1.3; Appendix A
(b)	The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report including:	Section 1.2, Figures 1, 2 and 3
	(i) the 21 digit Surveyor General code of each cadastral land parcel;	Appendix C
	(ii) where available, the physical address and farm name;	Appendix C
	(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	N/A
(c)	A plan which locates the proposed activity or activities applied for as well as the associated structure and infrastructure at an appropriate scale, or, if it is:	Figure 1, Figure 2 & Figure 3
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken;	Section 1.2
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 1.2
(d)	A description of the scope of the proposed activity, including:	Section 1.2,
	(i) all listed and specified activities triggered and being applied for; and	Section 1.4 (Table 2)
	(ii) a description of the associated structures and infrastructure related to the development;	Chapter 4
(e)	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Section 2.1 and 2.2
(f)	A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;	Chapter 3
(g)	A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;	Chapter 5
(h)	A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report including:	
	(i) details of all the alternatives considered;	Chapter 5
	(ii) details of the Public Participation Process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Chapter 8 and Appendix D and Appendix E

	(iii) a summary of the issues raised by I&APs, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 8.5 and Comments and Responses Report (Appendix E)
	(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 6
	(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts: (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Chapter 10
	(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Section 7.4
	(vii) positive and negative impacts that the proposed activity will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 9 and Chapter 10
	(viii) the possible mitigation measures that could be applied and level of residual risk;	Chapter 10 (mitigation measures)
	(ix) If no alternative development footprints for the activity were investigated, the motivation for not considering such; and	N/A
	(x) A concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	Chapter 12
(i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including -	Chapter 7
	(i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Chapter 10
	(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;	Chapter 10
(j)	An assessment of each identified potentially significant impact and risk, including	
	(i) Cumulative impacts;	Chapter 10
	(ii) The nature, significance and consequences of the impact and risk;	Chapter 10
	(iii) The extent and duration of the impact and risk;	Chapter 10
	(iv) The probability of the impact and risk occurring;	Chapter 10
	(v) The degree to which the impact and risk can be reversed;	Chapter 10
	(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and	Chapter 10
	(vii) The degree to which the impact and risk can be mitigated;	Chapter 10
(k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulation and an indication	Chapter 9

	as to how these findings and recommendations have been included in the final assessment report;	
(l)	An environmental impact statement which contains	Chapter 11
	(i) A summary of the key findings of the environmental impact assessment	Chapter 11
	(ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and	Refer to Figures in this report and in Appendix G
	(iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Chapter 10
(m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	Chapter 10
(n)	The Final proposed alternatives which respond to the impact management measures, avoidance, the mitigation measures identified through the assessment;	Chapter 5
(o)	Any aspects which were conditional to the finding of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Chapter 12
(p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 1.7
(q)	A reasoned opinion as to whether the proposed activity should or shouldn't be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Chapter 12
(r)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	N/A
(s)	An undertaking under oath or affirmation by the EAP in relation to -	Near the front of this report (Affirmation by the Environmental Impact Assessment Practitioner)
	(i) the correctness of the information provide in the reports;	As above
	(ii) the inclusion of comments and inputs from stakeholders and I&APs;	As above
	(iii) The inclusion of inputs and recommendation from the specialist reports where relevant; and	As above
	(iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made interested or affected parties;	As above
(t)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(u)	An indication of any deviation from the approved scoping report, including the plan of study, including	N/A

	(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and	N/A
	(ii) a motivation for the deviation;	N/A
(v)	Any specific information that may be required by the competent authority; and	Refer to the Comments and Responses Report in Appendix E
(w)	Any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A

1 INTRODUCTION

1.1 Background

2AFRICA is one of the largest subsea telecommunications projects in the world and will serve the African Continent and Middle East region (Figure 1). At 37,000km long, the 2AFRICA subsea fibre optic cable system will interconnect Europe (eastward via Egypt), the Middle East (via Saudi Arabia), and 21 landings in 16 countries in Africa. The venture is partnered by China Mobile International, Facebook, MTN GlobalConnect, Orange, Saudi Telecom Group, Telecom Egypt, Vodafone and West Indian Ocean Cable Company (WIOCC). The parties have appointed Alcatel Submarine Networks (ASN) to build the cable. The 2AFRICA Cable System comprises several sub systems to be delivered via different contracts. This report deals with part of the 2AFRICA/GERA (East) Cable System[7], **specifically the cable landing at Gqeberha (formerly named Port Elizabeth[8]),** located within the Nelson Mandela Bay Metropolitan Municipality (NMBMM) in the Eastern Cape Province, South Africa (Figure 2 and Figure 3). This landing will be operated by Vodacom (Pty) Ltd (Vodacom), as the South African Landing Provider.

The proposed project requires environmental authorisation from the Department of Forestry, Fisheries and the Environment[9] (DFFE) in terms of the 2014 Environmental Impact Assessment Regulations (as amended April 2017) (EIA Regulations) published under the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended). ASN, on behalf of Vodacom, has appointed ACER (Africa) Environmental Consultants (ACER) as the independent Environmental Assessment Practitioner (EAP) to undertake the application for environmental authorisation for the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing).

The application to DFFE requires a process of Scoping and Impact Assessment. The Final Scoping Report (FSR) and Plan of Study for Impact Assessment was accepted by DFFE on 8 June 2021, the DEIAR was completed and circulated for comment during the period 22nd July 2021 – 23rd August 2021. This FEIAR presents the final findings of the Impact Assessment and has been compiled in accordance with NEMA, in particular, Government Notice Regulation (GNR) 326 (April 2017), which outlines the requirements of an EIA process to be undertaken as part of the application for environmental authorisation for activities in Listing Notices 1, 2 and 3 of the EIA Regulations.

The purpose of the project is to improve Africa's information technology infrastructure via telecommunication cables. Submarine telecommunication cables are important for international telecommunication networks as they transport almost 100% of transoceanic Internet traffic throughout the world (www.iscpc.org). It is widely recognised that access to affordable international bandwidth is key to economic development in every country. Today, Africa relies primarily on satellites with few submarine cables to provide its international communications. Communication via submarine telecommunication cables generally allows for lower cost, better performance, and greater capacity (throughput) than that available via satellite.

Improvement in the technology will assist in removing one of the current key inhibitors to overall development in Africa and support economic growth and opportunities on the continent. By supplying increased bandwidths, the proposed 2AFRICA/GERA (East) Submarine Cable

[7] Note that separate EIA processes are being undertaken for two other 2AFRICA/GERA (EAST) South African landings, namely Amanzimtoti and Duynefontein, and for a 2AFRICA (WEST) landing in South Africa, namely Yzerfontein.
[8] Note that the change of name is recent (23 February 2021) and will, therefore, not necessarily reflect in all of the mapping contained in this report.
[9] Previously Department of Environment, Forestry and Fisheries (DEFF). The name change came into effect 1 April 2021.

System (Gqeberha landing) will support the primary objective of the New Partnership for Africa's Development (NEPAD to eradicate poverty in Africa and to place African countries both individually and collectively on a path of sustainable growth and development, to thereby halt the marginalisation of Africa in the globalisation process. At the core of the NEPAD process is its African ownership, which must be retained and strongly promoted, so as to meet the legitimate aspirations of the African people (http://www.dirco.gov.za/au.nepad/nepad_overview.htm).

Telecommunications is one of the fastest growing sectors of South Africa's economy which has been driven by rapid growth in the number of mobile phone users and their need for broadband connectivity. The proposed project will provide an opportunity to facilitate the growth of the telecommunications infrastructure in South Africa and in this way support the country's national development goals, including the goals of the Strategic Integrated Project (SIP) 15: *Expanding Access to Communication Technology*.

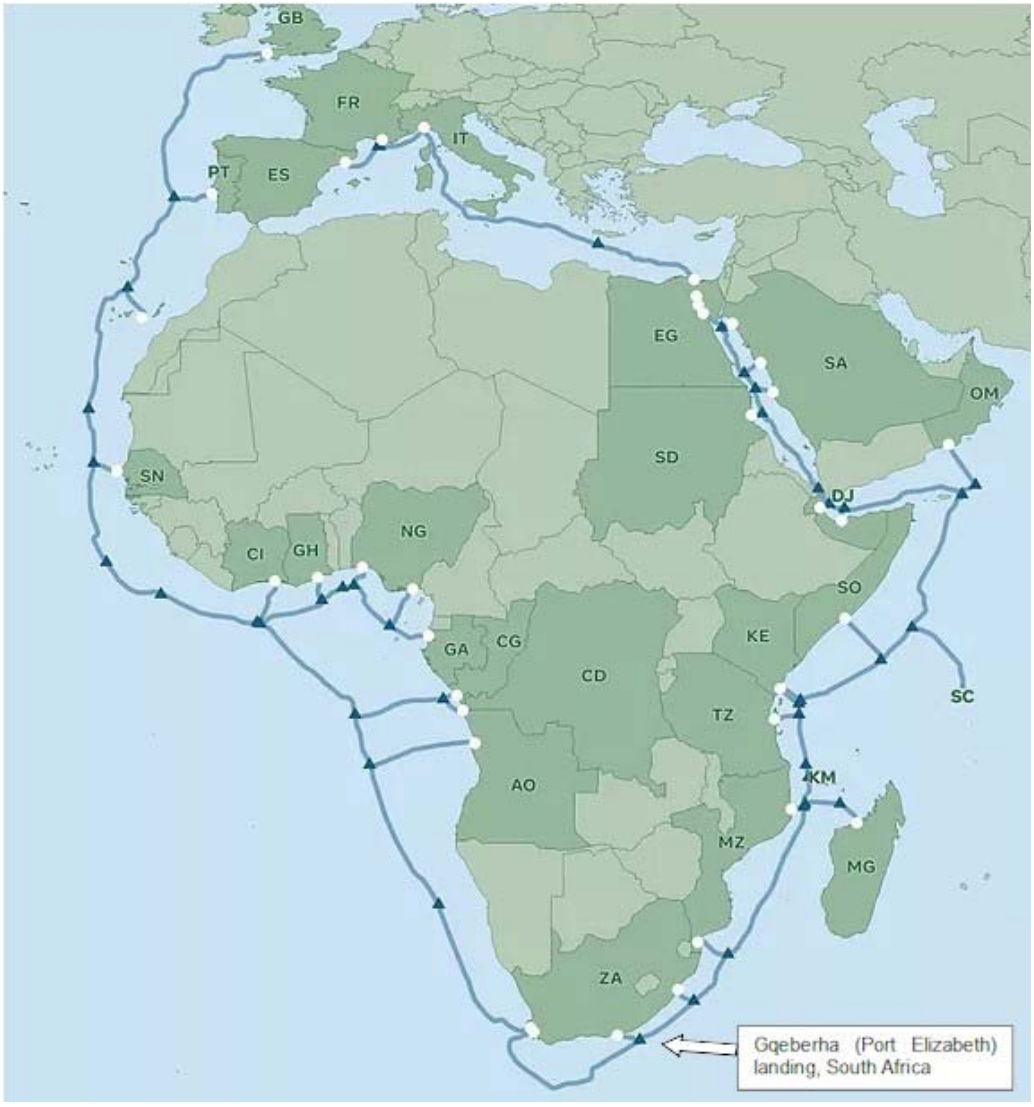


Figure 1 **General overview of the proposed 2AFRICA/GERA (East) and (West) Cable Systems** (Source: 2africacable.com)

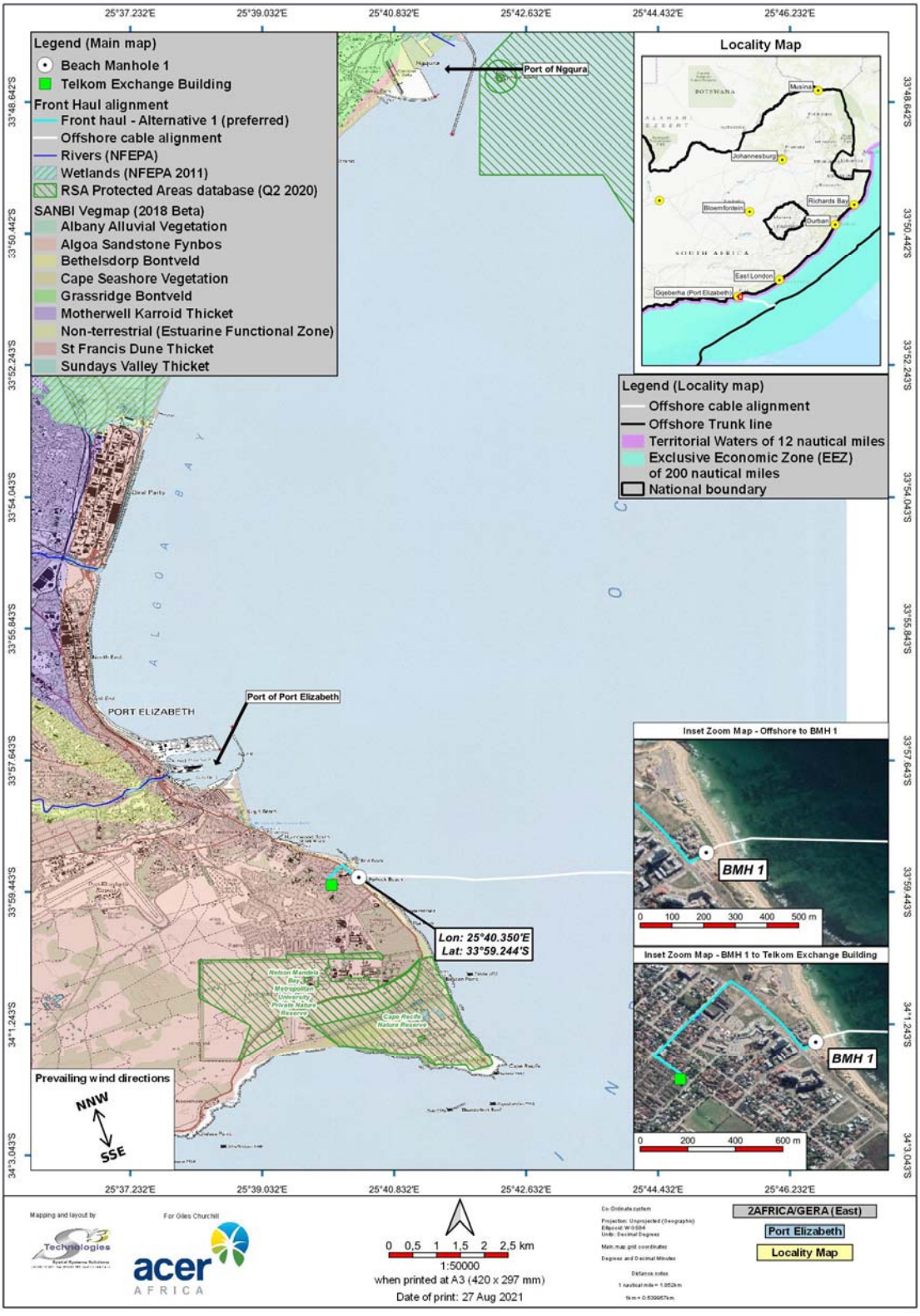


Figure 2 **Locality of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing), Eastern Cape, South Africa**

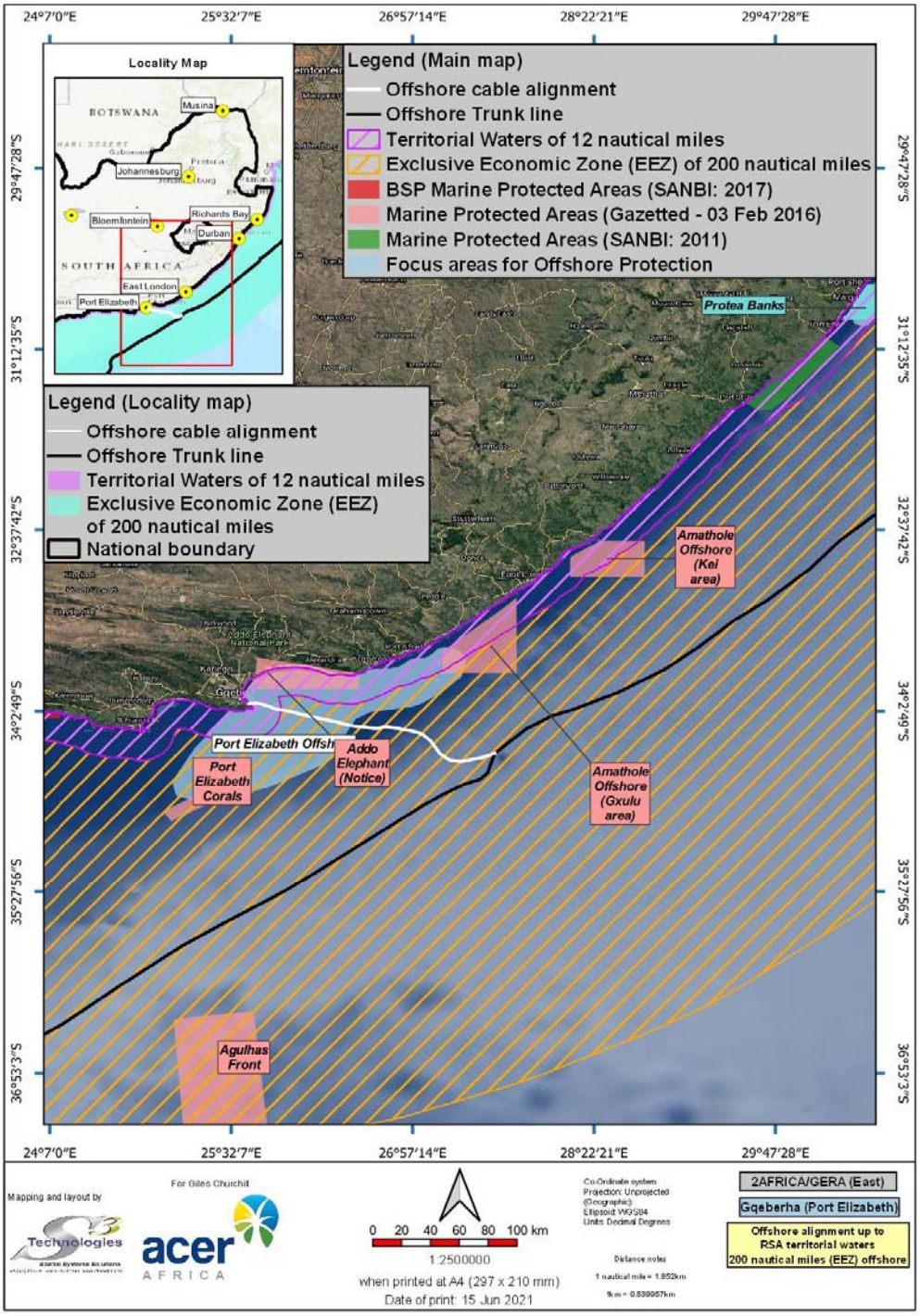


Figure 3 Locality of proposed offshore alignment of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

1.2 General location and scope of the project

The project involves the installation and operation of the 2AFRICA/GERA (EAST) Submarine Cable System (Gqeberha landing), which comprises marine and terrestrial components, as shown generally in Figure 2 and Figure 3.

The marine cable component is the branch line that lands at Gqeberha (Port Elizabeth) on the south side of Algoa Bay. The marine cable extends from the main trunk line of the 2AFRICA/GERA (East) Cable to Pollock Beach in Summerstrand, Gqeberha. From the main cable trunk (located in the Indian Ocean approximately 100 km from the shoreline off Gqeberha, within South Africa's EEZ), the branch line enters South African Territorial Waters approximately 22 km from the seashore (12 Nm) and will link into a Beach Manhole (BMH) on shore.

On land, the BMH will be constructed at Summerstrand and the cable will link up to the Cable Landing Station (CLS) which will be accommodated within the existing Telkom SOC Limited (Telkom) Exchange Building located on the corner of Skegness and Bognor Streets in Summerstrand. A cable trench will be required for the front haul alignment from the BMH to the CLS site.

Note that the width of offshore corridor assessed for the marine cable was 500 m (250 m either side of the cable), although the cable footprint to be disturbed is only 6 m wide (the width of the sea plough) when cable burial takes place. The entire beach where the cable is to land was assessed; however, the construction corridor on the beach will be limited to 50 m each side of the cable. On land, the cable trench is less than 1 m in width, however a construction corridor of 10 m (5 m either side of the cable) will require approval.

Relevant Global Positioning System (GPS) co-ordinates (approximate) are provided below.

GPS Co-ordinates (approximate) of the proposed infrastructure for the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)		
Location	**Latitude (S)**	**Longitude (E)**
Start of marine branch cable (at trunkline)	34°22.695′	27°35.789′
Mid-point of marine branch cable	34°10.976′	26°41.172′
Approximate length of marine branch cable	194 km	
Width of the offshore cable corridor to be authorised	0.5 km	
Width of the beach crossing corridor to be authorised	0,1 km	
Sea Earth Plate	33° 59.195'	25° 40.693'
Land based System Earth (if sea earth not used)	33° 59.252'	25° 40.688'
BMH at Pollock Beach (Alternative 1- preferred)	33 59.244 S	25°40.350′
Telkom exchange building housing the CLS	33°59.348′	25°39.980′
Mid-point of trench line for ducting from BMH to CLS.	33°59.109′	25°40.085′
Approximate length of trench line for ducting to CLS	Approximately 1,2 km	
Width of the land cable corridor to be authorised	0.01 km	

Project activities include:

- Pre-installation.
  - Cable Route Survey.
  - Route engineering.
  - Route Clearance.
  - Pre-Lay Grapnel Run.
  - Construction of a BMH and cable ducting to the existing CLS site

- Installation
  - Cable Surface Lay (> 1,500 m depths).
  - Cable Burial (<1,500 m water depths).
  - Shore End Landing.
  - Beach Burial. (If rock is encountered at depths shallower than 2 m, rock trenching or HDD will be used to achieve cable burial).
  - Installation of Sea Earth System. (A sea earth plate will be installed, unless HDD is required, in which case a standard land based System Earth will be installed inland of the BMH).
  - Post Lay Inspection and Inshore Burial (burial in shallow water off the beach, where conditions permit).
  - Cable surface lay on rock outcropping nearshore, clamping to rock and provision of armoured casing where required.
  - Installation of the terrestrial fibre optic cable from the newly constructed BMH to the existing CLS site, via the new underground ducting.
- Operation of the cable (maintenance only, should breakages occur).
- Decommissioning of the cable (only after expected life span of > 25 years).

The above provides a summary. Refer to Chapters 4 and 5 for detailed descriptions of the project activities and alternatives.

1.3 Qualifications and experience of the Environmental Assessment Practitioner

ACER (Africa) Environmental Consultants (ACER) is a well-established company with wide ranging expertise in environmental management and assessment processes. ACER has twice won the IAIAsa National Premium Award for excellence in environmental management and assessment. The qualifications and experience of the primary assessors and report compilers are listed in Table 1 and *curriculum vitae* are provided in Appendix A.

Table 1 Qualifications and experience of the Environmental Assessment Practitioner Team

Name	Academic Qualification	Relevant Work Experience
Ms A McKenzie (EAP, Pr. Sci. Nat. Author)	MSc	More than 21 years' experience in the field of environmental management. She is registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/1337) and the South African Council for Natural Scientific Professions (SACNASP) in the field of environmental science (Registration No 400026/05).
Mr Giles Churchill (EAP , Pr. Sci. Nat. internal review)	MSc	More than 13 years' experience in environmental management, impact assessments and the monitoring of compliance with specifications contained in Environmental Management Programmes. He is registered with EAPASA (2019/1687) and SACNASP in the field of environmental science (Registration No 116348).
Glenda du Toit (Public Participation)	Matric	More than 25 years of broad administrative and technical experience in industry (AngloGold Ashanti and Mondi Richards Bay) before joining ACER in 2021, to train as a public participation consultant.

1.4 Triggered listed activities, environmental assessment requirements and process

In terms of the EIA Regulations published under Section 24(5) read with Sections 24, 24D and 44 of NEMA, the proposed project potentially triggers activities in Listing Notices 1, 2 and 3 (GNR 327, GNR 325 and GNR 324 respectively - 7 April 2017) as shown in Table 2. As such, the project may not commence without environmental authorisation from the relevant competent authority, in this case, DFFE[10] (in close consultation with the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT).

Given that the proposed project triggers listed activities in Listing Notice 2, the application for environmental authorisation requires a process of Scoping and Impact Assessment with specified timeframes (Figure 4), as outlined in GNR 326 (April 2017). The process is currently in the Impact Assessment Phase.

Based on the current regulations, the EAP must complete Scoping and the Impact Assessment within 300 days of acceptance of the Application for Authorisation by DFFE, which is the Competent Authority (CA).

It is important to note that timeframes in the 2014 EIA Regulations (as amended) are based on calendar days and the following conditions apply:

- 15 December to 5 January are excluded from the calculation.
- No Public Participation between 15 December and 5 January unless justified by exceptional circumstances.
- Organs of State to comment within 30 days from the date on which it was requested to submit comments.
- For both Basic Assessments and Environmental Impact Assessments, the Competent Authority (CA) must issue a decision within 107 days.
- Notification of decision by CA within 5 days of date of decision.

Table 2 Listed activities potentially triggered by the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

Activity Numbers	Relevant Listed Activities as set out in Listing Notice 1 (GNR. 327) and reasons why they are triggered
Activity 15 of Listing Notice 1 (No. R. 327 of 2017) The development of structures in the coastal public property where the development footprint is bigger than 50 square metres, excluding - (i) the development of structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (ii) the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (iii) the development of temporary structures within the beach zone where such structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared; or	The project will entail the landing of a marine telecommunications cable at Pollock Beach in Summerstrand, Gceberha (Port Elizabeth). This will require the digging of a trench along the beach (coastal public property) into the intertidal zone and the installation of the telecommunications cable, System Earth and associated activities.

[10] DFFE is the authorising authority as the project crosses international boundaries and is of national importance.

(iv) activities listed in activity 14 in Listing Notice 2 of 2014, in which case that activity applies.	
Activity 17 of Listing Notice 1 (No. R. 327 of 2017) Development- i. in the sea; ii. .. iii. within the littoral active zone; iv. in front of a development setback; or v. if no development setback exists, within a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is the greater; in respect of- a) .. b) .. c) .. d) .. e) infrastructure with a development footprint of 50 square metres or more - but excluding- (aa) .. (bb) .. (cc) .. (dd) ..	The project will entail the landing of a marine telecommunications cable at Pollock Beach, Summerstrand. This will require the burying of the cable offshore where possible and the digging of a trench along the beach into the intertidal zone and the installation of the telecommunications cable to the Beach Manhole (BMH).
Activity 18 of Listing Notice 1 (No. R. 327 of 2017) The planting of vegetation or placing of any material on dunes or exposed sand surfaces of more than 10 square metres, within the littoral active zone, for the purpose of preventing the free movement of sand, erosion or accretion, excluding where - (i) .. (ii) ..	The project will entail the rehabilitation of the shoreline on Pollock Beach where construction activities associated with the laying of the underground telecommunications cable will disturb vegetation on the shoreline.
Activity 19A of Listing Notice 1 (No. R. 327 of 2017) 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- (i) .. (ii) the seashore; or (iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater but excluding where such infilling, depositing , dredging, excavation, removal or moving- (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.	The project will entail the excavation and deposition of more than 5 m^3 of material within a 100 m of the high-water mark of the sea when constructing the BMH and trenching for, and backfilling of, the marine telecommunications cable and System Earth.

Activity Numbers	**Relevant Listed Activities as set out in Listing Notice 2 (GN No. R. 325) and reasons why they are triggered**
<u>Activity 14 of Listing Notice 2 (No. R. 984 of 2014)</u> The development and related operation of- (i) .. (ii) anchored platform; or (iii) any other structure or infrastructure on, below or along the seabed; excluding - (a) development of facilities, infrastructure or structures for aquaculture purposes; or (b) the development of temporary structures or infrastructure where such structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	The proposed 2AFRICA/GERA (East) Cable System will be placed on the seabed. In shallow waters (less than 1,500 m in depth) the cable will be buried under the seabed to provide extra protection.
<u>Activity 26 of Listing Notice 2 (No. R. 325 of 2017)</u> Development-- i. in the sea; ii. .. iii. within the littoral active zone; iv. .. v. if no development setback exists, within a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is the greater; in respect of – a) .. b) .. c) inter- and sub-tidal structures for entrapment of sand; d) .. e) .. f) .. g) .. or h) underwater channels; but excluding the development of structures within existing ports or harbours that will not increase the development footprint of the port or harbour.	Although unlikely to be triggered, this listed activity has been included as the trench for the marine cable may result in the entrapment of sand within the inter- and sub-tidal zones. In addition, the trench in which to bury the cable may be construed as an underwater channel.

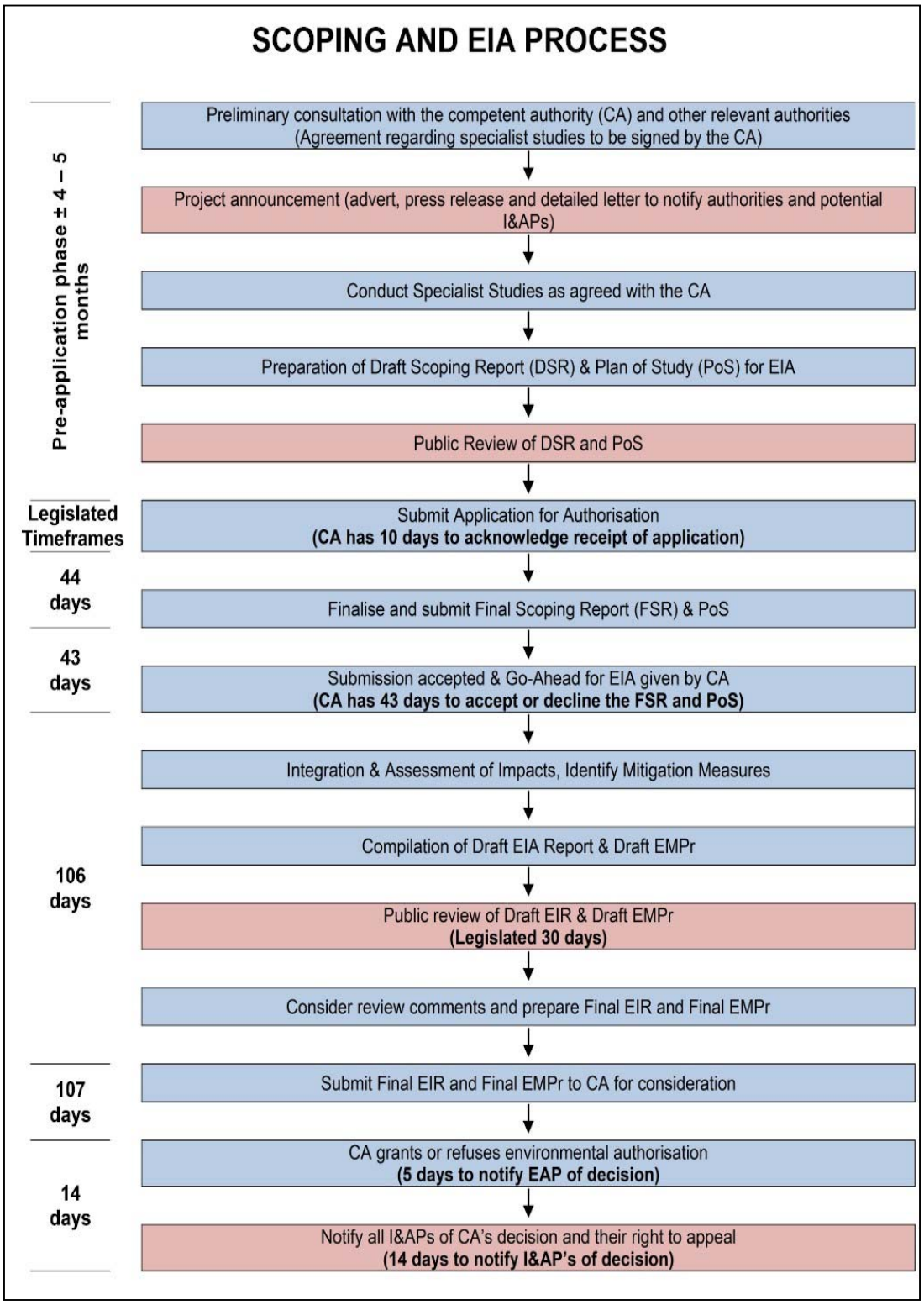


Figure 4 The phases of an environmental impact assessment, including legislated timeframes

1.5 Environmental Impact Assessment Report

The purpose of this FEIAR is to collate, integrate, summarise, and evaluate the findings of the specialist studies and to consider each of the issues raised during Scoping. This aims at providing the reader with a holistic understanding of the potential positive and negative impacts of the proposed development in a singular congruent unit. Several inputs have informed the content of the FEIAR, most notably the outcomes of the different specialist studies that were commissioned as part of the Impact Assessment and comments received from I&APs and authorities following the review of the DEIAR.

The information provided in this FEIAR complies with the legal requirements of GNR 326, as referenced in Tables (i) and (ii). The FEIAR was finalised and submitted to DFFE for review and decision-making and I&APs were notified of its submission and its availability for review and comment on ACER's website.

The following documentation is appended to this report:

- Appendix A: EAP *Curriculum Vitae.*
- Appendix B: Specialist reports, *Curriculum Vitae* and Declarations.
- Appendix C: Property Details.
- Appendix D: Public Participation Documentation.
- Appendix E: Comments and Responses Report.
- Appendix F: Environmental Management Programme.
- Appendix G: Supporting Maps.

1.6 Environmental Management Programme

An Environmental Management Programme (EMPr) has been prepared as part of this assessment. It contains mitigation measures to prevent, limit or enhance impacts identified during this EIA process. These measures may be applied at different stages of the project (design, construction or rehabilitation).

1.7 Assumptions, limitations and gaps in knowledge

Key assumptions, limitations and/or gaps in knowledge applying to the EAP are listed below. Additional discipline specific ones are listed in the individual specialist reports contained in Appendix B.

- This report has drawn on primary and secondary information from various sources including the client; engineering team; national, provincial and municipal databases; municipal planning documents; specialist studies and input from Interested and Affected Parties (I&APs). It is assumed that this information from these sources was true and correct at the time of writing this report.
- It is assumed that the project scope and information, including maps, GPS co-ordinates and kml files, provided by the client and the engineering/survey team to the EAP and specialists, are accurate.
- The impact assessment conventions are more applicable to the biophysical environment. Therefore, for social/socio-economic impacts, professional judgement is applied to the conventions to arrive at the assessment of impact significance.
- Economic impacts are not quantified.
- Cumulative impacts are not quantified in all cases.

2 FRAMEWORK FOR THE ENVIRONMENTAL ASSESSMENT

The Scoping process defined the limits of the assessment, identified and elicited inputs from I&APs, and defined the assessment framework with the purpose of focusing the scope of the assessment ensuring a focus on key issues and associated impacts.

2.1 Concept of sustainability

The framework (Figure 5) within which environmental aspects arising from or influencing the proposed project (and its alternatives) are considered is the concept of sustainability. This considers the inter-related dimensions of the environment, viz. the social, economic and biophysical dimensions, underpinned by a system of sound governance through the legal/statutory requirements of South Africa (particularly NEMA).

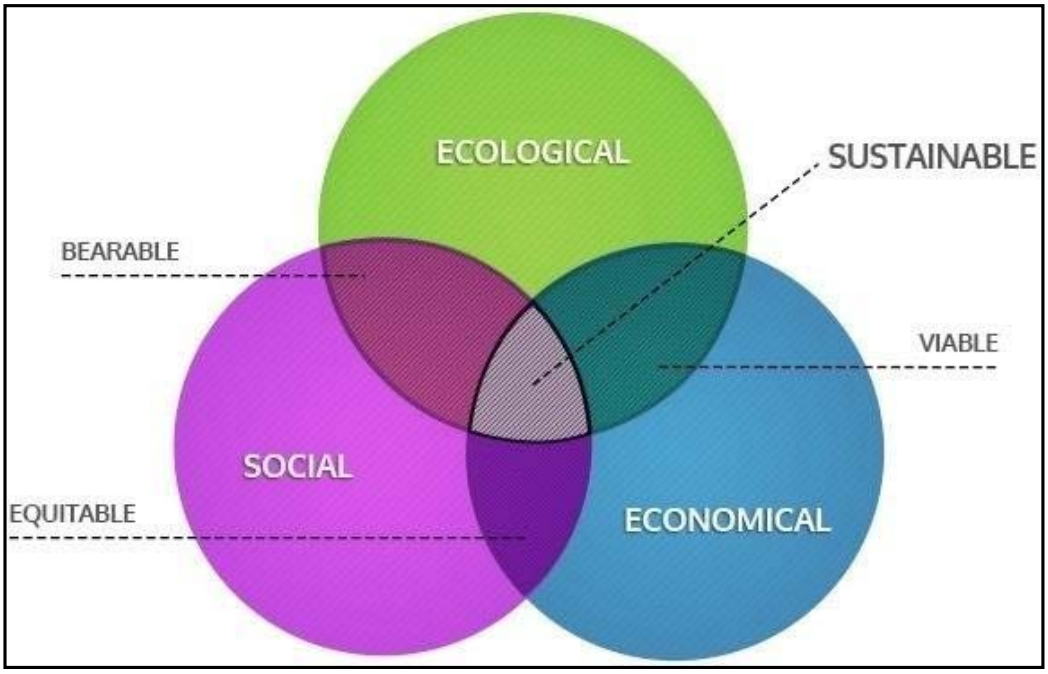


Figure 5 Assessment framework based on the concept of sustainability

All three dimensions of the environment, and the interactions between them (two- and three - dimensional), contribute to achieving sustainability and, therefore, each dimension, individually and its combined interaction with the other two dimensions, needs to be taken into account when assessing a proposed option or project, taking due cognisance that the three dimensions are seldom in perfect balance, with optimised solutions often being dictated by local circumstances, and requiring trade-offs between the dimensions.

In terms of sustainability and the assessment framework, key principles included:

- Development must not irretrievably degrade the natural, built, social, economic and governance resources on which it is based.
- Current actions should not cause irreversible damage to natural and other resources, as this potentially precludes sustainable options.
- Where there is uncertainty about the impact of activities on the environment, caution should be exercised in favour of the environment.

- Land-use and environmental planning need to be integrated.
- Immediate and long-term actions need to be identified and planned for, so that urgent needs can be met while still progressing towards longer-term sustainable solutions.

Issues and impacts were identified by way of interlinked technical and public participation processes. Information gathering focused on gaining an understanding of the interactions between the different dimensions of the environment to identify potentially significant issues and associated impacts. This involved site visits, reference to existing documentation and maps, liaison with the project proponent and technical team, as well as consideration and incorporation of the issues raised during the public participation process. Information was collated, integrated and evaluated, and potentially significant issues and impacts were identified. This enabled the EAP to focus and tailor the scope of work for Specialist Studies and further detailed investigations, the results of which are documented in this report.

In addition to the requirement for Scoping and an Impact Assessment, a review of legislation applicable to the project was undertaken to establish licencing and permitting requirements. Included in this review of legislation were the permit requirements of the Department of Human Settlements, Water and Sanitation (water use licences), the permit requirements of the DFFE – Oceans and Coasts (OC) (in terms of the proposed cable laying activities and beach access), plant permit requirements from DFFE and DEDEAT, permit requirements from the South African Heritage Resources Agency (SAHRA) and permit requirements of DFFE in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008). Findings from this review of applicable legislation and the required licence and permits are included in Section 2.2.

It should be noted that OC is also directly involved with Operation Phakisa which includes the sustainable utilisation of the oceans around South Africa to meet Government's development targets. It is estimated that the oceans around South Africa have the potential to contribute up to ZAR 177 billion to the country's Gross Domestic Product (GDP) and create just over one million jobs by 2033 (http://www.operationphakisa.gov.za).

Operation Phakisa consists of four critical areas to unlock the potential of South Africa's coastline:

- Marine Transport and Manufacturing.
- Offshore Oil and Gas Exploration.
- Aquaculture.
- Marine Protection Services and Ocean Governance.

2.2 Legal or statutory requirements

There are a host of legal requirements (national, provincial and local government spheres) to which Vodacom must adhere for the installation of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) and related infrastructure. Fundamentally, Vodacom is required to include and integrate environmental principles and values into all planning and implementation procedures taken for development purposes.

Underlying the above reasoning is the constitutional right that people have to environmental protection as set out in the Bill of Rights in the Constitution (Section 24). These rights have been interpreted and included into NEMA, which, together with other national and provincial legislation, governs the way environmental principles are incorporated into any form of development.

The Scoping Report (Draft and Final) have dealt in detail with the key pieces of legislation relevant to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). Furthermore, the specialist reports contained in Appendix B focus on the legislation particular to the issues under investigation. These are not repeated in this FEIAR. Rather, for completeness, the key pieces of legislation are listed below:

2.2.1 Legislation

- Constitution of the Republic of South Africa Act, 1996 (Act No. 108 of 1996) as amended by the Constitution of the Republic of South Africa, Amendment Act, 1997 (Act No. 35 of 1997).
- National Environmental Management Act , 1998 (Act 107 of 1998) and associated EIA Regulations, 2014 (as amended 2017).
- National Water Act, 1998 (Act 36 of 1998).
- National Heritage Resources Act, 1999 (Act 25 of 1999).
- National Forest Act, 1998 (Act 84 of 1998).
- Hazardous Substance Act, 1973 (Act 15 of 1973).
- Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).
- National Environmental Management: Waste Act, 2008 (Act 59 of 2008).
- National Environmental Management: Biodiversity, 2004 (Act 10 of 2004).
- National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003).
- National Environmental Management: Integrated Coastal Management Act, 2008 (Act 24 of 2008).
- National Environmental Management: Integrated Coastal Management Amendment Act, 2014 (Act 36 of 2014).
- Seashore Act. 1935 (Act 21 of 1935).
- The Marine Living Resources Act, 1998 (Act 18 of 1998).
- Maritime Zones Act, 1994 (Act 15 of 1994).
- Telecommunications Act, 1996 (Act 103 of 1996).
- Marine Traffic Act, 1981 (Act 2 of 1981).

For the proposed project, the Constitution of the Republic of South Africa Act, 1996 (Act No. 108 of 1996) as amended by the Constitution of the Republic of South Africa, Amendment Act, 1997 (Act No. 35 of 1997) is the overarching legislation of over-riding importance. Chapter 2 of the Constitution contains the Bill of Rights, which is the cornerstone of democracy in South Africa. It enshrines the rights of all people in our country and affirms the democratic values of human dignity, equality and freedom. It is within this context that all legislation since 1996 has been formulated.

There are several other pieces of key legislation through which the protection of human rights, community health, and safety and security will be assured:

- Labour Relations Act.
- Basic Conditions of Employment Act.
- Employment Equity Act.
- Occupational Health and Safety Act.
- Promotion of Access to Information Act.

And some key associated Regulations:

- Labour Relations Regulations.
- Compensation for Occupational Injuries and Diseases Regulations.

- Construction Regulations.
- General Safety Regulations.
- Hazardous Chemical Substances Regulations.

2.2.2 Guidelines

The following guidelines are also applicable:

- Public Participation Guideline in Terms of NEMA, 1998 and the EIA Regulations.
- Guideline Series 5: Companion to the EIA Regulations of 2010.
- Guideline Series 7: Public Participation in the EIA Process.
- Guideline Series 9: Need and Desirability in terms of the EIA Regulations of 2010 (Draft).
- Department of Environmental Affairs (DEA) Alternatives Guideline 5.
- DEA Guidelines for EMPrs.

2.2.3 National, provincial and local policies and plans

- National Development Plan 2030 (NDP).
- South African National Infrastructure Plan 2012 (with reference specifically to SIP 15 - expanding access to communication technology).
- National Coastal and Marine Spatial Biodiversity Plan (Version 1, Beta 2) (Harris, L.R., Sink, K.J., Holness, S.D., Kirkman, S.P., Driver, A. 2020).
- National Climate Change Adaptation Strategy (NCCAS).
- National Climate Change Response White Paper.
- Eastern Cape Vision 2030 Provincial Development Plan (PDP) (2014)
- Nelson Mandela Bay Metropolitan Municipality Integrated Development Plan (2017/18 – 2012/22)
- Nelson Mandela Bay Municipality Climate Change and Green Economy Action Plan (August 2015)

2.2.4 International treaties, conventions and protocols

There are various international treaties, conventions and protocols of relevance to this project:

- The National Convention for the Prevention of Pollution by Ships of 1973 and 1978, and the Protocol of 1997.
- The Convention on the Prevention of Marine Pollution through the Disposal of Waste and Other Matter, 1972 or the London Convention, 1972.
- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.
- United Nations Convention on the Laws of the Sea (UNCLOS).

2.2.5 Permits required

The main licenses/permits[11] required or potentially required for the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) are summarised in Table 3.

Table 3 Main licenses/permit obligations for the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

License/Permit	Authority
Heritage Permit (Offshore)	South African Heritage Resources Agency (SAHRA)
Heritage Permit (Onshore)	Eastern Cape Provincial Heritage Resources Authority (ECPHRA)
Beach Driving Permit	Oceans and Coast (DFFE)
Seashore Lease Permit	Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)
Protected Tree and/or Plant Permits (if required)	DFFE (Forestry) and (DEDEAT)
Water Use License (if required)	Department of Human Settlements, Water and Sanitation (DHSWS)
Permit to construct infrastructure in the Coastal Public Property	Department of Public Works
Local municipal permits and approvals	NMBMM
Section 53 of the Mineral and Petroleum Resources Development Act	Department of Mineral and Petroleum Resources

It is within this framework that the proposed development will need to be constructed and operated.

It should also be noted that due to the Covid -19 pandemic, South Africa declared a national state of disaster on 15 March 2020 in terms of the Disaster Management Act, 2002 (Act No. 57 of 2002). Since this date, a host of Regulations have been promulgated in terms of the Disaster Management Act, dealing with a wide range of matters affected by the pandemic. Of possible relevance to the implementation of this project will be the effect on various government department's processes of engagement with applicants and the public, as well as time frames for permitting and authorisation processes. The Regulations also govern the manner in which public participation can be carried out, with a view to limiting social interaction via social distancing.

[11] Excluded from the above are the following which are the responsibility of Telkom (i) Telecommunications operators' licenses, cable landing station licences and similar licenses required from the national telecommunications regulators (ii) Permits in Principle specifically for system elements landward of the Beach Manholes (iii) Operational clearances (iv) Agreements to cross other submarine cables, oil and gas concession blocks, pipelines and other seabed assets.

3 NEED AND DESIRABILITY

The need and desirability of a proposed development is a key consideration of an application for environmental authorisation and differs from the developer's aims and purpose of the development. The Guideline on Need and Desirability in terms of the EIA Regulations (DEA, 2017) states that *"consistent with national priorities, environmental authorities must support "increased economic growth and promote social inclusion" while ensuring that such growth is "ecologically sustainable"*. In essence, need and desirability are based on the principle of sustainability, viz. that a development is ecologically sustainable and socially and economically justifiable.

Sustainability in this context implies ecological sustainability, recognising that the maintenance of healthy ecosystems and natural resources are preconditions for human wellbeing and recognising that there are limits to the goods and services that can be provided by the environment. Sustainable development is the process that is followed to achieve the goal of sustainability.

Over recent years, private sector finance for infrastructure projects, both in the developed and developing world, has increased in importance. This has exposed financial institutions to increasing pressure from Non-Governmental Organisations (NGOs) for their involvement in a variety of controversial projects and the need for greater transparency, accountability and tighter standards in the operations of commercial banking. Stemming from these demands and concerns is a set of standards known as the Equator Principles, which are based on the International Finance Corporation (IFC) performance standards on social and environmental sustainability, and on the World Bank Group's Environmental, Health and Safety General Guidelines. The Equator Principles promote socially responsible conduct and sound environmental practices in relation to project financing initiatives.

The single most important factor in reducing the environmental (and social) impacts of marine telecommunications infrastructure projects is good site selection and the ease at which marine telecommunications cable can tie into the existing land based telecommunications network (distance from landing site to the CLS and existing network). The best option is, as much as possible, to avoid negative impacts on the environment from the outset, thereby minimising the amount of environmental mitigation measures required.

Table 4 and Table 5 are derived directly from the Guideline and contain the *"questions to be engaged with when considering need and desirability"* as highlighted in the guideline. Responses to these questions are correspondingly provided in the table, based on the information and knowledge gained during this EIA.

Table 4 Need and desirability aspects considered for securing ecological sustainable development and use of natural resources

Ref #	Description	Comment
1	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?	Implementation of the marine component of the cable is expected to have localised impacts on the marine benthic and shallow benthic environment. The terrestrial cable component affects an area that is already transformed by urban development and artificial stabilisation of the beach and dunes at Pollock Beach, Gqeberha.
1.1	How will the following ecological integrity considerations be taken into account?	
1.1.1	Threatened ecosystems.	The proposed marine cable is aligned, as far as possible, to avoid sensitive reef areas and MPAs, but will nevertheless traverse various areas identified in the National Coastal and Marine Spatial Biodiversity Plan (2020) as ecologically sensitive (CBA1, CBA2 and ESA). However, the impact of the cable on these areas is assessed by marine specialists to be of low significance. The terrestrial portion of the cable is located in an area where the beach, dunes and inland area are transformed and degraded by urban development. As confirmed by specialists, the cable does not traverse threatened ecosystems and does not impact on any wetlands or vegetation of conservation value.
1.1.2	Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems which require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.	Refer to 1.1.1 above.
1.1.3	Critical Biodiversity Areas and Ecological Support Areas.	Refer to 1.1.1 above.
1.1.4	Conservation targets.	The proposed cable will have no significant negative impacts on terrestrial or marine areas of conservation significance or on planned conservation targets.
1.1.5	Ecological drivers of the ecosystem.	Findings from the specialist studies indicate that there will be no significant impact on ecological drivers of the marine or beach ecosystems.
1.1.6	Environmental Management Frameworks (EMF).	The principles of sustainable development are incorporated into the identification, avoidance, and mitigation of impacts. Note however, that the proposed cable landing affects a fully urbanised area within the NMBMM.
1.1.7	Spatial Development Frameworks (SDF).	The proposed development is in line with the SDF's objectives of sustainable development, as it is aimed at improving telecommunications that will stimulate local economic growth through data connectivity.
1.1.8	Global and international responsibilities relating to the environment (e.g. RAMSAR sites, climate change, etc).	Climate change is recognised in terms of the cumulative impact of sea-level rise and increased storm events on the beach environment. The implications for associated beach and dune erosion and mitigation thereof, are considered in the specialist Beach and Coastal Dune Dynamics study (Appendix B) and in this EIA.

Ref #	Description	Comment
2	How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Benthic ecosystems are associated with microorganisms that are essential for ecological functions. Initially, the installation of the marine cable will disturb both shallow and deep benthic ecosystems along its alignment. However, once installed, the cable and its legislated buffer zone and the continuation of this buffer zone will have a positive impact on benthic communities as no trawling or anchoring of ships is permitted in the buffer zone. This will preserve the ecological longevity of these sensitive systems. Specialist studies (Appendix B) were commissioned to investigate impacts and identify mitigation measures.
3	How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Potential pollution onshore will be limited to hydrocarbon spills and light industrial and domestic waste. Specifications for the handling of waste and dealing with incidents are contained in the EMPr. Potential offshore pollution will be isolated and maintained, until disposed of at a registered landfill site. Further details are included in the EMPr.
4	What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	Waste will be limited to light industrial waste (cable offcuts and reclaimed cable from the seabed) in the marine environment and domestic waste in the terrestrial environment. Volumes are anticipated to be very small. Waste management specifications are provided in the EMPr.
5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	A specialist heritage study was undertaken to identify potential impacts of the cable installation on cultural heritage resources under the sea and on land. The findings indicate that the likelihood of negatively impacting heritage resources is negligible (refer to Appendix B).
6	How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Electricity is required to power the optical amplifiers to transmit the telecommunications signals over greater distances through the marine cable. It is possible that the generation of this power is from non-renewable energy sources. The source of energy originating at the start of the cable is outside the scope of this EIA.

Ref #	Description	Comment
7	How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	Electricity is required to transmit the telecommunication signal through the marine cable. It is possible that the generation of this power is from renewable energy sources. The source of energy originating at the start of the cable is outside the scope of this EIA.
7.1	Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (Sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life).	The development is neutral in terms of resource use, as once the cable has been laid it functions in its purposes of improving international telecommunications without further resource investment. Only cable repairs will be required on an *ad hoc* basis.
7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and inter-generational equity and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources for this proposed development?).	The natural resource to which the Applicant needs access to install a telecommunications cable is the “seabed”. Telecommunications is one of the optimal uses of the “seabed”. The other current “priority” for the use of the seabed, includes Oil & Gas. There are existing Oil & Gas Exploration Rights Holders in terms of the MPRDA who have rights to conduct exploration and rights to use the natural resource to install seabed infrastructure (such as well heads) as part of their exploration activities. The use of the seabed for both “telecommunications” and “Oil & Gas” is not mutually exclusive. The seabed resource is sufficiently abundant for multiple types of uses, when considering intra- and inter-generational equity. In addition, multiple uses can occur without undue and conflicting negative impact by the different activities on each other and on the seabed resource. The opportunity cost of preventing other uses and activities in future and for sterilizing hydrocarbon resources, can be minimised if the different parties share information early and consult with one another during the execution of their plans.
7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?	Improved digital telecommunications between distant locations is reducing dependency on travel.
8	How will a risk-averse and cautious approach be applied in terms of ecological impacts?	The cable alignment both offshore and onshore has been selected to minimise ecological impacts. Specialist studies have been undertaken to identify ecological impacts and how to mitigate them.

Ref #	Description	Comment
8.1	What are the limits of current knowledge (the gaps, uncertainties and assumptions must be clearly stated)?	Assumptions, limitations, and gaps in knowledge are clearly stated in section 1.7 of this report and in each individual specialist report in Appendix B.
8.2	What is the level of risk associated with the limits of current knowledge?	Based on knowledge of previous (similar) projects and current knowledge of, the proposed project and study area, the risk is considered low.
8.3	Based on the limits of knowledge and the level of risk, how and to what extent will a risk-averse and cautious approach be applied to the development?	Please see Item 8.
9	How will the ecological impacts arising from this development impact on people's environmental rights in terms following:	
9.1	Negative impacts, e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc), health impacts, visual impacts, etc. What measures will be taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	To effectively plan cable routes, armouring and burial and prevent cable system damage on the seabed (from other marine users who have current legal rights to perform activities in the marine environment and who have rights to install infrastructure on the seabed), the Applicant undertakes to implement the recommendations of the International Cable Protection Committee to "share the seabed in harmony with others". Applying the guidance from the International Cable Protection Committee to proactively inform all current marine users who have legal rights of its concept designs (for cable laying and routing) and to collaboratively plan on an ongoing basis its detailed installation designs and operational procedures. To promote spatial awareness and information sharing, and to formally document the cable routing, the Applicant undertakes to ensure that the cable routing is formally mapped on hydrographic and navigational charts by the South African Navy Hydrographic Office . With respect to Oil and Gas right Holders the applicant will obtain a right of access to the seabed by way of a Consent Letter from existing Oil & Gas Rights Holders as required by the MPRDA and negotiate a Co-operation Agreements with Oil and Gas right Holders where necessary outlining the principles of cooperation to limit the disruption of either parties commercial interests. The project will result in a temporary exclusion zone for fishing within 1,500 m of the cable laying vessels. A permanent exclusion zone of 500 m will apply either side of the cable once installed, precluding demersal trawling, longlining and anchoring, etc. This exclusion zone will serve to protect marine resources along the alignment.
9.2	Positive impacts, e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures will be taken to enhance positive impacts?	The project is expected to have a significant positive impact on the South African economy through improved telecommunications which, in turn, promotes economic development, job creation and education.

Ref #	Description	Comment
10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage sites, opportunity costs, etc).	No ecological impacts associated with this development that result in significant negative socio-economic impacts, have been identified for this project.
11	Based on the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	The impacts of this project on ecological integrity objectives/targets/considerations (marine and terrestrial). have been assessed by specialists to be of low significance, after mitigation. Recovery of the marine benthic environment will occur after the cable is installed and the terrestrial components of the project are located in a transformed environment.
12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being projected) will result in the selection of the "best practicable environmental option" in terms of ecological considerations.	The impacts of the selected alignments on ecological integrity objectives/targets/considerations (marine and terrestrial). have been assessed by specialists to be of low significance, after mitigation. The project makes use of existing infrastructure for the CLS.
13	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area.	No negative cumulative impacts of high significance were identified by the EAP or specialists.

Table 5 Need and desirability aspects considered for promoting justifiable economic and social development

Ref #	Description	Comment
1	What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
1.1	The Integrated Development Plan (IDP) (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks or policies applicable to the area.	The proposed development is in line with the vision of the NMBMM objectives in terms of the advantages of improved telecommunications technologies.
1.2	Spatial priorities and desired spatial patterns (e.g. need for the integration of segregated communities, need to upgrade informal settlements, need for densification, etc.).	N/A
1.3	Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.)	Existing infrastructure will be accessed, with no impact on spatial characteristics.
1.4	Municipal Economic Development Strategy.	Improved telecommunications technologies are a key consideration in the NMBMM development strategy.
2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects) and specifically also on the socio-economic objectives of the area?	Overall, the project is expected to contribute positively to the goal of improving livelihoods for South Africans through the educational and economic opportunities opened up as a result of access to improved telecommunications networks. The cable will render limited areas unavailable to the Oil and Gas industry however if the parties co-operate and share their plans, then this impact can be mitigated to a large extent. Multiple uses of the sea and the seabed can occur without undue and conflicting negative impact by the different sector activities on each other and on the natural resources. The cable will exclude the inshore trawl fishery from a small percentage of the currently trawled area near Algoa Bay. The cable will exclude a small area from the planned Algoa 1 Aquaculture project. The project will cause minor nuisance impacts during the installation phase (temporary).
2.1	Will the development complement the local socio-economic initiatives (such as local economic development initiatives), or skills development programs?	Improved telecommunications capacity in South Africa is anticipated to positively impact on skills development programs and education.
3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	Improved telecommunications, as a key driver for economic development, is expected to benefit all communities within South Africa.

Ref #	Description	Comment
4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	The investment in the 2AFRICA (East) Cable System is substantial and the telecommunications cable is anticipated to stay in operation for 25 years. There is no planned decommissioning date; however, technology will improve, and it is possible that the cable system will be replaced by enhanced technology in years to come.
5	In terms of location, describe how the placement of the proposed development will:	
5.1	Result in the creation of residential and employment opportunities in proximity to or integrated with each other.	The improved technology facilitates working from home, which has increased substantially due to the Covid-19 pandemic.
5.2	Reduce the need for transport of people and goods.	Improved telecommunications will reduce the need for people to travel to work meetings, conferences, etc.
5.3	Result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms of public transport?).	N/A
5.4	Complement other uses in the area.	The improved telecommunications will support all other uses that make use of telecommunications in the area.
5.5	Be in line with the planning for the area.	The proposed development complements the development initiatives at the Local, District, Provincial level, including the rest of South Africa.
5.6	For urban related development, make use of under-utilised land available within the urban edge.	N/A
5.7	Optimise the use of existing resources and infrastructure.	The proposed development will make use of the existing Telkom Exchange building for the CLS.
5.8	Opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement).	N/A
5.9	Discourage urban sprawl and contribute to compaction/densification.	N/A
5.10	Contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs.	Improved telecommunications will be accessible to all communities/locations with internet connections.
5.11	Encourage environmentally sustainable land development practices and processes.	N/A
5.12	Take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to a port, access to rail, etc.).	The location selection is driven by available existing networks to be connected and the ability to safely land a submarine cable.
5.13	The investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential).	N/A
5.14	Impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area.	The proposed project will have no significant impact on sense of place as the infrastructure is buried below ground. The potential to impact on subsea or terrestrial heritage resources is considered to be negligible.
5.15	In terms of the nature, scale and location of the	N/A

Ref #	Description	Comment
	development, promote or act as a catalyst to create a more integrated settlement.	
6	How will a risk-averse and cautious approach be applied in terms of socio-economic impacts?	The cable alignment is selected and refined to avoid sensitive areas and to minimise impacts on other commercial sea and land-based activities. The EIA process assists to identify socio-economic impacts and measures to mitigate negative impacts. Where a conflict of interest is possible, the cable developers will be required to enter into co-operation agreements with other seabed users (e.g. the O&G sector).
6.1	What are the limits of current knowledge? (The gaps, uncertainties and assumptions must be clearly stated).	Assumptions, limitations and gaps in knowledge are clearly stated in section 1.7 of this report and in each individual specialist report in Appendix B.
6.2	What is the level of risk? (Related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge).	Negligible.
6.3	Based on the limits of knowledge and the level of risk, how and to what extent will a risk-averse and cautious approach be applied to the development?	See Item 6.
7	How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following?	
7.1	Negative impacts: e.g. health (e.g. HIV/AIDS), safety, social ills, etc. What measures will be taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	The EMPr (Appendix F) provides specifications aimed at reducing negative impacts on health and wellbeing.
7.2	Positive impacts. What measures will be taken to enhance positive impacts?	Measures include local employment opportunities and improved telecommunications with a positive socio-economic impact.
8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.).	N/A
9	What measures will be taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	The proposed cable alignment seeks to avoid or minimise socio-economic impacts.
10	What measures will be taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified allow the "best practicable environmental option" to be selected or is there a need for other alternatives to be considered?	Improved telecommunications enabled by the proposed project will benefit all South Africans, including the disadvantaged.
11	What measures will be taken to pursue equitable access to environmental resources, benefits, and services to meet basic human needs and ensure human wellbeing, and what special measures will be	The technology enabled by the cable will be widely accessible.

Ref #	Description	Comment
	taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	
12	What measures will be taken to ensure that the responsibility for the environmental health and safety consequences of the development have been addressed throughout the development's life cycle?	Environmental considerations are actioned by the Developer through all phases of the project (design, construction, operation and maintenance) by various measures, including: • Technical research and development. • Risk analyses. • Compliance with environmental and safety legislation. • Environmental Screening, Scoping and Impact Assessment. • EMPRs • Ongoing maintenance and monitoring.
13	What measures will be taken to:	
13.1	Ensure the participation of all interested and affected parties.	The minimum requirements of the EIA Regulations were followed with respect to public participation, also taking into account special requirements to reduce the spread of Covid 19. Refer to Chapter 8 and to Appendix D and Appendix E.
13.2	Provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation.	The regulated public participation process is designed to share information and facilitate public comment. EAP staff make themselves available to discuss the project telephonically and respond to queries throughout the duration of the project. Given the current Covid risk, public meetings are not recommended but the EAP will be available to hold virtual focus group meetings.
13.3	Ensure participation by vulnerable and disadvantaged persons.	Disadvantaged individuals will be involved in the project during the construction phase, via local contractors who adopt unskilled, disadvantaged workers as part of their company policies/ BEE principles.
13.4	Promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.	The regulated public participation process is designed to share information and raise awareness.
13.5	Ensure openness and transparency, and access to information in terms of the process.	The Scoping Report and DEIAR were circulated for comment, and all documents are made available on ACER's website. All issues raised during the Public Participation Process have been responded to and captured in a CRR (Appendix E). The EAP team is available throughout the EIA process to respond to project related queries and concerns.
13.6	Ensure that the interests, needs and values of all interested and affected parties will be taken into account, and that adequate recognition is given to all forms of knowledge, including traditional and ordinary knowledge.	Refer to all responses under Item 13.
13.7	Ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein is promoted.	Internal empowerment was promoted during the EIA process, with both women and younger EAP team members.

Ref #	Description	Comment
		The Public Participation Process in terms of the 2014 EIA Regulations is open to all I&APs including women and youth. The improved telecommunications resulting from the proposed project will benefit all segments of society, including those involved in education.
14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that are consistent with the priority needs of the local area (or that are proportional to the needs of an area).	The improved telecommunication provision will benefit all segments of society.
15	What measures will be taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Environmental awareness training was employed during the cable survey and will be provided to staff once cable laying commences. Furthermore, ASN is an internationally acclaimed cable laying company with stringent Health, Safety and Environment protocols.
16	Describe how the development will impact on job creation in terms of, amongst other aspects:	
16.1	The number of temporary versus permanent jobs that will be created.	Job creation during the installation phase of the project will be limited to temporary jobs during cable landing activities. The project is, however, expected to promote economic development within South Africa which could result in significant job opportunities (albeit not directly related to the project).
16.2	Will the labour available in the area be able to take up the job opportunities (i.e. do the required skills match the skills available in the area?).	Specific skills are required for the cable landing activities and, therefore, the use of local labour will be limited.
16.3	The distance from where labourers will have to travel.	N/A
16.4	The location of job opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits).	The project will not result in any additional permanent local job opportunities directly related to the project.
16.5	The opportunity costs in terms of job creation (e.g. a mine might create 100 jobs but impact on 1,000 agricultural jobs, etc.).	Temporary jobs created during project implementation are limited and will not be at the expense of job losses in other sectors either directly or indirectly affected by the proposed development.
17	What measures will be taken to ensure:	
17.1	That there is inter-governmental coordination and harmonisation of policies, legislation and actions relating to the environment.	Local, provincial, and national Government departments are consulted during the EIA process, with the purpose of aligning requirements.
17.2	That actual or potential conflicts of interest between organs of state are resolved through conflict resolution procedures.	This is ongoing to achieve alignment between the three spheres of Government.
18	What measures will be taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	The environmental authorisation process is being undertaken as per the prescribed environmental legislation and associated regulations. Impacts will be mitigated to ensure the long-term sustainability of the proposed development.

Ref #	Description	Comment
19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	It is the EAP's opinion that the proposed mitigation measures will be realistic and achievable. The possible decommissioning of the marine cable in 25 years' time is likely to require an impact assessment at the time.
20	What measures will be taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	These will be addressed in the EMPr and the conditions of authorisation issued by the competent authority.
21	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), will result in the selection of the best practicable environmental option in terms of socio-economic considerations.	The alignment alternatives have been selected to minimise negative ecological and social/socio-economic impacts. For example, the marine cable alignment has been adjusted to minimise the impact on the planned Algoa1 Aquaculture Development Zone.
22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area.	Various socio-economic impacts resulting from the proposed project are identified in the EIA report. They are both positive and negative and along with other existing or future cables in the area can have cumulative effects on the environment. However, there are no cumulative impacts that have been identified as being of high significance. Refer to Section 10.7 of this report.

4 PROJECT DESCRIPTION

This chapter describes the infrastructure and operational aspects of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). The aim of this chapter is to enable readers to gain an understanding of how the cable system will be installed and maintained in order to understand the possible impacts the development may have on the receiving environment.

4.1 General overview

The main 2AFRICA/GERA (East) cable trunk will be located approximately 200 to 500 km from the shoreline in international waters and will run down the East Coast of Africa as shown in Figure 1 (generally parallel to the coastline). From the main cable, branches will run through EEZs and territorial waters to the landing sites in each country. Once the main cable trunk reaches a point opposite Port Elizabeth, South Africa, it will be located approximately 100 km from the shoreline and within South Africa's EEZ. The proposed branch cable to Gqeberha (Figure 3) is routed from the main trunk to the shore in a roughly east-north-east direction, a section passing the EEZ before entering South African territorial waters approximately 22 km (12 Nm) from the seashore. It makes landfall at Pollock Beach in Summerstrand

The proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) includes the following project components and activities:

- Pre-installation activities including cable route survey and route engineering. The Marine Cable Route Survey has already been undertaken to determine the suitability of the substrate and topography of the ocean floor. This included a geophysical survey using echosounders and sonar techniques and a geotechnical survey involving cone penetrometer tests and core sampling and analysis.
- Route clearance and Pre-Lay Grapnel Run (PLGR).
- Laying of the cable in the offshore environment (preceded by route clearance) and including cable burial to a water depth of approximately 1,500 m.
- Laying of the cable within the shallow water environment, which is likely to involve a direct shore end operation where the shore end of the subsea cable is installed directly from the main subsea cable installation vessel and floated to the beach landing point using buoys, assisted by small boats and divers.
- Cable burial in the seabed. The cable will be buried in sediment to a target depth of 2 m wherever possible up to a WD of 1,500 m. This burial is intended to provide protection to the cable from the hazards posed by ships' anchors, fishing trawls/lines and the like.
- Provision of additional cable protection measures (Articulated Pipe) in the shallow water environment and intertidal zone up to the BMH.
- Excavations within the intertidal zone, to bury the cable before it is anchored into a cable anchor block and BMH. Where cables cross outcropping rock, cables are surface laid and clamped to the rock, where possible.
- Excavations within the intertidal zone and beach, to a target depth of 2 meters, to bury the sea earth cable and sea earth plate (System Earth) (the sea earth plate will either be bolted to the seabed (outcropping rock) or buried if conditions allow).
- Note that for the cable landing at Gqeberha, substrate conditions on the beach and intertidal zone may not allow for standard excavation methods to sufficient depths, in which case alternative technologies (rock trenching or HDD) may be implemented. If HDD is utilised for the installation of the cable across the beach, a land-based System Earth rather than a sea earth plate will be installed.

- The BMH and underground ducting to the existing Telkom Limited SOC (Telkom) Exchange Building housing the CLS will be constructed prior to the cable landing. (The BMH is a concrete utility vault where the marine portion of the subsea cable is connected to the terrestrial portion).

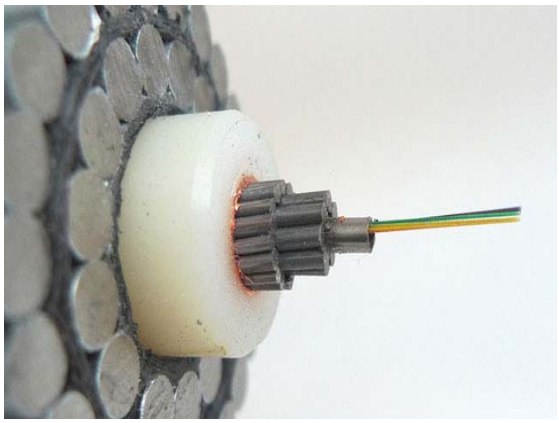
4.2 Marine components and installation methods

4.2.1 Marine fibre optic cable

Offshore, the cable is laid by a purpose-built cable-laying ship. Consistent with industry practice, the unarmoured cable (Plates 1 and 2) will rest on the seabed in water depths greater than approximately 1,500 m, where the risk of inadvertent damage from human activities is negligible.

At depths less than approximately 1,500 m, the cable will be buried beneath the sandy seabed of these shallower marine waters where substate allows. This is typically achieved with the use of a specially designed plough which is submerged onto the seabed by the cable laying ship. The cable is then fed from the ship to the plough which effectively buries the cable to a target depth of approximately 2 m. This burial is intended to provide protection to the cable from the hazards posed by ships' anchors, fishing trawls/lines and the like.

The diameters of the marine fibre optic cables range in size from 17 mm diameter (cables installed at a water depth of between 7,000 – 1,500 m) to a maximum of 50 mm diameter (rock armoured cable which is installed in shallow water depths (< 200 m). In shallow waters close to the beach (generally less than 10 m water depth) articulated pipes may be used to protect the armoured cable which have a diameter of 148 mm. These articulated pipes protect the cable and aid in cable burial due to their weight.



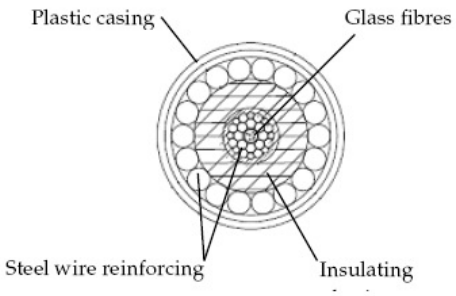


Plate 1 Cross section of a typical marine telecommunications cable

Plate 2 Examples of cable armouring and operational depths

4.2.1.1 Repeaters

Repeaters are optical amplifiers that are installed along the length of the cable and are used to extend the reach of optical communications links by overcoming loss due to attenuation of the optical fibre (Plate 3). Repeaters will be installed at specific distances along the route making up the cable system.

Repeaters are designed to function continuously without maintenance for 25 years in depths of up to 8,000m with no degradation in mechanical, electrical and optical performance. This requires among other, a controlled ambient internal climate and a durable enclosure.

Internal atmosphere is controlled to 20% relative humidity over the operating temperature range by the hydrogen getters[12] and moisture absorbing desiccants. The controlled internal gas atmosphere is suitable for maintaining the life expectations of all internal components.

The main structural component of the repeater housing is a monobloc tubular case fabricated from high tensile steel. The bulkhead and composite gland assembly provide full protection against water and gas ingress, either directly from the surrounding sea or from axial cable leakage due to a cable break close to the repeater.

The repeater housing is protected against corrosion with an organic electrically insulating barrier coating with additional mechanical reinforcement. This prevents seawater contact with the repeater housing steel surface and eliminates risk of metal wastage and galvanic corrosion and magneto-hydrodynamic effects that could generate hydrogen.

[12] A “getter” is a deposit of reactive material placed inside a vacuum system to maintaining the vacuum. Gas molecules striking the getter material combine with it chemically or by absorption, and the gas is removed from the evacuated space.

Repeaters are electrically powered. Voltage insulation is maintained between the internal unit and the repeater housing by two insulation paths: the polyethylene liner and the power conductor feeding through the gland assembly.

The repeaters will have the following specifications:

- The diameter of the rigid sea-case (white tube section in the photo) is approximately 270mm.
- The length of the sea-case section of the repeater is approximately 980 mm.
- The total length of repeater is approximately 3900 mm to 4240 mm depending on cable coupling.
- The spacing between repeaters is approximately 75 km to 83 km varying with the route plan.

Plate 3 Example of a repeater

4.2.2 Physical characteristics of fibre optic cables

4.2.2.1 External chemical properties of the cable

The external protection of the cable comprises a naturally occurring bitumen (asphalt) as a compound to adhere the outer polypropylene roving to the armour wires on the armoured shallow water cables. No form of additive to prevent bio-degradation or anti-fouling is used in the cable's outermost layers. The other cable components in contact with the sea are the galvanized steel armour wires and the polyethylene sheath, which also contain no additives harmful to marine life (Heath; 2001).

4.2.2.2 Electrical Current

According to Heath (2001), optical fibre cables carry a constant dc[13] current of 1.6 Amps to feed power to the underwater repeaters. This current is fed along the copper clad steel inner conductor and depending on the length of the cable span it may require several thousands of volts to maintain it. In very approximate terms the cable resistance is about 1 Ohm per kilometre and the repeaters, spaced at 50 km, drop about 30 volts each. Therefore, a cable spanning

[13] DC is direct current: the one directional or unidirectional flow electric charge.

4,000 km would have about 80 repeaters and require a power feed voltage of about 6500 volts. It is normal practice to apply half this voltage at positive polarity to one end of the system and half the voltage at negative polarity to the other end to establish a zero voltage point midway along the cable span. This reduces the level of voltage stress on the cable and repeaters.

There is no external electric field associated with the power on the inner conductor. The ratio of the conductivity of the polyethylene insulation to that of seawater means that the electric field remains only within the cable insulation.

4.2.2.3 Electromagnetic Fields (EMFs)

Electromagnetic fields (EMFs) are generated by current flow passing through cables and can be divided into electric fields (called E-fields, measured in volts per metre, V m^{-1}) and magnetic fields (called B-fields, measured in µT) (Taormina *et al*., 2018). The DC current in the inner conductor does set up a stationary magnetic field in the form of concentric rings emanating from the cable. The magnetizing force produced by this field diminishes with increasing radius from the cable. EMFs are generally effectively confined inside cables by armouring (Taormina *et al*., 2018). As referenced from Heath (2001), for a cable carrying 1.6 amps this means that the magnetic flux density due to the cable at a distance 1 metre away is 0.32 micro Tesla. This is two orders of magnitude lower than the vertical component of the earth's magnetic field on the West Coast of the United States, which is about 43 micro Tesla. This means that marine life forms would need to approach to within less than half an inch of the cable to detect its magnetic field above that of the earth.

4.2.2.4 Audible sound and frequency association with "toning"

Audible sound lies in the range 15 to 40,000 Hertz and neither coaxial nor optical cables emit this range, or any other frequencies, during their normal operation. During the laying of the cable, it does vibrate as a result of regular vortex shedding as it descends the water column. This is a low frequency phenomenon, at approximately 10 Hertz, is short lived and ceases when the cable comes to rest on the bottom.

The injection of a low frequency electrical signal from the land station is known as "toning". Toning is undertaken as an aid to cable location in the event of a fault on the cable or where other marine work is being conducted, which involves keeping a safe distance from the working cable. Toning works on the principle of a coaxial transmission line, formed by the inner conductor of the cable and the external armouring, providing a circuit for a low frequency signal.

At low frequency, a current applied to the inner conductor will propagate along the line, with its return path provided by a combination of the steel armour wires and the surrounding seawater. It is the proportion of current in the seawater, which enables electrodes trailed from a ship to detect the cable by locating the maximum level of the tone. During toning the level of the signal injected is usually around 160 mA at 25 Hz as the threshold level of detection on the ship electrodes is normally around 20 mA. The attenuation of the cables at low frequency is such that the tone injected at the terminal should be detectable across the length of the cable.

Toning is undertaken infrequently and is only really required prior to or during a repair operation on the cable. Toning is also undertaken during the installation of new cables, which have to cross or come close to the existing working cables. To increase safety margins in this situation, it helps the new installer to know the precise whereabouts of existing cables, which are mostly buried on the shelf area. Although toning is less effective in buried cables, it is much more reliable than visual or magnetometer detection in shallow water regions.

Toning has been used for many years on telegraph, coaxial, and optical fibre submarine cables throughout the world. From video evidence of ROV's tracking toned cables, the short-term presence of a low frequency, low level electric field in seawater does not appear to have any influence on the behaviour of fish.

4.2.2.5 Heat dissipation

When electric energy is transported, a certain amount is lost as heat by the Joule effect, leading to an increase in temperature at the cable surface and subsequent warming of the immediate surrounding environment (OSPAR, 2012). This is commonly referred to as thermal radiation. Thermal radiation in buried cables can warm the surrounding sediment in direct contact with a high voltage cable (Emeana *et al*., 2016). High voltage cables are used for transferring electricity related to offshore energy projects. Heat emission is higher in AC than DC cables at equal transmission rates (Taormina *et al*., 2018). According to Taormina *et al*. (2018), the impacts of local temperature increase caused by electric cables on benthic communities have rarely been examined and *in situ* investigations are lacking. They refer to this knowledge gap as preventing conclusions from being drawn about ecological impacts of long-lasting thermal radiation on ecosystems. They conclude that considering the narrowness of the corridor and the expected weakness of thermal radiation, impacts are not considered to be significant, referring to the need for new field measurements and experiments under operational conditions.

4.2.3 Marine fibre optic cable installation

Prior to the installation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) taking place, the following offshore marine investigations will be performed by a contractor appointed by ASN to install the cable system.

4.2.3.1 Cable Route Survey

The proposed cable routes were surveyed by the project team to identify whether the substrate and topography of the ocean floor were suitable for the installation of the 2AFRICA/GERA (East) Cable System. The survey included the following activities:

- A geophysical survey of the deep water, shallow water, and inshore sections of each proposed cable route was undertaken. This included the establishment of bathymetric corridor widths of 500 m (inshore and up to a depth of 500 m). In deeper water this corridor extended up to three times the water depth centred on the proposed cable route.
- Conducting a side scan sonar and survey of a 500 m corridor width (inshore and up to a depth of 500 m) centred along the proposed cable route.
- Bottom samples were taken at an average 10 km spacing in shallow water (less than 500 m in depth) (Sample sizes were approximately the size of a standard 10 l bucket).
- The cable route was surveyed using a multi-beam echo sounder (MBES) Swath Bathymetry system (the MBES equipment is integrated with the ship’s surface navigation equipment (GPS)).

- Bathymetric data was processed using the onboard workstation with specialised software to verify the coverage and accuracy of the collected bathymetry data and to provide colour contour charts. These charts were used to review the proposed route and where necessary plan offset lines.
- In the shallow water sections, an integrated Side Scan Sonar and a Sub-bottom Profiler was used. These were housed in a device which was towed behind the ship to get to an optimum position close to the seabed. The position of this towed device was tracked acoustically using an ultra-short base line (USBL) tracking system.
- A burial assessment survey was undertaken from the shoreline up to a depth of 1,500 m to test the suitability of the substrate for cable burial. The survey included Cone Penetrometer Tests (CPTs) with an average of 1 CPT taken at 4 km intervals in planned burial areas.
- The landing sites for all cable segments were positioned utilising Global Positioning System (GPS) and topographic surveying practices. (The in-shore survey vessels used a GPS navigation system).
- At each landing site, the survey of the shore approaches was supported where appropriate by a diver/swim team equipped with both video camera and bar probes. Any obstructions, potential hazards or engineering constraints to the submarine cable were located and fully documented.

4.2.3.2 Cable Route Clearance Operations

Prior to the installation of the cable, route clearance operations will be conducted along those sections of the route where burial is to be performed to ensure that, as far as practically possible, the burial operation will not be hindered by out of service cables or discarded fishing gear. This route clearance operation is typically called the Pre-Lay Grapnel Run. The objective of the PLGR operation is the clearance of any seabed debris, for example wires or hawsers, fishing equipment etc., which may have been deposited along the route.

PLGR is undertaken by dragging grapnels (Plate 4) behind a ship along the proposed cable route in order to clear the route of debris. Different types of grapnels can be used depending on the seabed conditions (Gillford in rockier areas and Rennies and Flat Fish in softer sandy sediments). The PLGR operations are normally carried out by a vessel specifically fitted out with winches and grapnels, and capable of sustaining good slow speed positional control. The vessel will be equipped with navigation and positioning system to the same specification as the main lay vessel.

Any debris recovered during these operations will be discharged ashore on completion of the operations and disposed in accordance with local regulations. If any debris cannot be recovered, then a local re-route of the cable system will be planned to avoid the debris.

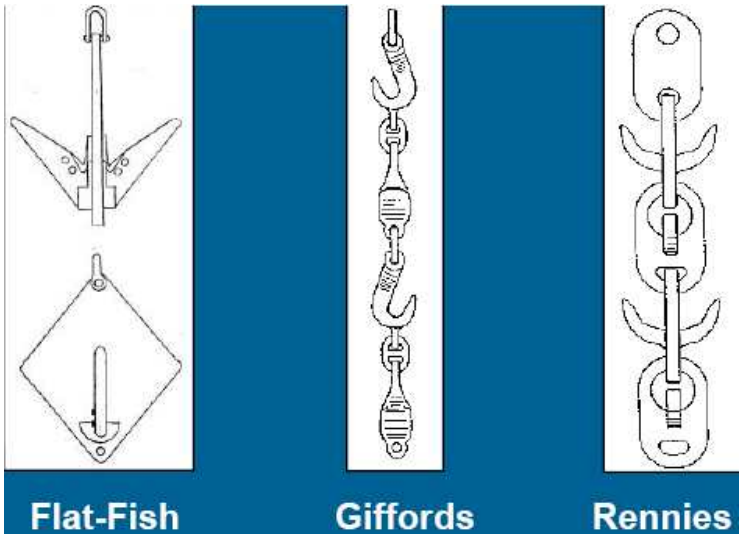


Plate 4 Types of grapnels used to clear the cable route of debris

4.2.3.3 Installation of the marine telecommunications cable

The marine fibre-optic cable will be installed using a purpose-built cable ship fully equipped with all the necessary equipment, tools and facilities to safely handle and install, join, test, and power the submerged plant, including simultaneous lay and plough burial. The vessel will have sufficient power and dynamic positioning capability to carry out the installation in the expected weather and current conditions. During cable laying an automatic log of all critical operational parameters will be kept including navigational data, speed, tension, slack, cable counter and plough data.

SURFACE LAYING OPERATIONS

Surface laying implies that the cable will be laid on the surface of the seabed. The objective is to install the cable as close as possible to the planned route with the correct amount of cable slack to enable the cable to conform to the contours of the seabed without loops or suspensions.

PLOUGH BURIAL OPERATIONS

The cable will be buried to a target depth as defined in the burial plan, and as determined by the cable route and burial assessment surveys. Burial depth will be controlled by adjusting the height of the plough's front skids. The depth of burial achieved will be continuously recorded by the plough and logged with the ship's data. In areas where plough burial is planned, the cable will be buried to a target depth of 2 m (Plate 5). The footprint of the cable trench is generally less than 1 m in width with the disturbance from the plough skids being limited to less than 6 m (3 m either side of the trench). The trench created for burial of the cable is narrow and usually closes soon after the plough has passed. No active backfilling is undertaken, and the trench re-closes naturally.

CROSSING OF EXISTING SUBMARINE CABLES AND PIPELINES

For cable route planning, ASN uses the Global Marine Cable Database (Global Marine, 2019) augmented by ASN's own internal databases and Admiralty Charts (UKHO, 2019) to identify all known existing and proposed telecommunication and power cable systems that will be crossed by the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)[14]. Where existing cables are crossed, the industry norm is to ensure that the crossing is undertaken using a similar type of cable, i.e. an armoured cable crosses an armoured cable or an un-armoured cable crosses an un-armoured cable. Where seabed conditions allow, post lay cable burial using a Remote Operated Vehicle (ROV) can be performed to afford additional protection to the cables at the crossing point.

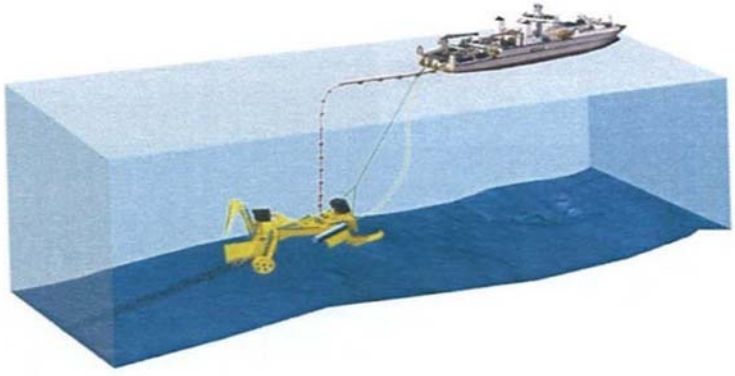


Plate 5 **Sea plough to be used to bury the cable along sections of the cable alignment where conditions permit burial from a depth of 15 m up to a depth of 1,500 m**

For pipeline crossings, ASN recommends the application of Uraduct (or similar product) (Plate 6) to the cable at the point of contact with the pipeline. Uraduct is a protection system designed and developed to protect subsea fiber optic cables, power cables, umbilicals, flexible flowlines, rigid flowlines, hoses and bundled products from abrasion and impact. Generally, the length of Uraduct required for a pipeline crossing is 50 m each side of the crossing or quarter the water depth either side of the crossing. Mattressing[15] can also be used when crossing pipelines; however, this is not considered necessary for standard pipeline crossings but may be installed in special circumstances at the request of the pipeline operator.

[14] The proposed Gqeberha branch cable does not cross cables or pipelines.

[15] Generally, mattresses are made of high strength concrete segments linked together with a network of high strength polypropylene ropes to form a continuous flexible concrete barrier which is used to separate structures ensuring the protection of infrastructure.

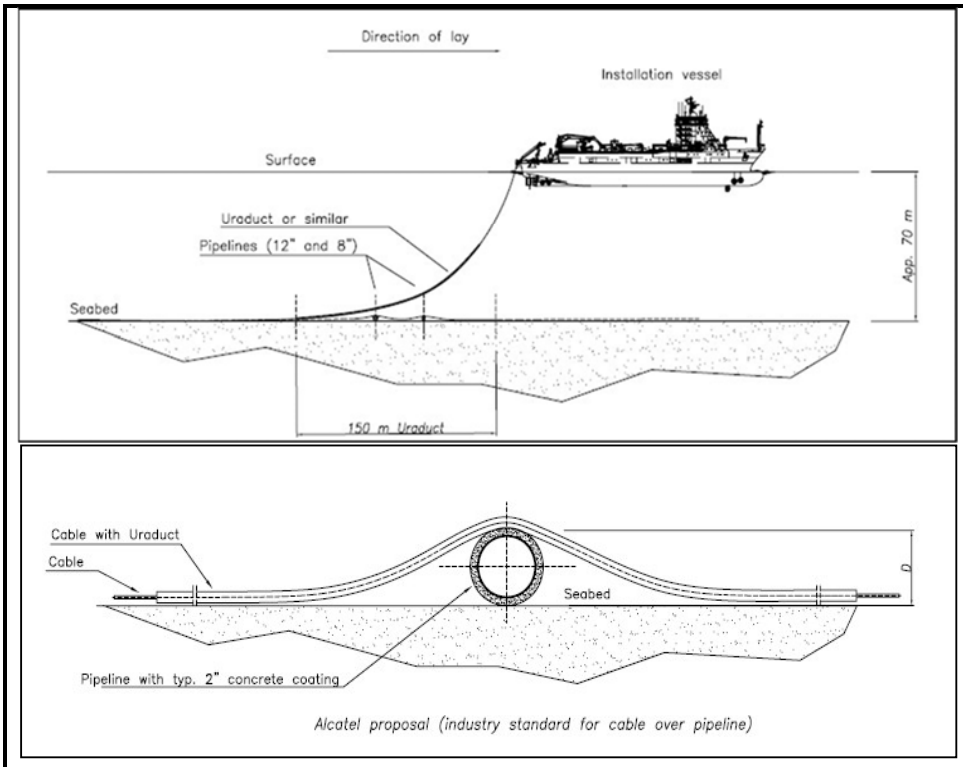


Plate 6 Example of a cable crossing using Uraduct or similar product (Source: ASN REH, 2019)

SHORE END OPERATIONS

Shore end operations refer to the installation of the cable through the shallow water near shore, through the intertidal zone and up onto the beach (Plates 7 and 8). The Pollock Beach shore-end landing will be performed directly from the main cable installation vessel.

During cable landing at Pollock Beach (Summerstrand), the following activities will be performed by the appointed contractor:

- Preparation of a detailed operational plan based on the findings of the survey, with site visits as necessary.
- Provision of an advance party to establish the beach equipment and to prepare the beach, cordon off a working area to protect the public, etc.
- The marking of any existing in-service cables at the shore end location (with the assistance of the cable owners).
- Performance of the installation of the shore end section of the sea cable and support of the cable vessel activity (Plate 7).
- Installation of cable slack at the beach, as required.
- Installation of a cable loop in the BMH to facilitate re-terminations.
- Securing the cable in the BMH by means of an armour wire anchor clamp.
- Burial of the cable from the BMH to the Low Water Mark (LWM) to a target depth of 2 m, where possible (Plate 8). Refer to Section 5.3 for alternative excavation and burial techniques that will be applicable if rock outcropping is encountered at depths shallower than 2 m.

- Installation and burial of the sea earth cable and sea earth plate (System Earth) (Figure 6a). Should substrate conditions not be compatible with a sea based System Earth, a land based System Earth will be installed (Figure 6b). (Refer to Sections 5.3 and 5.4 for further details on these alternatives).
- Excavation will start prior to the planned cable landing. Timing will be dependent on the final methods used[16].
- Reinstatement of the beach to the required standards.
- Clamping of cable to outcropping rock. In the nearshore environment of the Gqeberha landing at Pollock Beach, the cable will need to cross outcropping rock. Double armoured fibre optic cable will be surface laid over the outcropping rock and clamps will be used to secure the cable to the rock surface where possible.
- All testing, reporting, and accurate as-built records.
- Articulated pipe (Plate 9), where required across the beach up to the BMH, will be fixed to the BMH outside wall by means of a flange adapter.

In the near shore zone (generally in waters less than 9m in depth) external protective measures such as articulated split pipes are installed around the cable to guard against damage due surf zone wave action, small vessel anchoring, nearshore currents and tidal ebb and flow. Using articulated pipe in the near shore environment increases cable protection against chafing by providing an additional physical barrier of protection against external forces. Articulated pipe (Plate 9) is usually made of cast iron and the additional weight it provides to the cable aids in stabilising the cable and in maintaining cable burial depth where that is possible. Standard practice is to apply articulated pipe to beyond the surf zone, however, at landings where burial may prove difficult, articulated pipe can be extended further offshore.

Plate 7 Landing of a cable on shore. Similar works will be undertaken for the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

[16] Excavation usually takes 1-2 days; however, rock trenching or HDD will take longer (HDD may take up to four weeks).

Plate 8 **Bringing the cable to shore from the cable laying vessel. Cable is buoyed off and pulled to shore with smaller vessels**

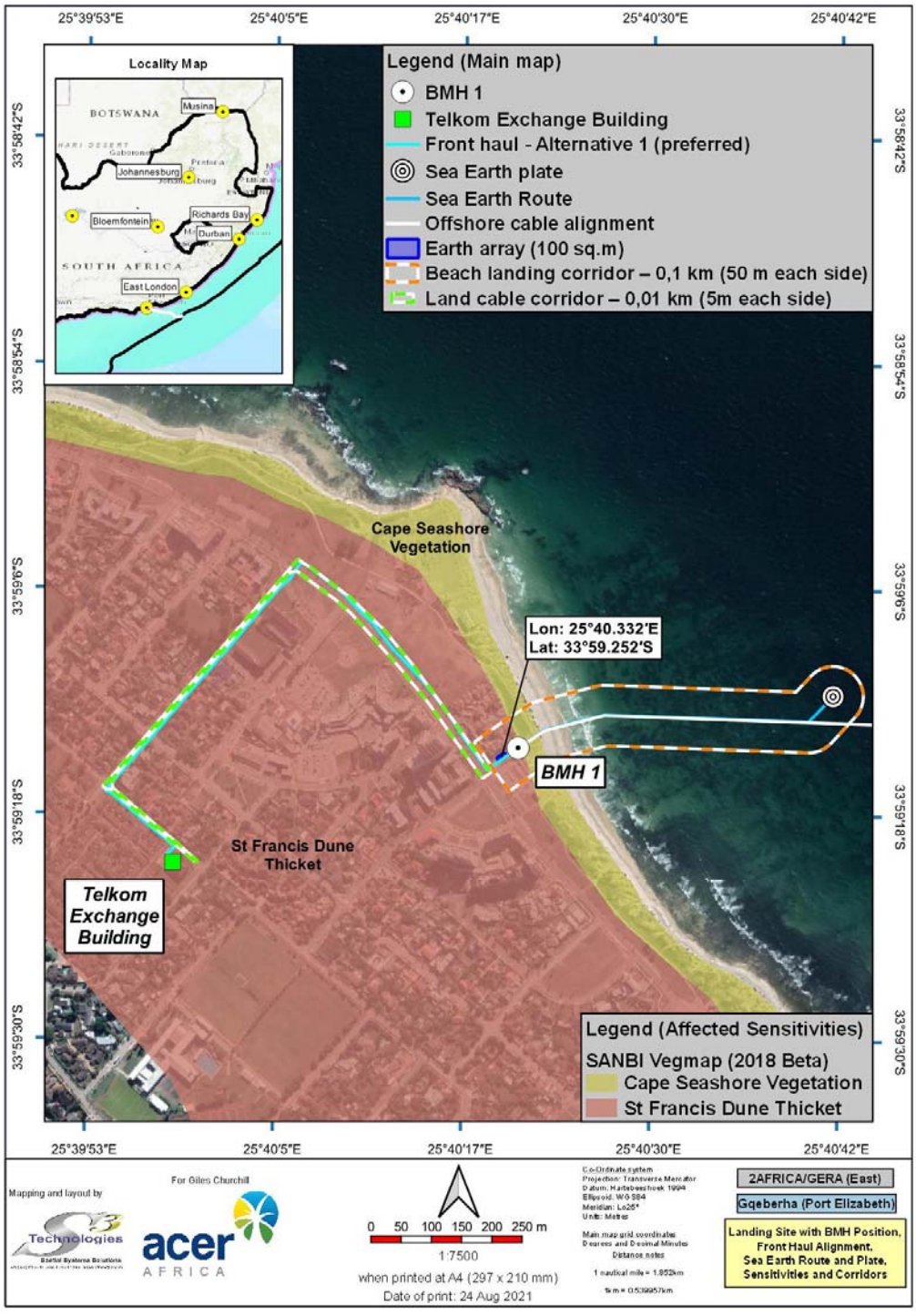


Figure 6a **Approximate position of the sea earth cable and sea earth plate (System Earth) for the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)**

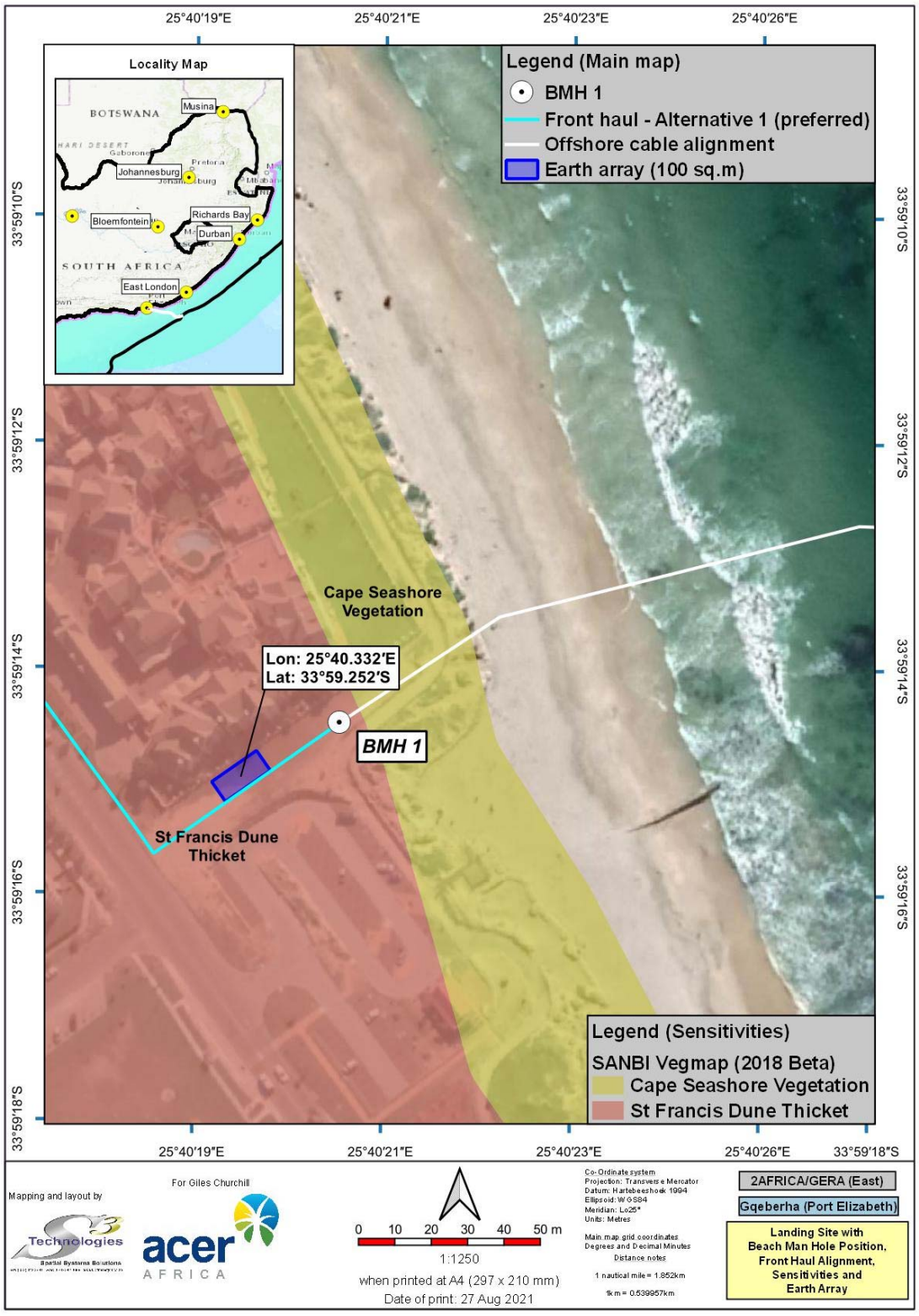


Figure 6b **Approximate position of the land based System Earth, which may need to be installed instead of the sea earth plate, dependant on final substrate conditions prevailing for the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)**

Plate 9 **Articulated pipe sections which are installed around the cable in shallow water to offer additional protection**

4.2.4 Post construction maintenance of the cable

Once installed, marine telecommunications cables generally require little to no maintenance if the cable is not damaged by natural disasters (underwater landslides, earthquakes, etc.) or through human activities (fishing trawlers, anchors, etc.). If the cable is damaged, a cable repair ship is dispatched to repair the cable fault (Plate 10), which usually entails the following:

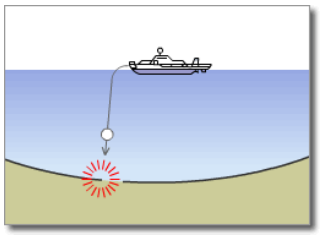
- Localization of the cable failure point and recovery of the failed cable section onto the ship.
- Cutting and removal of the cable failure section and then joining the recovered cable to the new cable section on board the ship.
- Testing of the cable followed by reburial of the cable on the exact same alignment.

4.2.5 Cables in operation – life cycle analysis

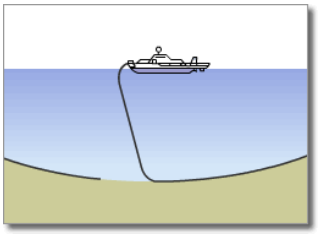
A life cycle analysis study suggests that over a typical operational lifetime of 25 years (manufacture-to-decommissioning)[17] the main environmental impacts of a cable system are carbon emissions emanating from power consumption at the terminal station (chiefly related to air conditioning and powering of the terminal equipment); and b) vessel transits for cable maintenance.

*"*The results show that the use and maintenance phase clearly dominate all impact categories at an average of 66 percent. By comparison, the raw materials and design and manufacturing phases account for, on average, only 6 percent of the total potential impact. This clearly highlights that the greatest impact over the life cycle of a submarine cable system comes from the use and maintenance activities. Namely, electricity use at the terminal to power the terminal equipment and the combustion of marine fuel during cable maintenance with purpose-built ships."

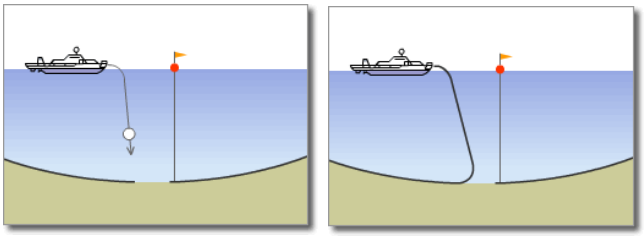
[17] Donavan, 2009. "Twenty thousand leagues under the sea: A life cycle assessment of fibre optic submarine cable systems".



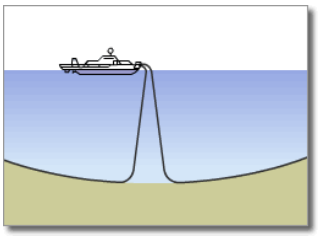
The cable ship is navigated to the location by a Differential GPS (DGPS). Once the fault is located, a cable cutting tool attached to the rope is paid out to the seabed. This tool and grapnel (Cable Catch) are then used to hook the cable before cutting the cable.



Once cut, the cable is recovered to the ship (Cable Recovery). Once on board the cable is tested to find the fault and that section of cable is removed. The cable is then waterproofed and dropped back to the sea floor attached to a buoy.



The same procedure is then carried out on the other section of cable still on the sea floor.



Once both sides of the fault have been repaired, the cables are once again bought up to the ship where a new section of cable is joined to the cable sections. Once completed the cable is placed back onto its original alignment and if necessary reburied.

Plate 10 Protocol for repairing cable faults to marine telecommunications cables
(Source: http://www.k-kcs.co.jp/english/solutionRepairingMethod.html)

4.3 Terrestrial components and installation methods

4.3.1 Beach Manhole

A BMH is typically an underground chamber made of reinforced concrete, with the approximate dimensions: 3m (length) x 1.8 m (height) x 2m (width) (Figure 7). It usually houses 4 cable ducts (two spare for future use). Once complete, the only visible sign of the structure is the manhole covers and cement roof slab which will cause minimal interference with vehicle movement or other activities. Plate 11 shows an example of a BMH during construction and becoming operational.

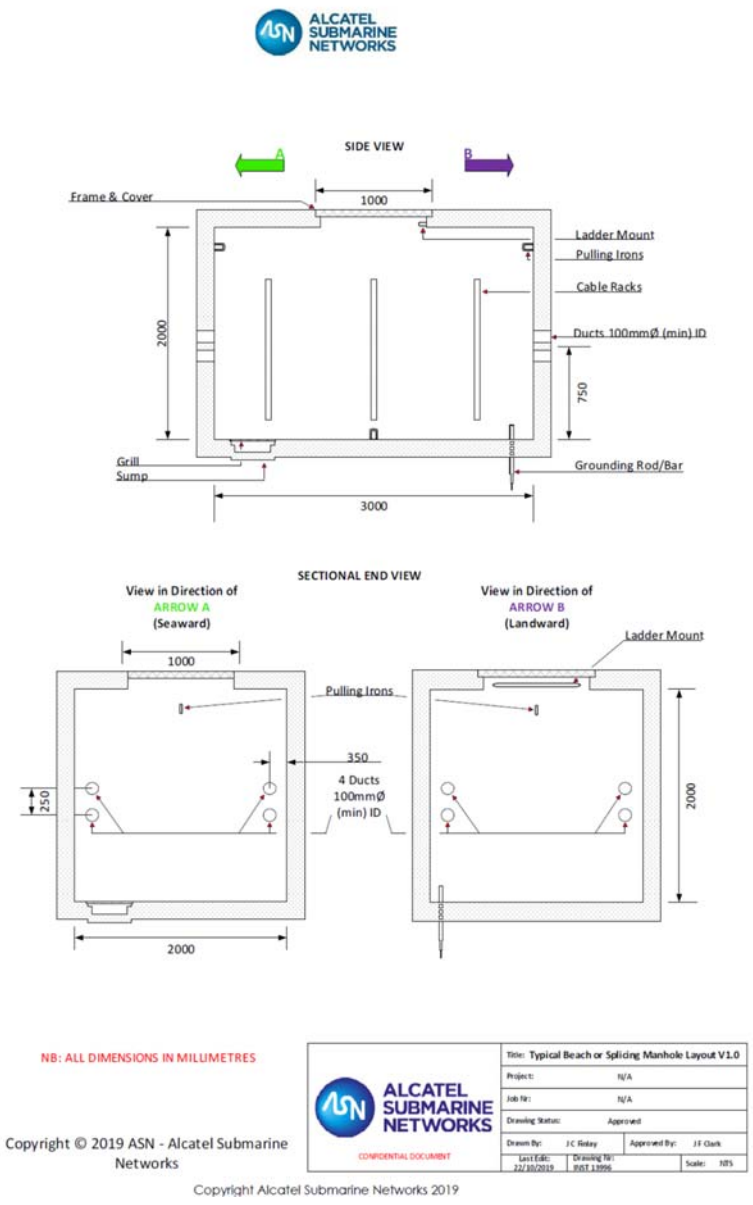


Figure 7 Typical Layout of a Beach Manhole (ASN, 2019)

Once the fibre optic cable has made landfall and been buried through the beach section of the cable alignment, it will be anchored to a BMH located directly adjacent to the Summerseas Beachfront Apartments within an existing service corridor which extends from Marine Drive down to the beach and separates the residential complex to the north from a public parking area to the south (Figure 8).

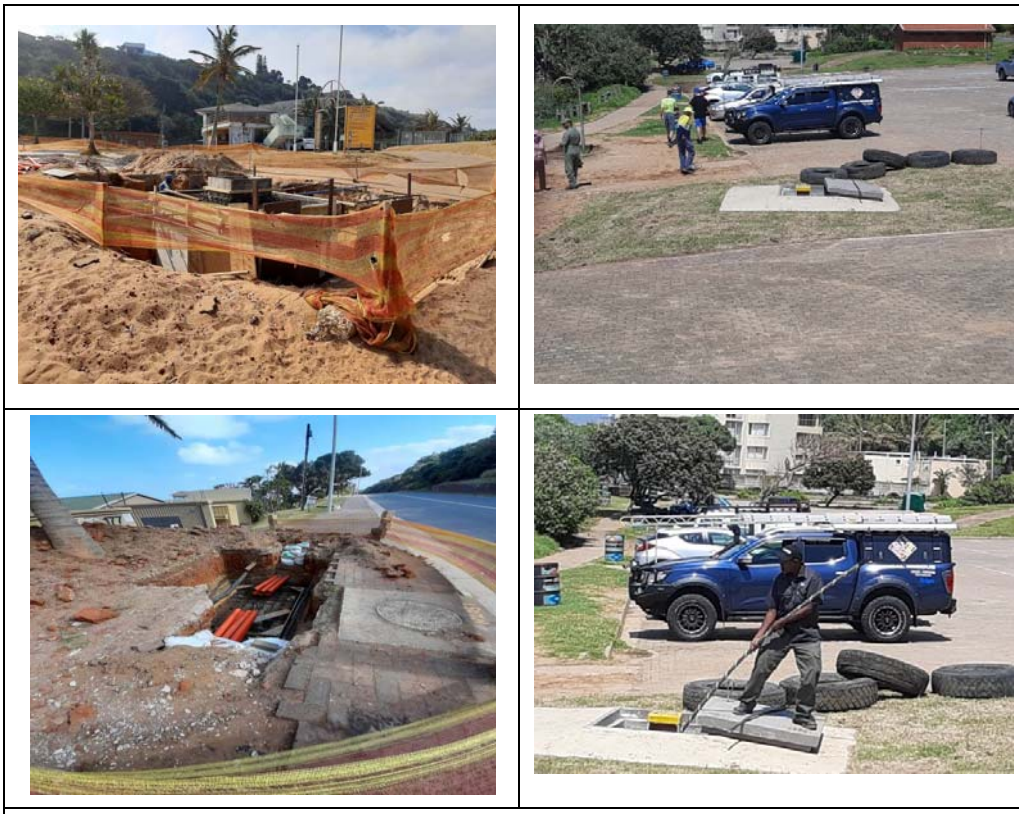


Plate 11 **Example of a BMH during and after construction (top); cable ducting to the CLS (bottom left) and fibre-optic cable being pulled through once landed (bottom right)**

4.3.2 Cable ducting from BMH to CLS

From the BMH, a trench line will be dug to house the PVC ducts to the CLS. The trench depth will be approximately 1.5 m to allow at least 1 m of soil cover over the ducts. Steel ducts can be used where burial depth cannot be achieved. The width of the trench will be no wider than reasonably necessary for the execution of the work. For the most part, the cable trench will be dug along the pavements and verges alongside existing roads. The front haul alignment of the cable is approximately 1,200 m in length and will require seven road crossings, of which only three are considered to carry significant traffic volumes namely Marine Drive, Brighton Drive and Skegness Road (Figure 8 shows 2 potential alignments, with the blue line being selected as the preferred alignment).

From the BMH to the Telkom Exchange building, new manholes will be constructed along the proposed cable alignment which will be located within existing road reserves. Driveways (paved and concrete) as well as tarred roads will be crossed which will require the following:

- Approximately 31 m^2 of brick paving
- Approximately 162 m^2 of tar surfacing
- Approximately 32 m^2 of concrete works
- Approximately 1,060 m^2 of grass planting to reinstate disturbed areas.

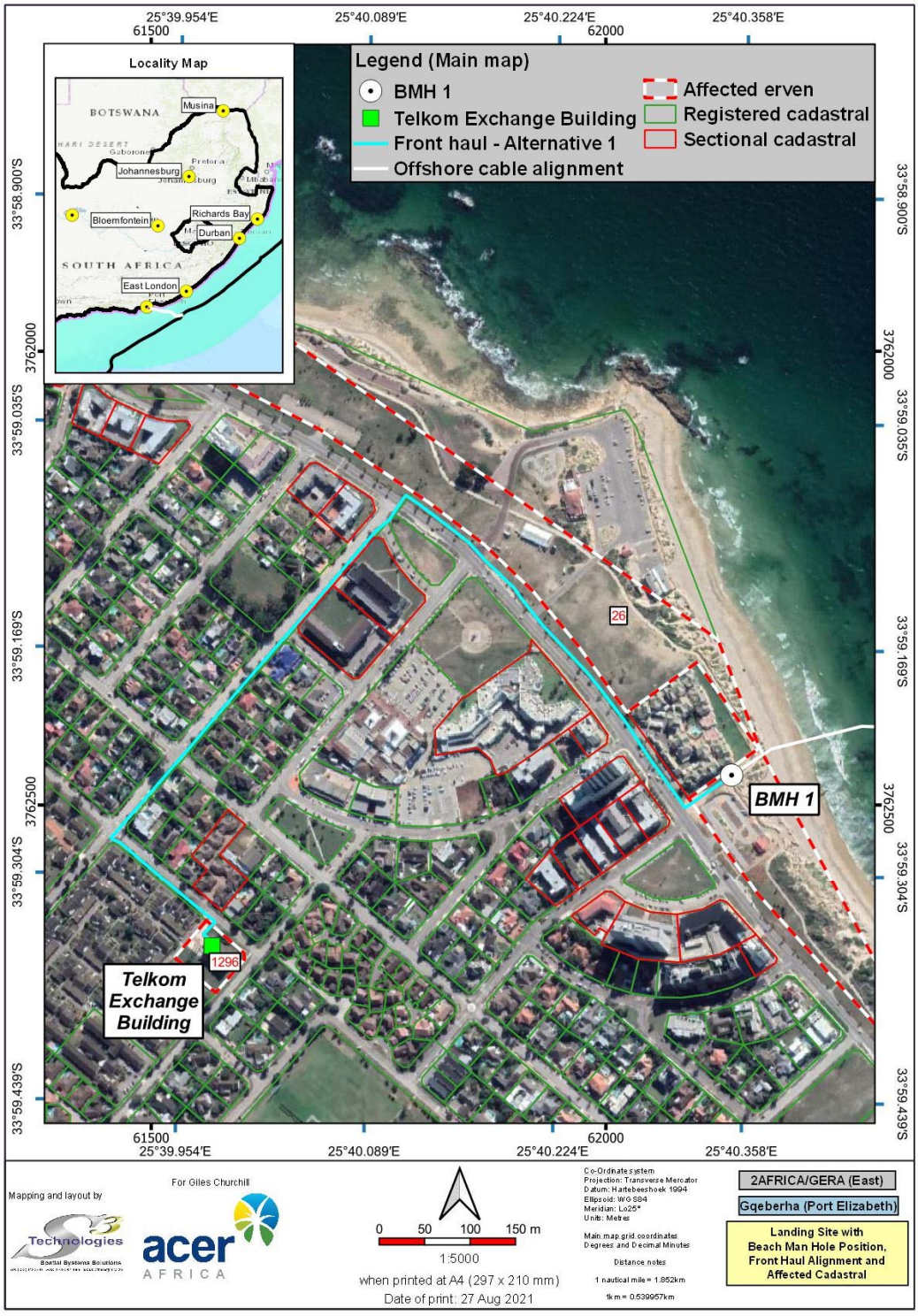


Figure 8 **Image showing the selected landing site, BMH and selected front haul alignment (blue line) to CLS at the Telkom Exchange Building**

4.3.3 Cable Landing Station

The instrumentation required for the CLS is proposed to be accommodated within the existing Telkom Exchange Building located on the corner of Skegness and Bognor Streets in Summerstrand (Plate 12 and also see Figure 8).

Plate 12 Telkom Exchange Building (left) and existing room inside the building (right) proposed to house the instrumentation for the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

4.4 Existing services and project implementation

Construction and installation of the 2AFRICA/GERA (EAST) Submarine Cable System (Gqeberha landing) on land will involve the following services/utilities/resources:

4.4.1 Roads, private property access and road reserves

Trenching will affect pavements, verges and roads. Where major roads need to be crossed by the cable, HDD may be employed to install the cable. This will allow the cable to be installed without disrupting traffic and road users.

If the cable alignment is installed within the road reserve, some impacts on private property and driveways are anticipated. Where possible, these will be avoided but if trenching results in damage to private properties along the cable alignment this damage will be recorded, and the areas affected will be reinstated to what is currently in place. Prior to construction commencing, the appointed contractor and Vodacom will notify all surrounding landowners of the construction activities to take place and the scheduling thereof.

4.4.2 Water

Water for construction purposes will be sourced from the closest municipal supply point and tankered to site when required. Water use during construction is however very limited and confined to the concrete works required for the construction of the BMH and inspection manholes along the front haul alignment to the CLS.

4.4.3 Sewage

Chemical toilets will be provided for construction workers. These chemical toilets will be routinely serviced by the appointed service providers and all waste will be disposed at a licensed waste treatment works within the area. Given the short construction period associated with this project, the impact associated with sewage is not expected to pose any significant risk.

4.4.4 Storm water

The proposed development should not have any impact on storm water once construction is completed. During construction, however, the appointed contractor will take cognisance that the NMBMM does have storm water structures within the project area and damage to these structures must be avoided during construction. While trenching of the cable alignment is underway, stockpiles of soil will be located outside any storm water drains to prevent the wash away of material and siltation of downstream habitats.

4.4.5 Waste streams

Little waste is expected to be generated on site and waste will be limited to litter, spoil from the trenching operations (where rubble or buried waste is unearthed) and material off cuts. It is envisaged that a skip will be hired for the duration of the construction period where all construction related waste will be stored and then disposed of by an appointed service provider.

4.4.6 Job creation and procurement

Specific skills are required for the cable landing activities and the land-based work will be of short duration. Therefore, for the landing, the use of unskilled, local labour will be limited. The construction of the BMH, trenching and installation of ducting to the CLS is anticipated to benefit local SMME's with a limited number of temporary jobs. SMMEs will be offered part of the backhaul work provided they are compliant with respect to Health and Safety. A tender process will be set up for work available to SMMEs.

4.4.7 Noise

The use of excavators and construction vehicles will increase noise levels on site during the shore landing period, however this will be temporary and of short duration. Ambient noise levels along the road and on the beach are generally high and therefore additional noise during construction is not anticipated to cause significant disturbance.

4.4.8 Anticipated construction dates and programme

It is anticipated that construction of all infrastructure required for the landing of the 2AFRICA/GERA (EAST) Submarine Cable System (Gqeberha landing) will not take longer than 3 – 6 months to complete including the offshore and onshore cable installation. Construction and installation of the offshore cable infrastructure is not anticipated to take longer than 2 – 3 weeks to complete.

The landing of the cable is entirely dependent on receiving a positive environmental authorisation from DFFE. Only once the environmental authorisation process is nearing its completion will the project proponent be able to realistically set dates for project implementation. Vodacom is planning to have the 2AFRICA/GERA (East) cable system installed and operational in 2022.

As soon as the project's timing is determined, other factors can be taken into account in scheduling, such as peak tourist seasons, seasonal whale migration patterns and activities of the offshore fisheries sector (in particular, the squid fishery) where certain species are targeted at a specific time of the year.

4.4.9 Decommissioning

Submarine Cables are designed to have a lifespan of 25 years. With fibre optic cables implemented in the last 20 years or so, it is normally possible to increase capacity during the cable's lifetime by modifying the land based parts of the system to provide significant increases in speed (in many cases to hundreds of times the original installed capacity). This means that many old cables that might have once been taken out of service and replaced with a new more capable cable are actually reused in situ. In some cases, it is possible to re-use a cable in a different place, or to leave the cable in place and re-purpose it for scientific research (https://www.quora.com/What-happens-to-decommissioned-undersea-communication-cables-Are-they-left-in-place-or-removed-for-scrap)

If cables are removed, recovery is assumed to be the exact opposite of the installation process (Donavon, 2009) and therefore will have the same impacts as discussed in Chapter 10.

Decommissioning of the 2AFRICA/GERA (EAST) Submarine Cable System (Gqeberha landing) in the near future is unlikely, given the current growth in the telecommunications sector within South Africa. If and when decommissioning takes place, all activities would be subject to legislation relevant at the time.

5 PROJECT ALTERNATIVES

Alternatives are different means of achieving the purpose and need of a proposed development and include alternative sites, layouts or designs, technologies and the "no development" or "no go" alternative. This chapter describes the various alternatives applicable to the proposed 2AFRICA/GERA (EAST) Submarine Cable System (Gqeberha landing).

5.1 Proposed landing site alternatives

Two potential sites for landing at Gqeberha were considered during Scoping:

- **Alternative 1** (preferred), located along the southern section of Pollock Beach, as shown in Figure 8. The proposed BMH is located directly adjacent to the Summerseas Beachfront Apartments within an existing service corridor which extends from Marine Drive down to the beach and separates the residential complex to the north from a public parking area to the south.
- **Alternative 2,** located at Pollock Beach approximately 300 m northwest of the proposed Alternative 1 landing point with an alternative site for the BMH located to the southeast of the Something Good Roadhouse and within the public beach parking area directly inland from the beach.

As detailed in the Scoping Report (ACER, 2021), Alternative 2 was discarded in favour of Alternative 1, for a number of reasons, including that burial of the cable (Alternative 2) would not be possible at this landing site due to the shallow sand profile of the beach and numerous rock outcrops within the shallow water environment.

5.2 Terrestrial cable alignment alternatives

Two fronthaul alignments associated with the Alternative 1 landing site were investigated. The preferred alignment (as shown by the blue line in Figure 8) was selected as it would result in less disturbance to residents and motorists. The discarded alternative, although shorter, would require at least 5 road crossings over busy roads along 10th Avenue and Brighton Drive.

5.3 Beach excavation and burial alternatives from the BMH to the ocean

Pollock Beach is located within a bay which is frequently exposed to periods of marine inundation and tidal surge. The swash zone supports a thin veneer of sandy beach which poses a risk of beach erosion exposing the trench and possibly the cable itself. Substrate conditions will dictate the final method used for excavation and the type of System Earth to be installed. Therefore, the alternatives described below have been considered.

5.3.1 Excavation and burial Alternative 1 (preferred)

Installation of the cable and the earth return cable from the BMH to the sea is planned to be undertaken through trenching across the beach and cable burial to a depth of 2,0 m, substrate depending. If rock substrate is encountered at depths shallower than 2,0 m, rock trenching will be undertaken to bury the cable. Rock trenching will involve the trenching of rock to a depth of approximately 30 cm, allowing for the cable to be installed below the natural rock profile.

Once installed, the channel excavated through the rock will be backfilled with the rock chips removed during trenching/cutting and mixed with a cement suitable for the marine environment. By backfilling the rock trench to its original rock profile, the cable will be suitably protected from exposure, should storm events result in sand deflation on the beach and the exposure of the underlying rock shelves.

If required, rock trenching will be undertaken across the beach into the intertidal area to a water depth of approximately 0,5 – 1 m. From this depth, the cable will be provided with articulated pipe to afford it extra protection and will be pinned to outcropping reefs in the shallow water environment where possible.

5.3.2 Excavation and burial Alternative 2

Rock trenching can only be undertaken where the substrate is conducive for trenching i.e. rock shelves and not where the substate is made up of rock boulders tightly packed together. If boulders are encountered on the beach, the alternative installation method under consideration involves HDD.

HDD is a method of installing underground pipelines, cables, and service conduits through trenchless methods. It involves the use of a directional drilling machine, and associated attachments, to accurately drill along the chosen bore path and back ream the required pipe. Directional drilling is a three-stage process:

Stage 1
The first stage consists of drilling a small diameter pilot hole. Drilling fluid is pumped through the drill pipe to the drill bit where high-pressure jets and the bit will grind the soils ahead of the drill stem. The drilling fluid will also carry the cuttings back to the entrance pit at the drill rig. Tracking of the pilot hole can be done in several ways depending on the size and complexity of the shot. Smaller shots are done using a walkover guidance system whereas the larger more complex shots have a wire line magnetics type system. With both methods there is a transmitter or steering tool located near the drill head which sends a signal to the location engineer giving the exact coordinates of the drill stem. Readings are constantly taken which check the depth, alignment and percent slope of the drill head.

Stage 2
The second step is to enlarge the hole to a size sufficient to safely install the 2AFRICA/GERA (East) Cable System. A reamer is pulled back and rotated while pumping drilling fluid to cut and remove solids to enlarge the hole. Pre-reaming speeds will vary depending on existing soil conditions and the amount of cuttings that are removed from the hole. Bentonite and other additives will be used to ensure a clean and stable hole. Bentonite is used to create a “cake layer” around the outside of the hole during pre-reaming. This will help with the stability of the bore hole and with fluid loss or infiltration.

Stage 3
The final step is to remove the drilling head and pipe from the hole and to install the 2AFRICA/GERA (East) Cable System.

If HDD is utilised to install the cable, it is expected that it will take approximately four weeks to complete the drilling works and install the cable from the BMH out to sea where the cable will daylight at a water depth of between 5 – 10 m water depth beyond the surf zone at Pollock Beach.

Horizontal directional drilling (HDD) is a minimally intrusive construction method for installing underground utilities and pipelines. Today, HDD is becoming widely accepted as a cost-effective alternative to traditional open-cut construction and is considered environmentally friendly, as long as appropriate working standards are maintained.

When HDD is undertaken a drilling fluid is required to facilitate movement of the drilling head and pipe through the hole. Bentonite is commonly used as a drilling fluid as it is water absorptive and helps seal the sides of the hole. Bentonite is a nontoxic material which can also be used for the removal of toxic chemicals from the environment, the reduction of contamination, spread in soil, water, and air, as well as, typically, in the sealing of landfills. Bentonite can also be used in environmental engineering where it is widely used in water and wastewater treatment technologies to absorb various types of contaminants.

5.4 System Earth Alternatives

Powered submarine cable systems need power fed from the shore to operate the underwater plant. The power feed equipment requires a dedicated earth for optimum operation. The preferred location for the System Earth is near to the cable landing point at the beach. Two System Earth types have been considered for the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing).

5.4.1 Beach and Sea Earth Plates

If the preferred construction method which involves trenching across the beach to install the 2AFRCA/GERA (East) Cable System is utilised the system earth will consist of a sea earth plate which will be installed offshore in shallow waters (+- 5 – 10 m WD). The sea based System Earth consists of a circular mild steel plate, 25 mm thick and 2 metres in diameter with an approximate weight is 1000 kg. When installed at sea, the plate is either buried using divers or secured to a rocky seabed using anchor bolts.

5.4.2 Standard Land Based System Earth

The land based System Earth as shown in Figure 6b will be installed should substrate conditions require the use of HDD (Excavation and Burial Alternative 2). This type of System Earth is comprised of earth rods or anodes which are buried underground. Constructed of a silicone iron core surrounded by low resistance carbon granules encased in a lightweight tin canister, they are approximately 2.0 metres in length and 0.22 metres diameter, weighing approximately 45 kg each. In standard form they are supplied with a 50 m single core 10 mm diameter electrical cable tail. They are generally installed ‘inland’ in sets of 4, 6, 8 or 12, with a separation of 5 metres between each anode. The number of rods required dictates the footprint of the earth array.

For the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing), it is proposed that the earth array be buried within the servitude just inland of the proposed BMH site[18] (see

18 This is only required if HDD is used to bring the cable ashore.

Figure 6b). The surface area will be approximately 100 m^2. This System Earth will not represent a hazard to the general public, as it is buried in the ground, the cables are screened and placed in PVC conduits, and the anodes can have concrete slabs placed above them for additional mechanical protection, if required. System Earths are often placed in public areas, under sports fields, parks, parking lots and the like, as once installed they require no routine maintenance for the entire life of the cable system.

5.5 CLS alternatives

No CLS alternatives were investigated, as both landing sites would make use of the existing Telkom Exchange building as described under Section 4.3.

5.6 Proposed marine cable alignment alternatives

When selecting the preferred offshore alignment for the 2AFRICA/GERA (East) Cable System, the following factors were taken into consideration by the cable engineers:

- The presence of rock. Within the shallow water environment, the cable will be buried in sediment wherever possible, and the route will be adjusted to avoid obvious visible rock and sub-surface rock detected by the cable route survey. The aim is to bury the cable to a depth of 2 m where possible. If rock is encountered at a depth shallower than this, no effort will be made to trench through or excavate any rock but rather lay the cable upon the rock substrate. The cable, in such situations, will be securely held in place by its own weight and the weight of the rest of the cable buried in the sand. Approximately 900 meters of cable from the BMH out to approximately 10 m water depth will be protected by encasement in articulated iron pipe shells which will make it very heavy thus aiding burial and stability of the cable on the ocean floor. In the shallow areas where reef is present the cable is planned to be anchored to the reef by means of clamps to prevent cable movement where substrate allows.
- The location of the Algoa 1 Aquaculture Project. The cable alignment will traverse the southern section of the Algoa 1 Aquaculture block. This will require close collaboration with the ADZ when planning of the aquaculture site commences. The anchoring of cages will not be possible over or near to the cable, in any manner that would pose a risk to or prevent access for maintenance operations to the cable. Following engagement between ASN and the Algoa 1 Aquaculture Project, the cable route was realigned closer to the outer edge of the aquaculture block, to minimise impacts on the aquaculture project. Additionally, the project proponent has joined a working group with the ADZ to ensure that both projects can be implemented through close collaboration between both parties.
- Anchorages. No viable landing points were considered suitable from Pollock Beach towards the Port of Port Elizabeth and Port of Ngqura, as the offshore cable alignment would pass through demarcated anchorages for the Port of Port Elizabeth. The anchoring of vessels (especially larger vessels) poses a risk to the marine cable through snagging.
- Fisheries. Known fisheries trawling grounds were avoided as best possible.
- Bathymetry. Offshore reefs and steep canyons which could pose a risk to cable integrity were avoided as best possible.
- Currents. To mitigate the impact of the surface current on installation operations it is preferable to install either ‘into’ or ‘with’ the current. The less perpendicular the cable route is to the current the more its impact is reduced. By carefully selecting the direction of the cable route the impact of seabed currents can be reduced by ensuring the cable is at an as oblique angle as possible to the prevailing current flow. i.e. the more perpendicular the cable is to the current flow the more exposed it is to abrasion/damage.

Based on the factors above, the preferred offshore cable alignment moves offshore in an easterly direction (Figure 9) slightly oblique to the coastline to reduce the impacts of prevailing ocean currents until joining the main trunk cable which is located 100 km from the shoreline in deep waters.

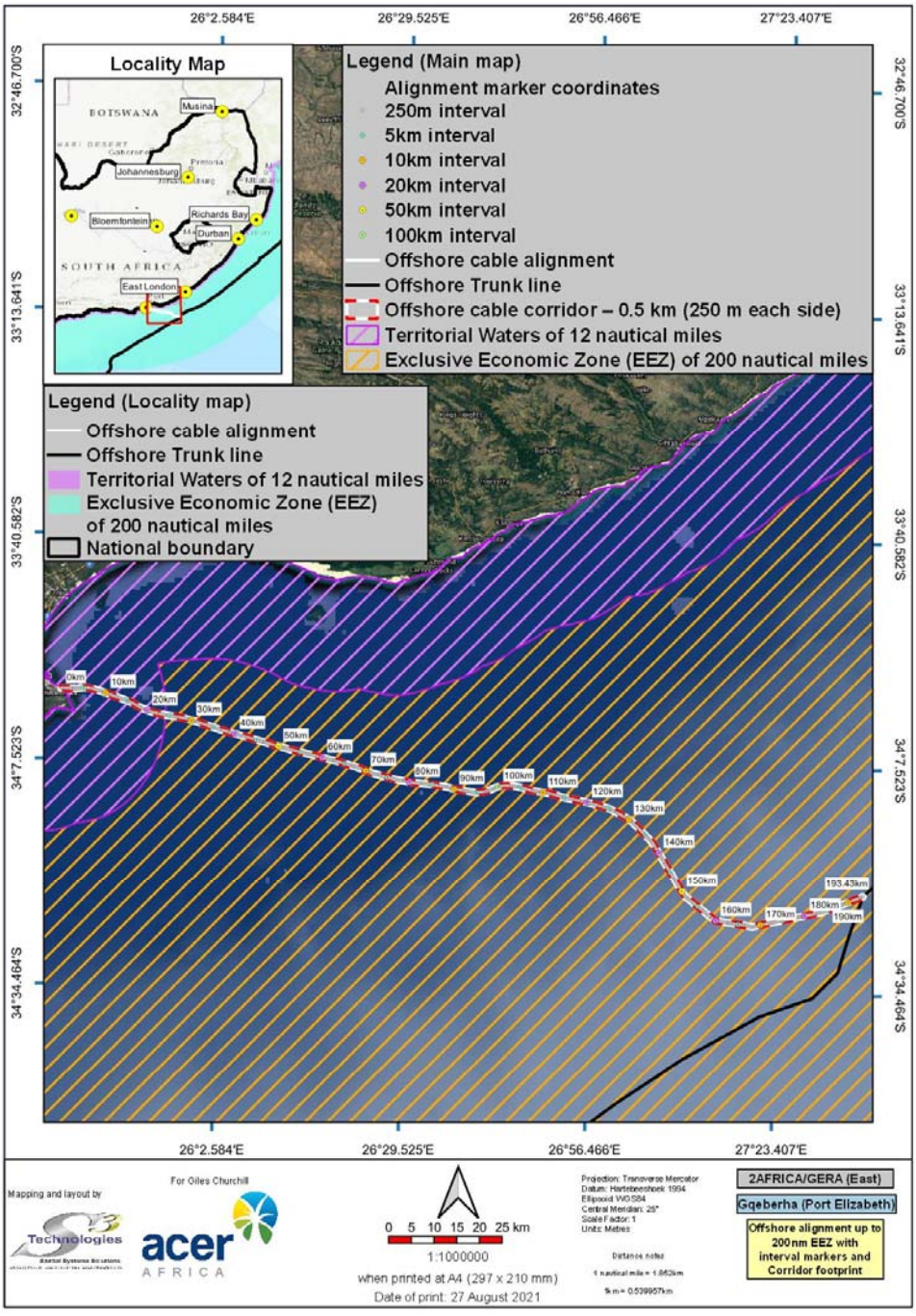


Figure 9 Proposed alignment of the 2AFRICA/GERA (EAST) Submarine Cable System (Gqeberha landing) – corridor width is 250 m either side of the cable.

5.7 Technology alternatives

Although there are a number of available telecommunication mechanisms used world-wide and in South Africa, the scale of customer demand and expectation of ever faster data transfer have made many of these inadequate or obsolete. Radio has largely been phased out due to restricted bandwidth and poor data transmission. Currently, Africa relies primarily on satellites with few submarine cables to provide its international communications. Satellite and microwave transmissions are unable to offer the capacity required for South Africa and other African countries to remain part of the global community in terms of communication services.

Within South Africa, fibre optic networks are currently the only available technology able to transmit sufficiently high volumes of voice and data traffic, with higher security, reliability and at a lower cost. This is the current preferred technology for meeting demand for data and voice transmission on a global scale and is one of the main reasons why the 2AFRICA/GERA (East) Cable System is based on a fibre optic network.

5.8 No development (no-go) alternative

In the context of the proposed development, the No-Go alternative would involve Vodacom not landing and installing the proposed 2AFRICA/GERA (EAST) Submarine Cable System at Gqeberha. Although impacts on the marine and terrestrial environments would be avoided entirely, the anticipated benefits from the proposed submarine telecommunication cable, in line with the country's development goals, would not be realised. This needs to be understood in the context that access to affordable international bandwidth is widely recognised as being key to economic development in every country.

Africa relies primarily on satellites (with few submarine cables) to provide its international communications. Communication via submarine telecommunications cables generally allows for lower cost, better performance, and greater capacity (throughput) than that available via satellites. If the No-Go alternative is selected, Vodacom and South Africa as a whole, would miss an opportunity to unlock economic development within the country. In addition, should the No-Go alternative be selected, it would mean that Vodacom would be unable to increase their supply of international fibre-optic bandwidth and they will be unable to facilitate more affordable and effective transport of voice, data, Internet and television services to South Africa's population.

For these reasons, the No-Go alternative is not preferred.

6 DESCRIPTION OF THE RECEIVING ENVIRONMENT

A broad description of the receiving environment was provided in the Scoping Report for the 2AFRICA/GERA (EAST) Submarine Cable System (Port Elizabeth landing) (now renamed Gqeberha landing). Where applicable, further detailed information is provided in this section, most of it sourced directly from the specialist reports contained in Appendix B, unless otherwise cited. Note that the primary literature references for the information presented in this section can be found in the corresponding specialist reports and have not been cited here.

6.1 Marine and offshore environment

6.1.1 Geophysical characteristics

6.1.1.1 Bathymetry

The orientation of the coastline along the Southeast Coast is relatively uniform, and north-northeast trending. The continental shelf along the southeast coast is narrow, with a steep continental slope. The bathymetry drops steeply at the coast to approximately 50 m. In the region of Algoa Bay, the shelf begins to widen, with depth increasing gradually to the shelf break at a depth of 140 m off Gqeberha. Outside the shelf break, depth increases rapidly to more than 1,000 m, descending into the Transkei Basin (Figure 10).

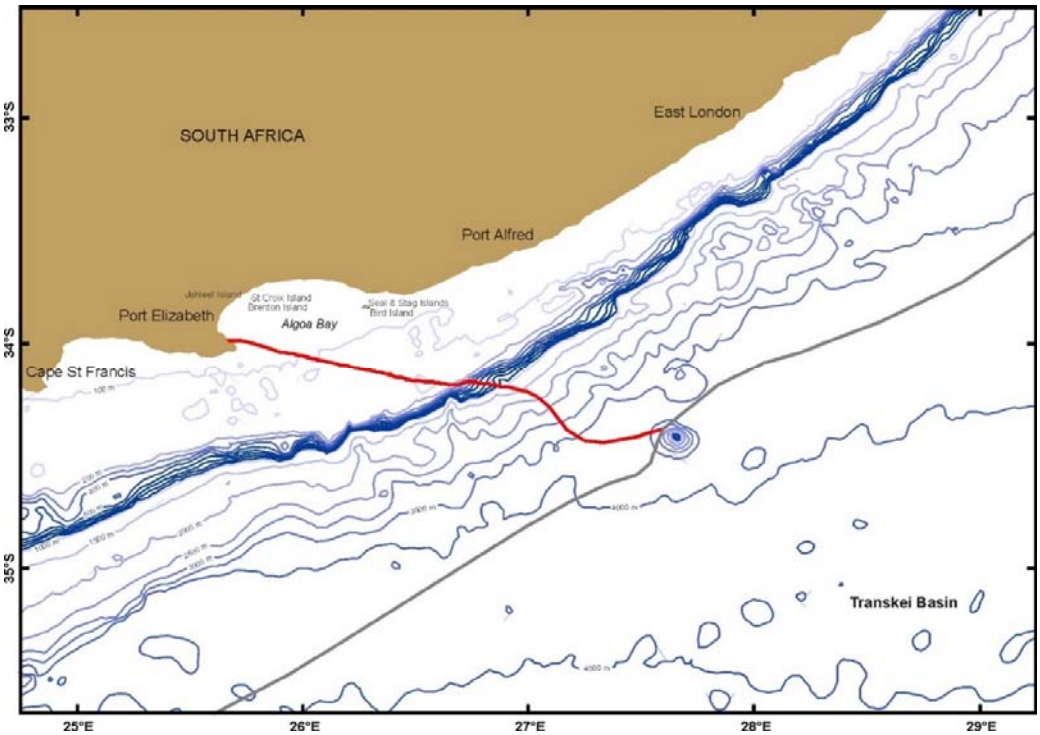


Figure 10 Map indicating proposed Port Elizabeth (Gqeberha) branch (red line) off the main trunk (grey line) of the 2AFRICA/GERA (East) Cable System in relation to bathymetry and bathymetric features off the South African East coast

Algoa Bay extends from the back of the surf zone to the edge of the embayment demarcated by the prominent capes, Cape Padrone and Cape Recife (Figure 11). The embayment includes the St Croix and Bird Island groups. The mouth of the bay is considered the dividing line between Algoa Bay and the rest of the continental shelf (Aquatic Ecosystem Services, 2021). The proposed cable alignment approaches shore at the south edge of Algoa Bay.

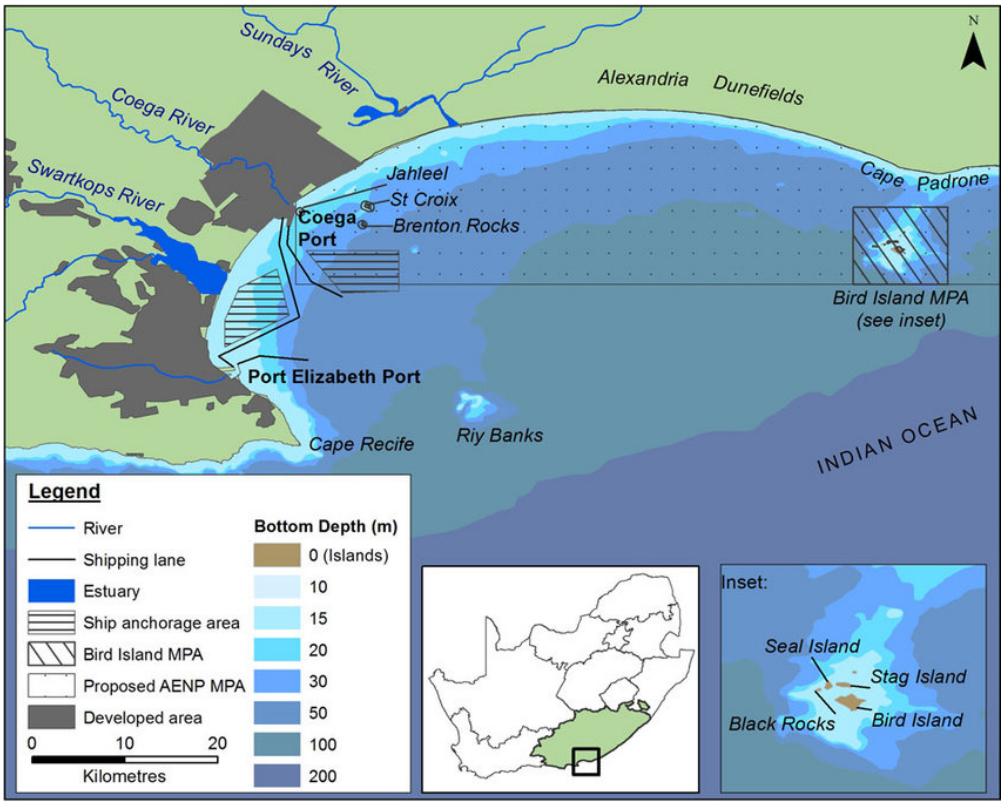


Figure 11 Features of Algoa Bay on the South-Eastern coastline of South Africa (https://www.researchgate.net/figure/Features-of-Algoa-Bay-on-the-south-eastern-Cape-coastline-of-South-Africa-SA-AENP-14_fig1_317136290)

6.1.1.2 Coastal and inner-shelf geology and seabed geomorphology

Figure 12 illustrates the distribution of seabed surface sediment types off the South African south-eastern coast. Seaward of the inner shelf sediment-wedge, the seafloor off Port Elizabeth is predominantly rocky. Mud patches occur inshore east of Cape Infanta, but the majority of unconsolidated sediment is sand to muddy sand. Offshore of the shelf break, benthic habitats are dominated by Southwest Indian Upper and Lower Bathyal unconsolidated sediments, with the deeper portions of the project area comprising sediments of the Southwest Indian Unclassified Abyss (Sink *et al.,* 2019).

The cable route planning survey undertaken by Fugro (2020) identified that the inshore portion of the cable at depths <-30 m comprised primarily rock outcrop (66%) and subcropping rock interspersed by areas of shallow transient sand (25%), with fine sands dominating beyond approximately -24 m depth and coarse sediments being prevalent at depths beyond ~-28 m (6%).

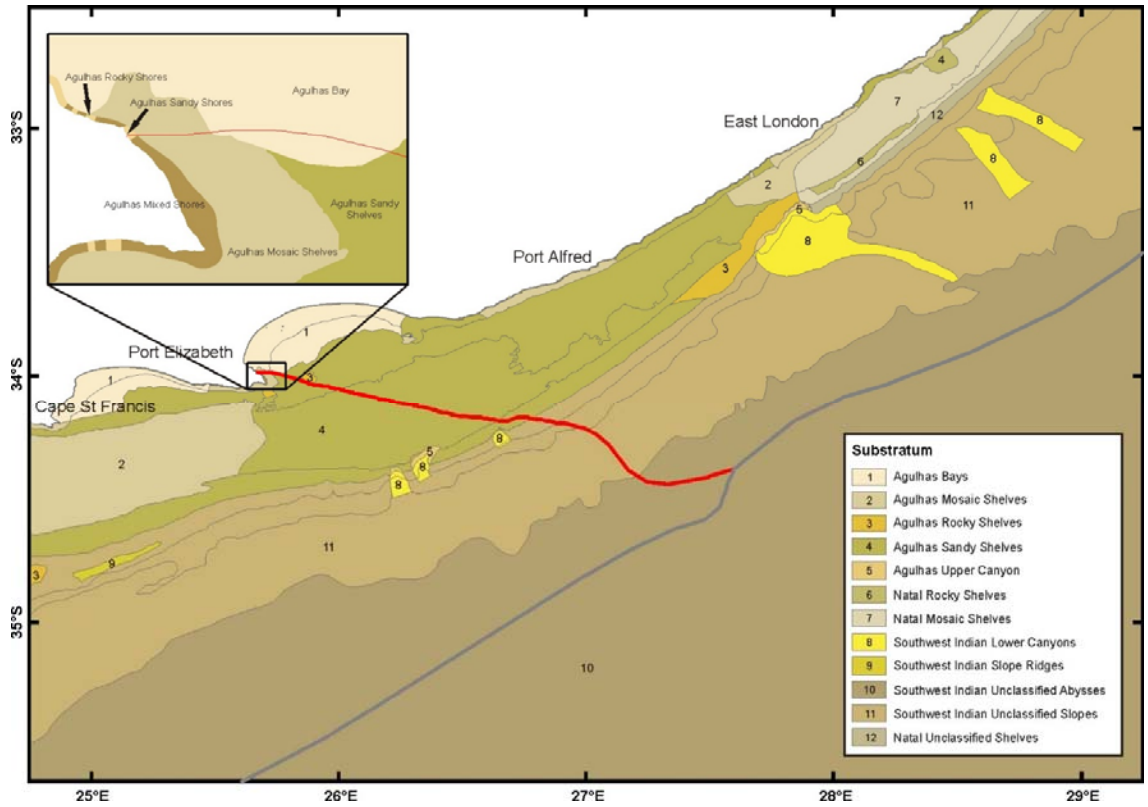


Figure 12 Substratum types off the south-east coast of South Africa in relation to the proposed 2AFRICA/GERA (EAST) Submarine Cable System main trunk line (grey line) and branch cable to Gqeberha (red line) (adapted from Sink *et al*., 2019, cited in Pisces, 2021)

6.1.2 Biophysical characteristics

6.1.2.1 Winds, swells and tides

Along the Eastern Cape, westerly winds predominate in winter, frequently reaching gale force strengths. During summer, easterly wind directions increase markedly, resulting in roughly similar strength/frequency of east and west winds during that season. Calm periods are most common in autumn.

The wave climate in Algoa Bay (Gqeberha is situated on the coastline of Algoa Bay), is predominantly from the southwest with swells of <2 m occurring approximately 80% of the time. Only a small percentage of waves from the southwest exceed 3 m; these are generated by storms in the Southern Ocean. Most of Algoa Bay is protected from these swells by the rocky headland at Cape Recife, although some degree of refraction does occur. Maximum recorded wave heights along the surf zone of Algoa Bay reached 6 m, with higher wave heights dominating during winter.

In common with the rest of the southern African coast, tides are semi-diurnal, with a total range of some 1.5 m at spring tide, but only 0.6 m during neap tide periods.

6.1.2.2 Large scale circulation and coastal currents

The oceanography of the Southeast Coast is almost totally dominated by the warm Agulhas Current (Figure 13). The current forms between 25° and 30° S, its main source coming from recirculation in a South-West Indian Ocean subgyre. Further contributions to the Agulhas Current come from the Mozambique Current and the East Madagascar Current in the form of eddies that act as important perturbations to the flow.

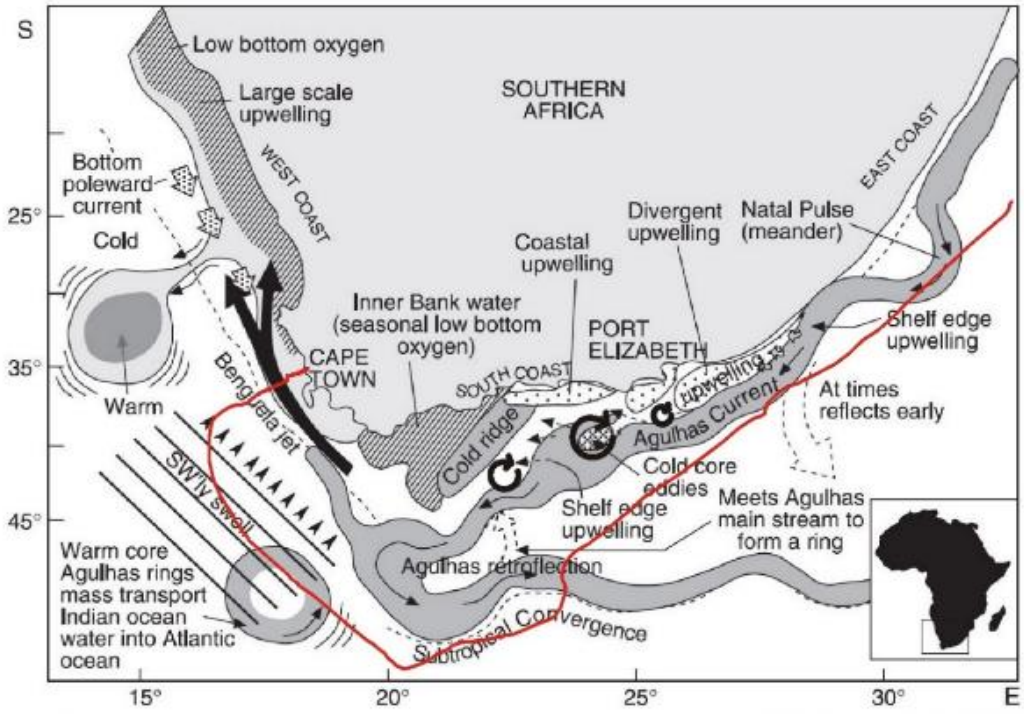


Figure 13 The proposed 2AFRICA/GERA (East) Cable route (red line) in relation to the major circulatory elements along the Southeast Coast of South Africa

The offshore movement of the Agulhas Current in the vicinity of East London creates shear edge eddies, which periodically circulate warm water inshore near Gqeberha, resulting in rapid variation of water temperatures. During easterly wind conditions, periodic upwelling may occur near the rocky headlands, causing sharp drops in seawater temperature. Bottom water shows a persistent westward movement, although short-term current reversals may occur. Temperature and current dynamics within Algoa Bay are therefore complex and vary over small spatial scales. Current speeds of less than 10 cm/s have been measured most frequently within the bay, although currents exceeding 20 cm/s are not uncommon. Off Gqeberha, currents flow in a predominately southerly direction out of the Bay.

6.1.2.3 Turbidity

Turbidity is a measure of the degree to which the water loses its transparency due to the presence of suspended particulate matter consisting of Particulate Organic Matter (POM) and Particulate Inorganic Matter (PIM); the ratios between them varying considerably. The POM usually consists of detritus, bacteria, phytoplankton and zooplankton, and serves as a source of food for filter-feeders. On the Agulhas Bank, seasonal microphyte production associated with upwelling events, both inshore and along the shelf edge, will play an important role in

determining the concentrations of POM. PIM, on the other hand, is primarily of geological origin consisting of fine sands, silts and clays. The PIM loading in nearshore waters is strongly related to natural riverine inputs and resuspension and bedload transport of seabed sediments. Within Algoa Bay, turbidity levels in surface waters are typically low throughout the year, indicative of clear water. Elevated turbidity has, however, been detected nearer the seabed.

6.1.3 The biological environment

6.1.3.1 Overview of ecoregions, ecosystems and habitat types encountered by the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

Biogeographically, the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) falls into the Agulhas and Southwest Indian Deep Ocean ecoregion (Figure 14). For about half of its length, the cable will be located on the shelf in waters <200 m depth, dropping down the shelf edge to connect to the main trunk in beyond the shelf break of ~3,000 m. The seabed communities on the continental shelf off Algoa Bay lie within the Agulhas photic, sub-photic and continental slope bioregion, which extend from the shore to the shelf edge. Where the cable passes from the upper and lower continental slope to the abyssal deep sea, it lies within the Southwest Indian Deep Ocean ecoregion. The wide oceanic shelf provides an array of habitats and the local oceanography and temperature structure of the water column play a role in accounting for high levels of biodiversity and endemicity, including the highest number of endemic fish species along the South African coast.

The biota of nearshore marine habitats on the Southeast Coast are relatively robust, being naturally adapted to an extremely dynamic environment where biophysical disturbances are commonplace. Communities within this region are largely ubiquitous, particular only to substrate type (i.e. hard vs. soft bottom), exposure to wave action, or water depth. Habitats specific to the study area include:

- Sandy intertidal and subtidal substrates.
- Intertidal rocky shores and subtidal reefs.
- The water body.

A comprehensive description of the above habitats and the biological communities ‘typical’ of these habitats, as relevant to the proposed cable landing, are described in the marine ecology specialist report. The biological communities consist of many hundreds of species, often displaying considerable temporal and spatial variability (even at small scales). No rare or endangered species have been recorded.

The ecosystem threat status of the offshore benthic habitat types along most of the Southeast Coast, have been rated as ‘Least Concern’ reflecting the great extent of these habitats within the South African EEZ (Sink *et al*., 2012) (Figure 15). However, on the shelf and in the coastal zone of the project area, the Eastern Agulhas Bay, Agulhas Inner Shelf Mosaic, Agulhas Sandy Outer Shelf and Agulhas Coarse Sediment Shelf Edge habitats through which the cable crosses are considered ‘Vulnerable’, whereas the Agulhas Sandy Mid Shelf is considered ‘Near Threatened’. The intertidal beach at the shore crossing in Algoa Bay is rated as ‘Least Concern’.

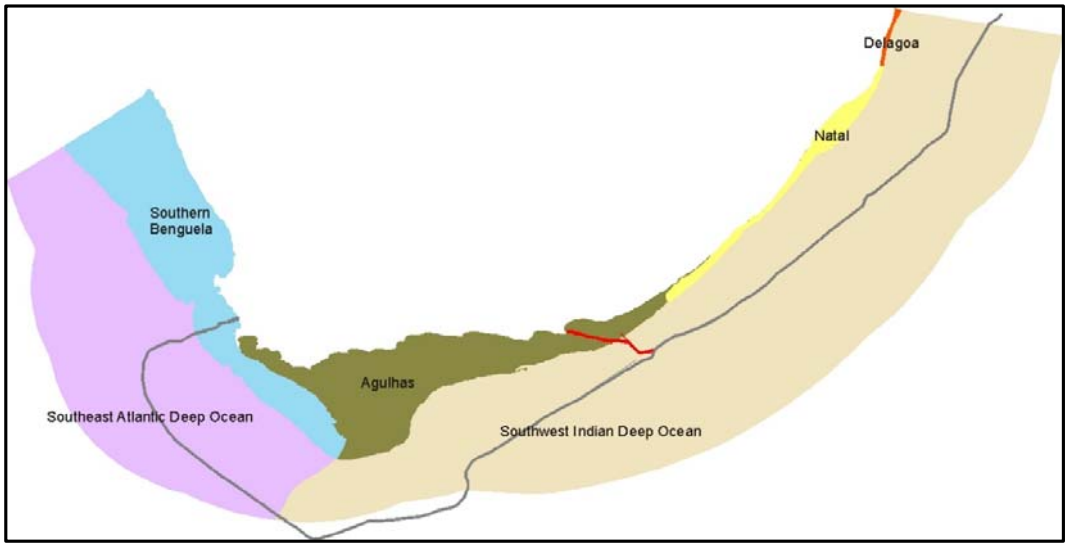


Figure 14 **The proposed Gqeberha branch (red line) of the main trunk (black line) of the 2AFRICA/GERA (East) Cable System in relation to the South African inshore and offshore ecoregions (adapted from Sink *et al*., 2019)**

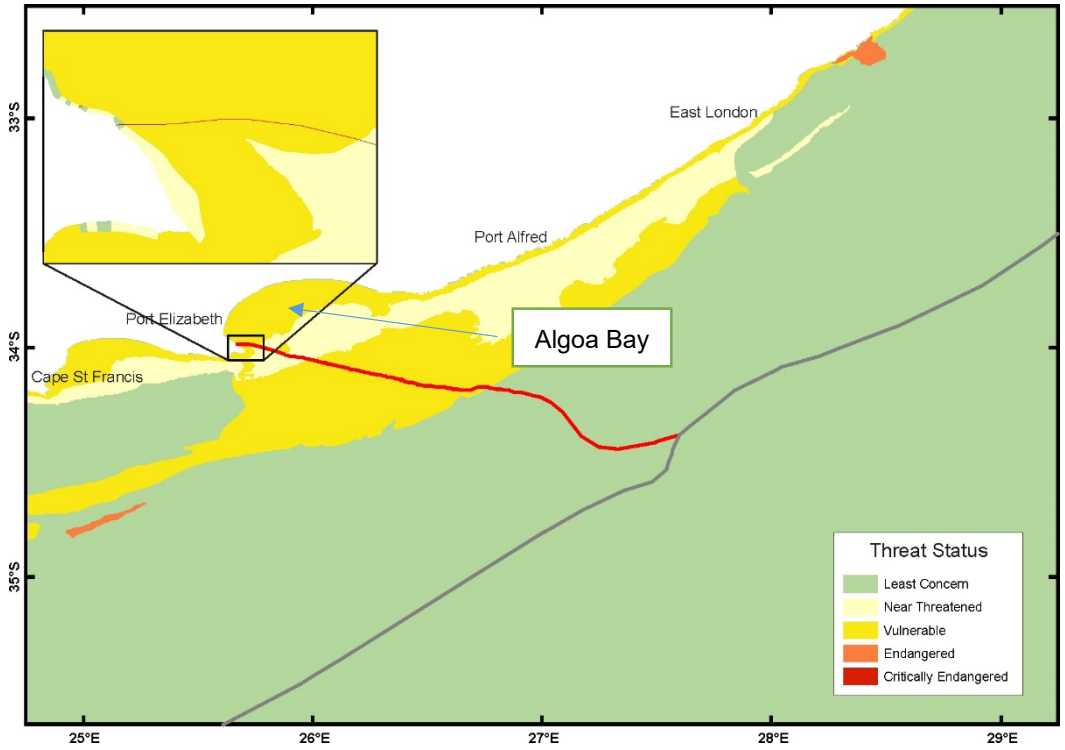


Figure 15 **Ecosystem threat status for coastal and offshore benthic habitat types on the South African south-east coast, in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). The insert provides details of the threat status of intertidal habitats at the cable shore crossing (adapted from Sink *et al*., 2019)**

6.1.3.2 Sandy substrate habitats and biota

The benthic biota of soft bottom substrates constitutes invertebrates that live on, or burrow within, the sediments, and are generally divided into megafauna (>10 cm), macrofauna (animals >1 mm) and meiofauna (<1 mm).

INTERTIDAL SANDY BEACHES

The coastline of Algoa Bay is dominated by sandy beaches. The composition of their faunal communities is largely dependent on the interaction of wave energy, beach slope and sand particle size, which is termed beach morphodynamics. There are three general morphodynamic beach types: dissipative, reflective and intermediate beaches. Virtually all the beaches in Algoa Bay are classified as dissipative-intermediate sandy shores comprised of dune and medium-grained marine sands. Considerable small-scale spatial and temporal variability in the physical state can, however, occur and beaches and their associated macrofaunal communities should therefore be viewed as extremely dynamic. Within a biogeographic province, the macrofaunal communities of sandy beaches are generally ubiquitous. As the study area falls within the transition zone between the South and East Coasts, invertebrate macrofauna representing both regions can occur.

NEARSHORE AND OFFSHORE UNCONSOLIDATED HABITATS

The structure and composition of benthic soft-bottom communities is primarily a function of abiotic factors such as water depth and sediment grain size, but others such as current velocity and organic content abundance also play a role. Further shaping is derived from biotic factors such as predation, food availability, larval recruitment and reproductive success. The high spatial and temporal variability for these factors results in seabed communities being both patchy and variable. In nearshore waters where sediment composition is naturally patchy, and significant sediment movement may be induced by the dynamic wave and current regimes, the benthic macrofauna are typically adapted to frequent disturbance. In contrast, further offshore where near-bottom conditions are more stable, the macrofaunal communities will primarily be determined by sediment characteristics and depth.

Recent research within Algoa Bay has revealed that the Bay harbours an extraordinary invertebrate diversity. The invertebrate macrofauna are important in the marine benthic environment as they influence major ecological processes and serve as an important food source for commercially valuable fish species and other higher order consumers.

Also associated with soft-bottom substrates are demersal communities that comprise epifauna and bottom-dwelling vertebrate species, many of which are dependent on the invertebrate benthic macrofauna as a food source.

Pease refer to the marine ecology specialist report in Appendix B, for detailed information.

6.1.3.3 Rocky shores and subtidal reefs

The intertidal and shallow subtidal reefs along the East Coast of South Africa support a wide diversity of marine flora and fauna and a relatively high percentage of endemic species. Relative to sandy habitats, reefs are scarce in Algoa Bay (Figure 16), although a large proportion of the inshore coastal region between Bird Rock (near the Landing Site) and Cape Recife point comprises hard reef substrata (Pisces, 2021). The cable alignment crosses both outcropping as well as subcropping rock from just beyond the beach at the shore crossing to ~2.6 km offshore, at which point sandy substrate becomes the dominant seabed type (Fugro 2020).

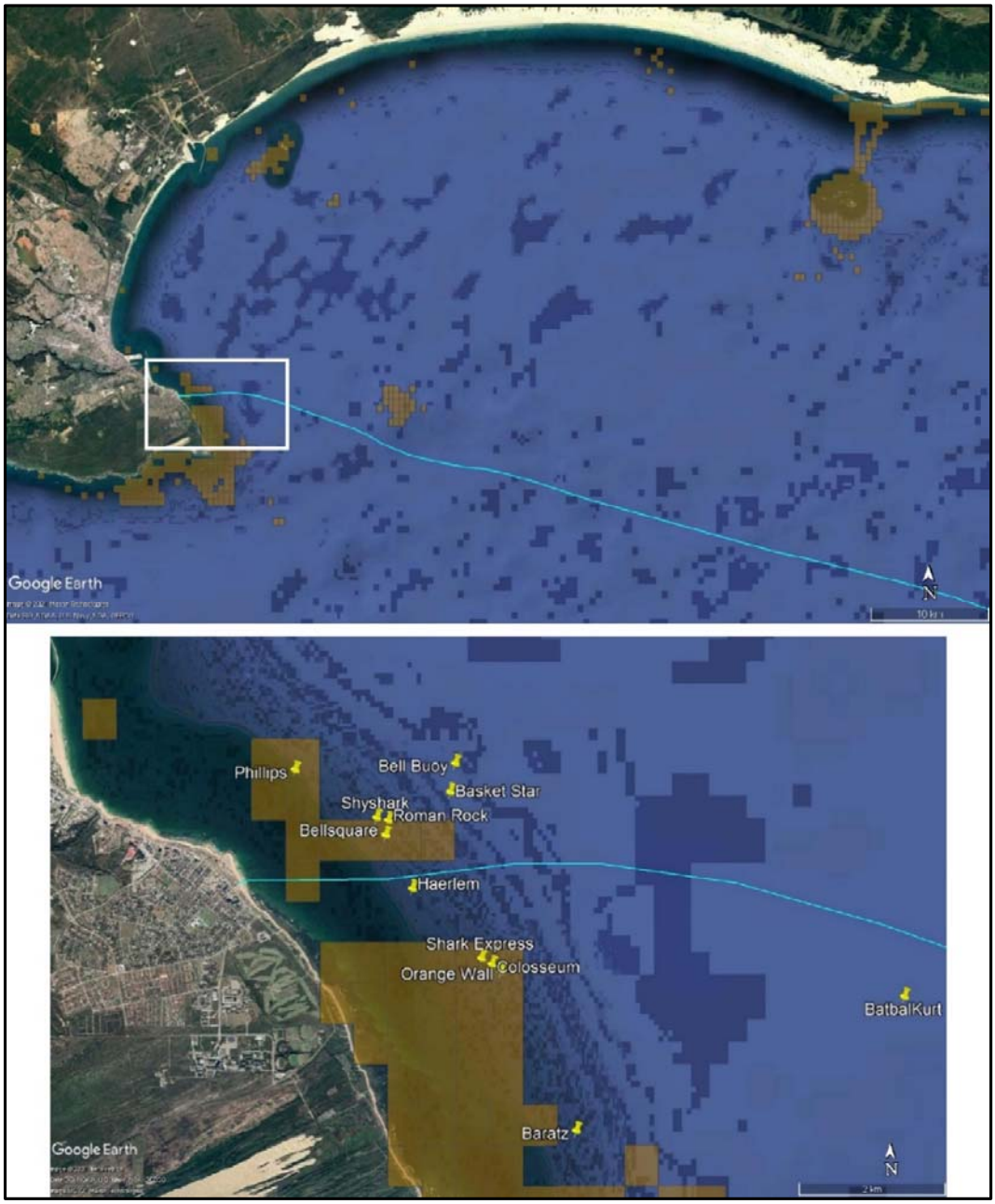


Figure 16 **Proposed landing site of the Gqeberha branch of the 2AFRICA/GERA (East) Cable System in relation to confirmed reef areas (brown) within Algoa Bay (Chalmers 2021, cited in Pisces, 2021). Insert provides details of reef distribution at the shore crossing as well as popular dive sites in the area**

Reef structure in the vicinity of the cable routing appears to be diverse. Haerlem (see insert in Figure 16) is a navy frigate, scuttled in 1987 to form an artificial reef. She lies at a depth of 21 m between the Bell Buoy and Cape Recife and has become inhabited by shy sharks, nudibranchs, soft corals and a variety of fish. Basket Star is a flat reef at a depth of 25-29 m, which protrudes 1-1.5 m above the ocean floor and is home to a thriving reef community dominated by basket starfish and soft coral. In contrast, Bell Buoy, Shyshark Reef and Orange Wall are pinnacle reefs comprising gullies and pinnacles with an abundance of fish, soft corals, feather stars, starfish, sea fans and anemones. Roman Rock (also known as Shark Alley) is home to an abundance of red roman fish and ragged-tooth sharks, whereas Phillips Reef is densely populated with sea fans, sponges and soft corals, and a diversity of fish (www.prodive.co.za). Plate 13 illustrates typical reef habitat and associated communities found in the Algoa bay area.

In particular, the islands in Algoa Bay form ecological distinct subtidal habitats, containing many endemic species of invertebrates and seaweeds.

The deep water habitats on the Agulhas Bank are thought to be characterised by a number of Vulnerable Marine Ecosystem indicator species such as sponges, soft corals and hard corals (Plate 14). VMEs are known to be associated with higher biodiversity levels and indicator species that add structural complexity, resulting in greater species abundance, richness, biomass and diversity compared to surrounding uniform seabed habitats.

Plate 13 Typical subtidal reefs and their associated communities found in the Algoa Bay area (Pisces, 2021)

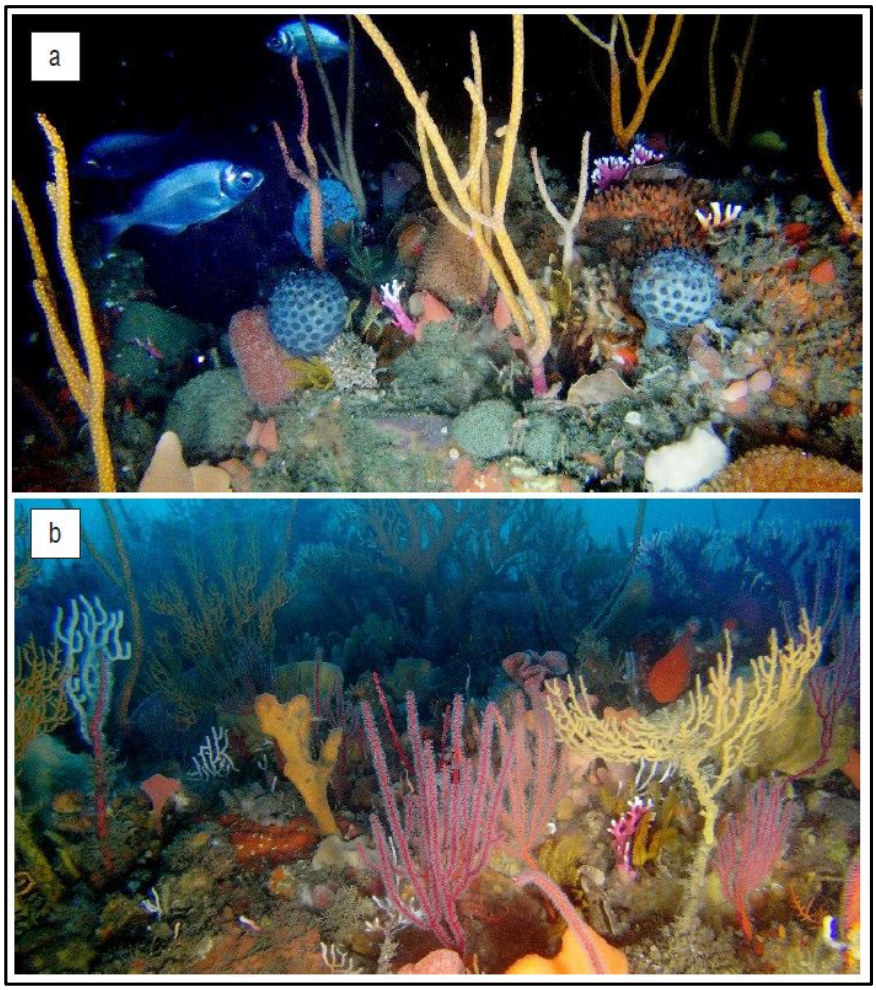


Plate 14 Benthic habitats in deeper water in Algoa Bay (a) Evan's Peak reef and (b) Riy Banks reef (Source: cited in Pisces, 2021)

6.1.3.4 Benthic Invertebrates

The deep-water rock lobster (Plate 15) occurs on rocky substrate in depths of 90 - 170 m between Cape Agulhas and southern KZN, and is fished commercially. Other deep-water crustaceans that may occur in the proposed survey area are the shovel-nosed crayfish, West Coast rock lobster, East Coast rock lobster, Longlegged spiny lobster, the ornate spiny lobster and the painted spiny lobster, all of which are typically associated with shallow-water reefs.

Forty-five species of cephalopods have been recorded on the Agulhas Bank and the shelf break off the South Coast, the majority of which are cuttlefish, which form an important food item for demersal fish. The squid (*Loligo vulgaris reynaudii*) (Plate 15) occurs extensively on the Agulhas Bank out to the shelf edge (500 m depth contour) increasing in abundance towards the eastern boundary of the South Coast, especially between Plettenberg Bay and Algoa Bay

Plate 15 The South Coast rock lobster (*Palinurus gilchristi*) occurs in deep water (left) and the chokka squid (*Loligo vulgaris reynaudii*) spawn in nearshore areas off the South Coast (right) (Pisces, 2021)

6.1.3.5 Demersal Fish

The varied habitat of rocky reefs and soft-bottom substrates off the Southeast coast supports a high diversity of Teleosts (bony fish) and Chondrichthyans (cartilaginous fish) associated with the inshore and shelf waters, many of which are endemic to Southern Africa. Those species that undertake migrations along the South and East Coasts include Red Steenbras, White Steenbras (summer), Seventy-four, Silver Kob , Geelbek, leervis and Elf (winter). Characteristic fishes found on the deeper reefs of the eastern Agulhas Bank and off Algoa Bay include Panga, Piggy grunter, Santer, Carpenter, Fransmadam, Red Roman, Red Stumpnose, Dageraad, Yellowbelly Rockcod, Steentjie and White Musselcracker (Pisces, 2021).

The Cape hake is distributed widely on the continental shelf along the Eastern Cape and onto the Agulhas Bank, while the deep-water hake is found further offshore in deeper water. Kingklip is also an important demersal species, with adults distributed in deeper waters along the coast west of Algoa Bay, especially on rocky substrate.

Furthermore, a wide variety of chondrichthyans occur in nearshore waters along the Eastern Cape, including the Ragged-tooth shark, Bronze whaler, Dusky shark, St Joseph shark and Soupfin shark.

6.1.3.6 The Water Column

PELAGIC INVERTEBRATES

The giant squid *Architeuthis sp*. is a deep-dwelling species that could potentially occur along the offshore portions of the Gqeberha branch of the 2AFRICA/GERA (East) Cable System beyond the 1,000 m depth contour. Growing to in excess of 10 m in length, it is the principal prey of the sperm whale, and is also taken by beaked whaled, pilot whales, elephant seals and sleeper sharks.

PELAGIC FISH

Small pelagic shoaling species occurring along the Eastern Cape include anchovy (*Engraulis encrasicolus*), pilchard (*Sardinops sagax*), round herring (*Etrumeus japonicas*), chub mackerel (*Scomber japonicas*) and horse mackerel (*Trachurus capensis*).

The fish most likely to be encountered on the shelf, beyond the shelf break and in the offshore waters of the project area are the large migratory pelagic species, including various tunas , billfish and sharks, many of which are considered threatened by the International Union for the Conservation of Nature (IUCN), primarily due to overfishing (Pisces, 2021).

TURTLES

Five species of sea turtles occur along the Southeast Coast; the green turtle (*Chelonia mydas*), olive ridley (*Lepidochelys olivacea*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*) and loggerhead (*Caretta caretta*).

Leatherback Turtles are listed as “Vulnerable” worldwide by the IUCN and are in the highest categories in terms of need for conservation in CITES (Convention on International Trade in Endangered Species), and CMS (Convention on Migratory Species). Loggerhead turtles are globally listed as “Vulnerable”, whereas Green turtles are globally listed as “Endangered”. As a signatory of CMS, South Africa has endorsed and signed a CMS International Memorandum of Understanding specific to the conservation of marine turtles. South Africa is thus committed to conserve these species at an international level.

MARINE MAMMALS

The marine mammal fauna of the eastern coast of southern Africa comprises between 28 and 38 species of cetaceans (whales and dolphins) known or likely to occur here (Table 6) and one seal species, the Cape fur seal. Of the migratory cetaceans listed in 6, the blue, sei and humpback whales are listed as ‘Endangered’ and the Southern Right, South African inshore Bryde’s and fin whale as ‘Vulnerable’ in the IUCN Red Data book (Plate 16). The endangered Indo-Pacific Humpback Dolphin is known to use the shallow water reef areas of Algoa Bay for social interaction and feeding (ACER, 2021).

Table 6 Cetaceans occurrence off the Southeast Coast of South Africa, their seasonality. IUCN Conservation Status is based on the SA Red List Assessment (2014) (sourced from Pisces, 2021)

Common Name	Species	Shelf (<200 m)	Offshore (>200 m)	Seasonality	IUCN Conservation Status
Delphinids					
Common bottlenose dolphin	*Tursiops truncatus*	Yes	Yes	Year round	Least Concern
Indo-Pacific bottlenose dolphin	*Tursiops aduncus* -Ifafa-Kosi Bay subpopulation	Yes		Year round	Vulnerable
	T. aduncus -Ifafa-False Bay subpopulation	Yes		Year round	Near threatened
	T. aduncus -Seasonal subpopulation	Yes		Year round	Data Deficient
Common (short beaked) dolphin	*Delphinus delphis*	Yes	Yes	Year round	Least Concern
Common (long beaked) dolphin	*Delphinus capensis*	Yes		Year round	Least Concern
Fraser's dolphin	*Lagenodelphis hosei*		Yes	Year round	Least Concern
Spotted dolphin	*Stenella attenuata*	Yes	Yes	Year round	Least Concern
Striped dolphin	*Stenella coeruleoalba*		Yes	Year round	Least Concern
Spinner dolphin	*Stenella longirostris*	Yes		Year round	Least Concern
Indo-Pacific humpback dolphin	*Sousa plumbea*	Yes		Year round	Endangered
Long-finned pilot whale	*Globicephala melas*		Yes	Year round	Least Concern
Short-finned pilot whale	*Globicephala macrorhynchus*		Yes	Year round	Least Concern
Killer whale	*Orcinus orca*	Occasional	Yes	Year round	Least Concern
False killer whale	*Pseudorca crassidens*	Occasional	Yes	Year round	Least Concern
Risso's dolphin	*Grampus griseus*	Yes (edge)	Yes	Year round	Least Concern
Pygmy killer whale	*Feresa attenuata*		Yes	Year round	Least Concern
Sperm whales					
Pygmy sperm whale	*Kogia breviceps*		Yes	Year round	Data Deficient

Common Name	Species	Shelf (<200 m)	Offshore (>200 m)	Seasonality	IUCN Conservation Status
Dwarf sperm whale	*Kogia sima*		Yes	Year round	Data Deficient
Sperm whale	*Physeter macrocephalus*		Yes	Year round	Vulnerable
Beaked whales					
Cuvier's	*Ziphius cavirostris*		Yes	Year round	Least Concern
Arnoux's	*Beradius arnouxii*		Yes	Year round	Data Deficient
Southern bottlenose	*Hyperoodon planifrons*		Yes	Year round	Least Concern
Strap-toothed whale	*Mesoplodon layardii*		Yes	Year round	Data Deficient
Longman's	*Mesoplodon pacificus*		Yes	Year round	Data Deficient
True's	*Mesoplodon mirus*		Yes	Year round	Data Deficient
Gray's	*Mesoplodon grayi*		Yes	Year round	Data Deficient
Blainville's	*Mesoplodon densirostris*		Yes	Year round	Data Deficient
Strap-toothed whale	*Mesoplodon layardii*		Yes	Year round	Data Deficient

Common Name	Species	Shelf (<200 m)	Offshore (>200 m)	Seasonality	IUCN Conservation Status
Baleen whales					
Antarctic Minke	*Balaenoptera bonaerensis*	Yes	Yes	>Winter	Least Concern
Dwarf minke	*B. acutorostrata*	Yes		Year round	Least Concern
Southern Hemisphere Fin whale	*B. physalus*		Yes	MJJ & ON, rarely in summer	Endangered
Pygmy Blue whale	*B. musculus brevicauda*		Yes	MJJ	Data Deficient
Blue whale	*B. musculus intermedia*		Yes	Winter	Critically Endangered
Sei whale	*B. borealis*		Yes	MJ & ASO	Endangered
Bryde's (inshore)	*B. edeni (inshore form)*		Yes	Year round	Vulnerable
Pygmy right	*Caperea marginata*	Yes		Year round	Least Concern
Humpback	*Megaptera novaeangliae*	Yes	Yes	AMJJASOND	Least Concern
Southern right	*Eubalaena australis*	Yes		JJASON	Least Concern
Delphinids					

Plate 16 The humpback whale (left) and the southern right whale (right) migrate along the South and East Coasts during winter (Photos: www.divephotoguide.com; www.aad.gov.au)

SEABIRDS

Along the Southeast Coast, 60 species of seabirds are known or thought likely to occur. South Coast seabirds can be categorised into three categories: 'breeding resident species', 'non-breeding migrant species' and 'rare vagrants'. According to Pisces (2021), fifteen species breed within the South Coast region (Table 7), including Cape Gannets (Algoa Bay islands) (Plate 17 left), African Penguins (Algoa Bay islands) (Plate 17- right), Cape Cormorants (a small population at Algoa Bay islands and mainland sites), White-breasted Cormorant, Roseate Tern (Bird and St Croix Islands), Swift Term (Stag Island) and Kelp Gulls. Furthermore, a number of species breed along the adjacent mainland coast; a breeding colony of Cape Cormorant has established on Robberg Peninsula, kelp gulls breed in high numbers on the Keurbooms River estuary spit and African Black Oystercatcher, Caspian Tern and White-fronted Plover breed on many of the beaches between Plettenberg Bay and the eastern boundary of the Tsitsikamma Section of the Garden Route National Park. African Black Oystercatchers breed as far east as East London while breeding of Whitefronted Plovers extends into KZN. Damara Terns breed inshore between Cape Agulhas and Cape Infanta on the South Coast, with the bulk of the South African population breeding in Algoa Bay. African Penguin colonies occur at Cape Recife, and on the Algoa Bay islands (St Croix Island, Jaheel Island, Bird Island, Seal Island, Stag Island and Brenton Rocks) (Figure 17).

Plate 17 Typical diving seabirds on the South Coast are the Cape Gannets (left) and the flightless African Penguin (right) (Sourced from Pisces, 2021)

Table 7 Breeding resident seabirds present along the South Coast and their Regional and Global IUCN status (sourced from Pisces, 2021)

Species Name	Common Name	Regional IUCN Status	Global IUCN Status
Haematopus moquini	African black oystercatcher	Least Concern	Near Threatened
Spheniscus demersus	African Penguin	Endangered	Endangered
Phalacrocorax capensis	Cape Cormorant	Endangered	Endangered
Phalacrocorax neglectus	Bank Cormorant	Endangered	Endangered
Phalacrocorax coronatus	Crowned Cormorant	Near Threatened	Near Threatened
Phalacrocorax lucidus	White-breasted Cormorant	Least Concern	Least Concern
Morus capensis	Cape Gannet	Vulnerable	Endangered
Larus dominicanus	Kelp Gull	Least Concern	Least Concern
Larus cirrocephalus	Greyheaded Gull	Least Concern	Least Concern
Chroicocephalus hartlaubii	Hartlaub's Gull	Least Concern	Least Concern
Hydroprogne caspia	Caspian Tern	Vulnerable	Least Concern
Sterna bergii	Swift Tern	Least Concern	Least Concern
Sterna dougallii	Roseate Tern	Endangered	Least Concern
Sterna balaenarum	Damara Tern	Critically Endangered	Vulnerable

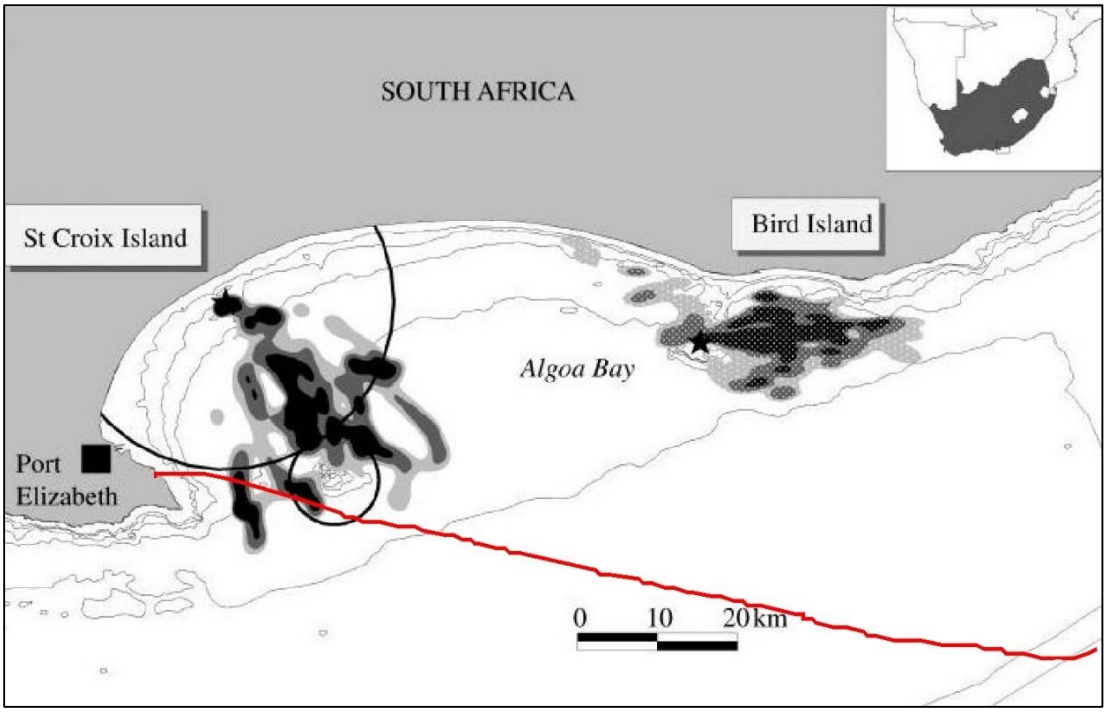


Figure 17 The proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) in relation to the foraging areas (density of feeding dives) of African penguins breeding on St Croix Island and Bird Island (stars) in 2009, after closure to the purse-seine fishery within 20 km of St Croix Island (circled). Foraging range (feeding dives): black, 50%; dark grey, 50-75%; and light grey, 75-90% (Sourced from Pisces, 2021)

6.1.4 Marine biodiversity, MPAs and marine areas of conservation significance

Numerous coastal and offshore areas of conservation significance exist along the coastline of the Southeast Coast of South Africa, affording protection to the marine ecosystems and biota. Those relevant to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) are discussed in the sections below.

6.1.4.1 Biodiversity Priority Areas as per the National Coastal and Marine Spatial Biodiversity Plan

The 2018 National Biodiversity Assessment, with its updated ecosystem maps and assessments, provided an opportunity for the first National Coastal and Marine Critical Biodiversity Areas (CBA) map to be developed, as described in the National Coastal and Marine Spatial Biodiversity Plan (Version 1, Beta 2) (Harris, L.R., Sink, K.J., Holness, S.D., Kirkman, S.P., Driver, A. 2020). The CBA map aims to consolidate several past and present spatial assessment and planning initiatives to provide a coherent map of the coastal and marine biodiversity priority areas in South Africa that require focused management measures to support sustainable development of the blue economy. These initiatives include: the most recent classification, mapping and assessment of coastal and marine biodiversity in South Africa; previous and new work to support MPA expansion; identification, revised delineation and proposed management of Ecologically or Biologically Significant Marine Areas (EBSAs; MARISMA Project 2020); and other spatial prioritisations done at local, provincial or other sub-national scales.

Figure 18 shows part of the CBA map and indicates that while the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) cable route avoids MPAs, it does pass through CBA1, CBA2 and Ecological Support Areas (ESAs), particularly around Cape Recife and on the sandy shelf edge.

CBA 1 indicates irreplaceable or near-irreplaceable sites that are required to meet biodiversity targets with limited, if any, option to meet targets elsewhere, whereas CBA 2 indicates optimal sites that generally can be adjusted to meet targets in other areas. ESAs represent EBSAs outside of MPAs and not already selected as CBAs. The management objectives for these CBA and ESA categories is shown in Table 8.

The management objective for CBA1 areas is to maintain them in a natural or near natural state as the areas represent sites in which the features they contain are irreplaceable or near-irreplaceable. Undersea cables are indicated as being ‘Conditional’ in the proposed sea-use guidelines for CBAs. The principles outlined for assessing the compatibility of activities within CBAs is based on the level of likely degradation caused by the project. This is based on a three tier impact-based scale: Very Severe/Severe, Moderate and Low/Very Low degradation. Activities causing Moderate Degradation are Conditionally Compatible and require careful regulation and controls over and above the general rules and legislation to avoid unacceptable impact. Activities with Low to Very Low impact are compatible and should be allowed and regulated by the general rules of the area.

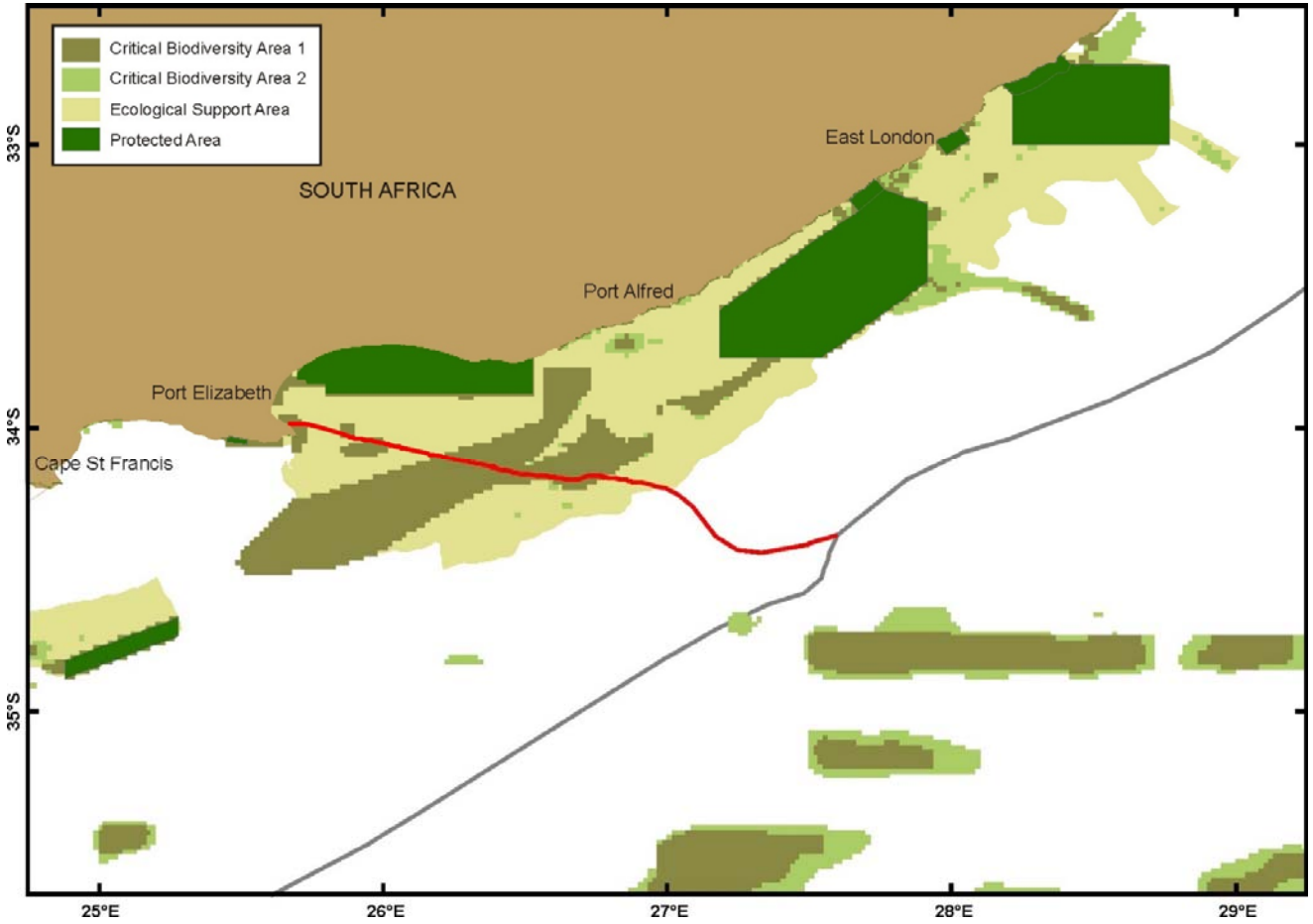


Figure 18 **The proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (red line) in relation to the National Coastal and Marine Critical Biodiversity Areas (version 1.0 (Beta 2)) (adapted from Harris *et al*. (2020))**

The National Coastal and Marine Spatial Biodiversity Plan further proposes a list of sea use activities under various proposed Marine Spatial Planning (MSP) Zones, in accordance with their compatibility with MPAs, CBAs and ESA's. Under the present draft National Coastal and Marine Spatial Biodiversity Plan (Version 1, Beta 2), undersea cables are proposed under an MSP Zone named "Underwater Infrastructure" and may be conditionally allowed in CBA areas and considered compatible in ESA's. These proposals are considered draft and still under discussion.

Table 8 Definitions of biodiversity priority areas, including the management objective of each category (adapted from SANBI 2017). (CBA= Critical Biodiversity Area; ESA= Ecological Support Area)

Category	Definition	Broad management objective
Protected Areas	Protected areas declared or recognised in the National Environmental Management: Protected Areas Act (No. 57 of 2003)	As per each Protected Area Management Plan
CBA 1	Irreplaceable or near-irreplaceable sites where there are no other options to represent the features they contain in the planning area. Ideally these sites are natural or near-natural, but exceptions can be made if the only sites where a feature exists are degraded.	Must be kept in a natural or near-natural state
CBA 2	Sites that are the best option available for representing the features in a spatial prioritisation. Ideally these sites are natural or near-natural, but exceptions can be made if the only sites where a feature exists are degraded.	
ESA 1	Sites that are not CBAs but are still important for meeting targets for biodiversity and ecological processes. These sites must be in natural, near-natural or moderately modified ecological condition.	Must be kept in at least a functional state (ideally at least in a moderately modified ecological condition)
ESA 2	Sites that are not CBAs but are still important for meeting targets for biodiversity and ecological processes. These sites are generally in severely modified ecological condition.	

6.1.4.2 Hope Spots

Hope Spots are defined by Mission Blue of the Sylvia Earle Alliance as special conservation areas that are critical to the health of the ocean. The first six Hope Spots were launched in South Africa in 2014 and include Aliwal Shoal in KZN, Algoa Bay in the Eastern Cape, and Plettenberg Bay, Knysna, the Cape Whale Coast (Hermanus area) and False Bay in the Western Cape. Of these, the Algoa Bay Hope Spot overlaps with the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing).

6.1.4.3 Marine Protected Areas

Figure 19 shows the location of MPAs on the Southeast Coast, in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) The closest MPAs to the cable are Addo Elephant and Sardinia Bay MPAs, described briefly below.

- The **Sardinia Bay MPA** has a shoreline 7 km in length and extends one nautical mile seawards of the high-water mark, between Schoenmakerskop and Bushy Park. It contains representative habitat including rocky platforms, sandy beaches, subtidal rocky reefs, and subtidal sandy benthos.

- The **Addo Elephant MPA**, which incorporates the Algoa Bay Islands was gazetted in May 2019. This 1,200 km^2 MPA expands on the original Bird Island MPA (comprising Bird, Seal, Stag and Black Rock Islands) to protect sandy beaches, rocky shores, reefs, an estuary and islands and aid recovery of valuable fisheries resources such as abalone and kob, as well as great white sharks and whales (brydes, minke, humpback and right). The MPA protects important feeding areas for the 9,000 pairs of Endangered African penguins breeding at St Croix Island and the 60 000 pairs of Endangered Cape gannets breeding at Bird Island.

6.1.4.4 Ecologically or Biologically Significant Areas (EBSAs)

Figure 19 shows the location of EBSAs on the Southeast Coast in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). Together with MPAs, EBSAs represent a network of sites that are important for biodiversity and contribute towards including connectivity in the CBA Map. They also encompass areas that are important for ecological processes. As shown in Figure 19, the proposed cable alignment passes through the Algoa to Amathole EBSAs.

The **Algoa to Amathole EBSA** encompasses the likely largest single collection of significant and special marine features in the country that also jointly support key ecological processes, including important land-sea connections. It spans the Eastern Cape shoreline between Sardinia Bay MPA and Amathole MPA/Kei River mouth, extending from the dune base to approximately the continental shelf break/slope at -2000 m. Complex ocean circulation occurs where the Agulhas Current leaves the coast, following the shelf break resulting in the formation of cold-water eddies, intrusions of Agulhas water onto the shelf and large offshore meanders of the Agulhas Current. Consequently, this EBSA includes spawning areas, nursery areas and key transport pathways for demersal and pelagic fish, which in turn support a myriad of top predators, including shark and seabird breeding and foraging areas. The Algoa Bay islands support the easternmost colony of Endangered African penguins and the largest colony of Cape Gannets in southern Africa. Regionally 'Critically Endangered' leatherback and regionally 'Near Threatened' loggerhead turtles migrate through the EBSA between their nesting and foraging grounds, with hatchlings of both species also passing through during their dispersal from the nesting beaches. Green turtles have also been sighted in the area. The EBSA includes 36 ecosystem types, 18 of which are threatened and a further seven that are Near Threatened. Sensitive features and species include submarine canyons, steep shelf edge, deep reefs, outer shelf and shelf edge gravels, and reef-building cold-water corals ranging in depth between 100 and 1,000 m. It also contains several key biodiversity features, including stromatolites; sites where coelocanths are present; a 'Critically Endangered' localised endemic estuarine pipefish, several priority estuaries, rare ecosystem types of limited spatial extent and a few existing coastal marine protected areas.

Under the current Marine Spatial Management and Governance (MARISMA) Programme (MARISMA 2014-2020), South Africa has revised its EBSAs and is preparing management recommendations for each one. It is proposed that EBSAs comprise two zones, a Biodiversity Conservation Zone and an Environmental Impact Management Zone, with recommendations for management per zone. There is alignment in the management objectives of CBAs and the Biodiversity Conservation Zone, and of ESAs and the Environmental Impact Management Zone. Therefore, the National Coastal and Marine CBA map has been adopted as the tool by which South Africa's EBSAs are zoned for recommended inclusion in the national Marine Spatial Planning processes. This careful and deliberate alignment of the National Coastal and Marine CBA Map and the EBSA zones is important for identifying a single, coherent portfolio of coastal and marine biodiversity priorities.

The management objective in the zones marked for 'Conservation' is "*strict place-based biodiversity protection aimed at securing key biodiversity features in a natural or semi-natural state, or as near to this state as possible*". The management objective in the zones marked for 'Impact Management' is "*management of impacts on key biodiversity features in a mixed-use area to keep key biodiversity features in at least a functional state*" (https://cmr.mandela.ac.za/EBSA-Portal/South-Africa/SA-EBSA-Status-Assessment-Management). Activities within these two zones can be placed into one of four different Marine Spatial Planning (MSP) categories depending on their compatibility with the EBSA features and management objective of that zone.

6.1.4.5 Sensitive Areas

Despite the development of the offshore MPA network a number of 'Vulnerable' ecosystem types are currently 'poorly protected' or 'not protected' and further effort is needed to improve protection of these threatened ecosystem types (Sink *et al.,* 2019). Ideally, all highly threatened ('Critically Endangered' and 'Endangered') ecosystem types should be well protected. Currently, however, most of the Agulhas Coarse Sediment Shelf Edge and Southwest Indian Mid Slope are poorly protected receiving only 0.2-10% protection, whereas the Southwest Indian Lower Slope and Southwest Indian unclassified Abyss receive no protection at all (Sink *et al.,* 2019). Although most of the ecosystem types in the inshore portions of the project area are either moderately protected, most of the offshore areas of the proposed Gqeberha branch route are poorly protected or not protected (Figure 2).

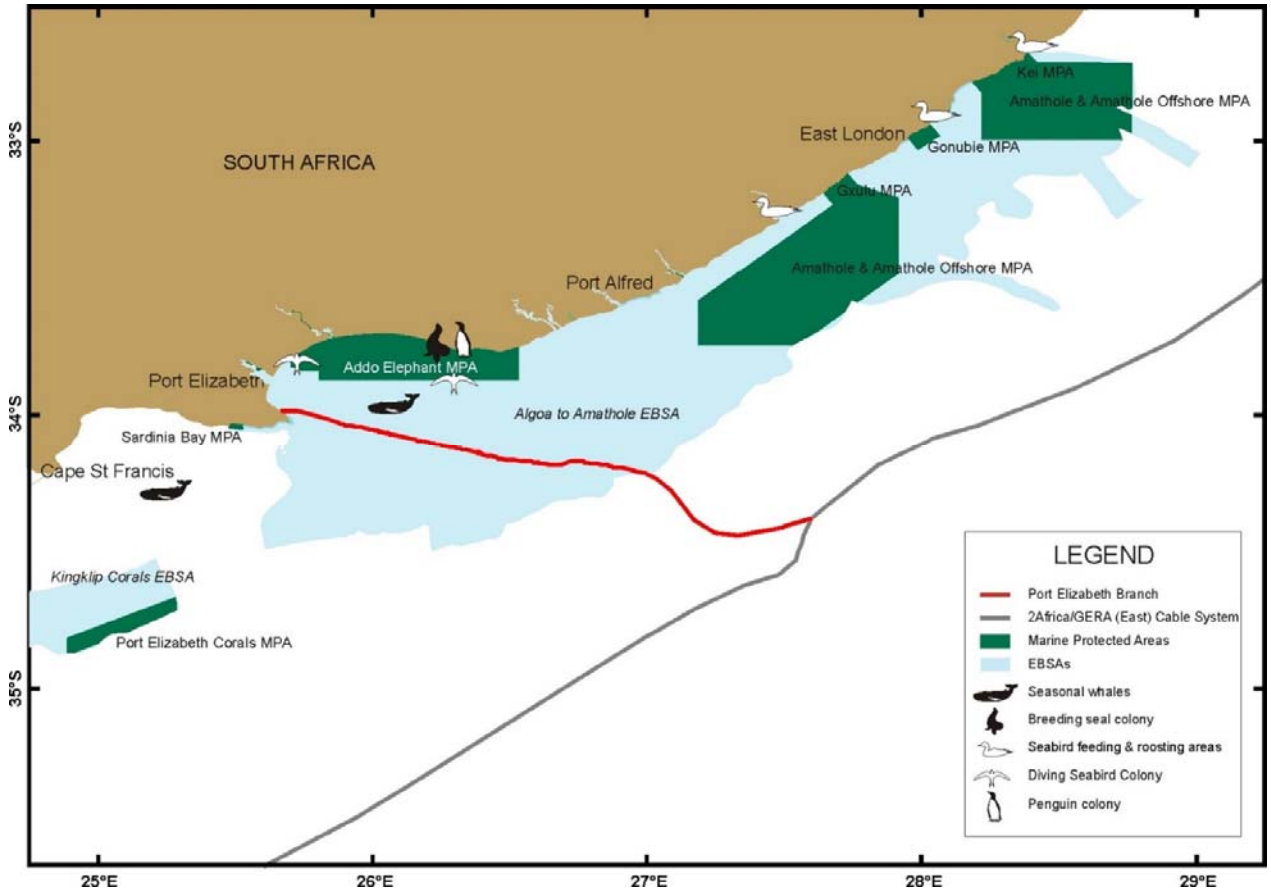


Figure 19 The proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (red line) in relation to Marine Protected Areas (MPAs) and Ecologically and Biologically Significant Areas (EBSAs) on the South and East Coasts, illustrating the location of seabird and seal colonies, and seasonal whale populations

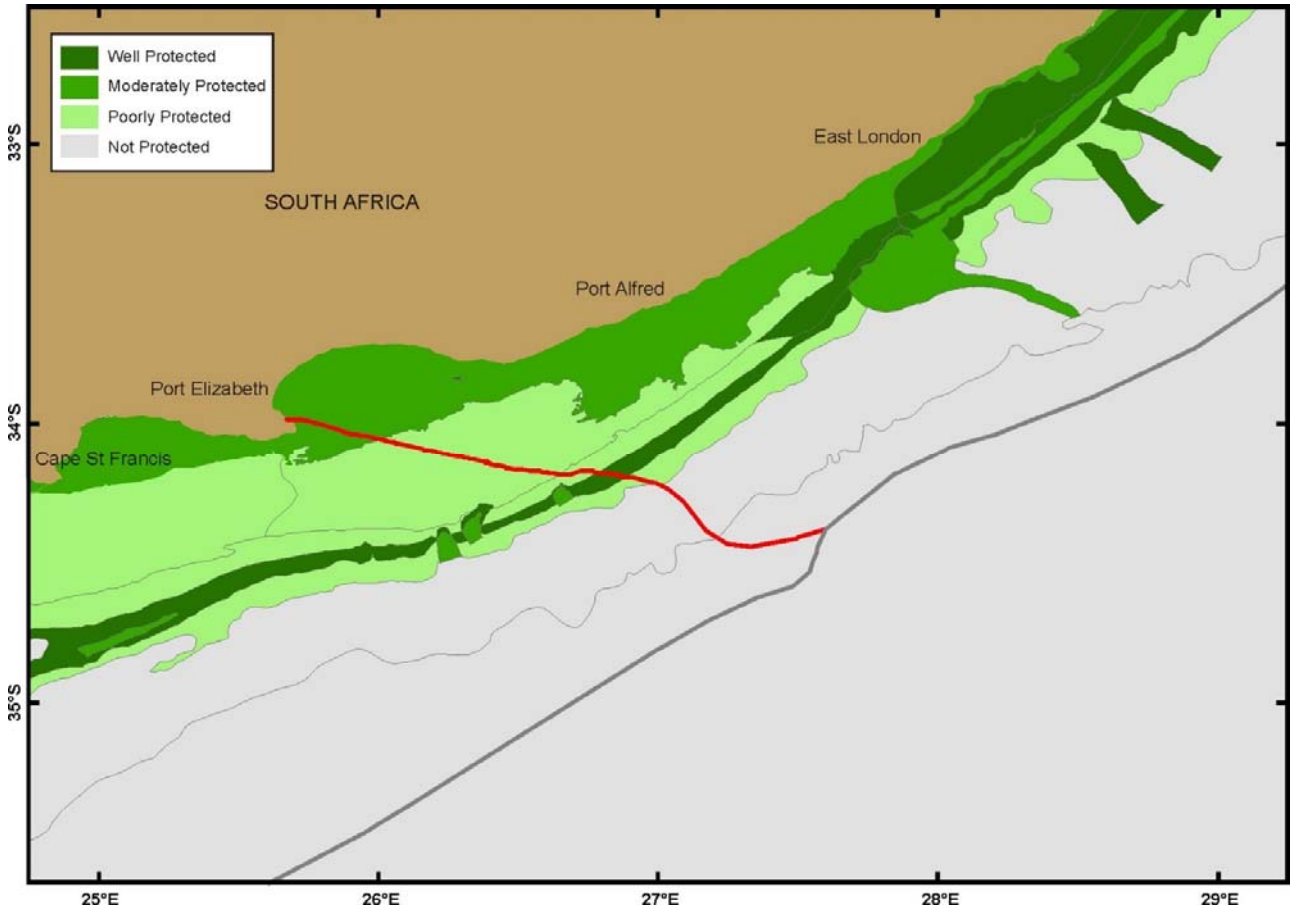


Figure 20 Protection levels of 150 marine ecosystem types as assessed by Sink *et al*. (2019) in relation to the proposed Gqeberha branch (red line) of the main trunk (grey line) of the 2AFRICA/GERA (East) Cable System

6.1.4.6 Important Bird Areas (IBAs)

The Algoa Bay Islands Nature Reserve IBA (Figure 21) comprise the only islands between Cape Agulhas and Inhaca in Mozambique and are therefore ecologically extremely important. Fourteen seabird species, as well as several shorebird and 33 terrestrial bird species have been recorded on the Algoa Bay Islands. The Algoa Bay Islands support almost 50% of the global population of African Penguins, mostly on St Croix Island.

Various marine IBAs have also been proposed in South African territorial waters, with those in the broader project area shown in Figure 21. Marine IBAs are primarily defined for the regular presence of globally threatened species, and congregations of >1% of biogeographic or global populations. The proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) crosses through the proposed Alexandria coastal belt/Algoa Bay Islands Nature Reserve Marine IBA, specifically aimed at protecting the African Penguin, Cape Gannet, Kelp Gull, Damara Tern and Roseate Tern.

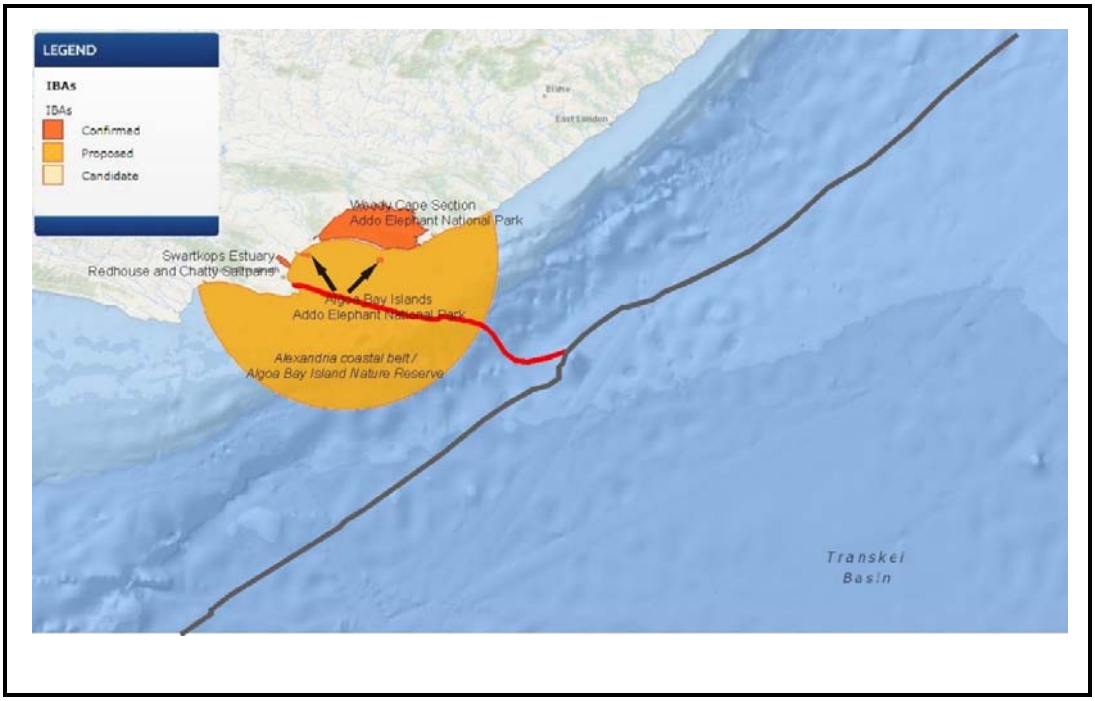


Figure 21 The proposed Gqeberha branch (red line) of the main trunk (grey line) of the 2AFRICA/GERA (East) Cable System in relation to confirmed and proposed coastal and marine IBAs in the Eastern Cape (Source: https://maps.birdlife.org/marineIBAs)

6.1.4.7 Proposed Marine Protection Zone

The formation of a Humpback Dolphin Marine Sanctuary extending 800 m offshore from Bird Rock to Cape Recife has been proposed to protect the rare and endangered Indo-Pacific Humpback Dolphin. Degradation of their shallow inshore habitat and an increase in boating activity has been identified as the primary causes of their unfavourable conservation status. The high frequency noise emitted by speeding Inflatable Boats or Personal Water Craft (PWC), as well as these craft travelling at high speeds could result in behavioural disturbance and physical injury to these animals. It is proposed that motorised craft will be required to travel slower than plaining speed within the Sanctuary, and that inflatable Boat & PWC riding will not be permitted.

6.1.5 Offshore fishing industry

The South African offshore commercial fishing industry is an important contributor to the economy, with the wholesale value of production in 2017 estimated at approximately R9.8 billion. Approximately 14 different commercial fisheries sectors currently operate within South African waters. The primary fisheries in terms of highest economic value are the demersal (bottom) trawl and long-line fisheries targeting the Cape hakes (*Merluccius paradoxus* and *M. capensis*),), and the pelagic-directed purse-seine fishery targeting pilchard (*Sardinops sagax*), anchovy (*Engraulis encrasicolus*), and red-eye round herring (*Etrumeus whiteheadi*. Fisheries relevant to the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) are described briefly below. Refer to the specialist report (CAPMarine, 2021) (Appendix B) for further information.

6.1.5.1 Demersal Trawl

The demersal trawl fishery comprises an offshore and inshore fleet. The wholesale value of catch landed by the inshore and offshore demersal trawl sectors, combined, during 2017 was R3.9 billion, or 40.5% of the total value of all fisheries combined.

The offshore fishery is comprised of 45 vessels operating from most major harbours on both the West and South Coasts. On the West and South-West Coasts, these grounds extend in a continuous band along the shelf edge between the 200 m and 1,000 m bathymetric contours although most effort is in the >300 m to 600 m depth range. Trawl nets are generally towed parallel to the depth contours (thereby maintaining a relatively constant depth) in a north-westerly or south-easterly direction. Trawlers also target fish aggregations around bathymetric features, in particular seamounts and canyons, where there is an increase in seafloor slope and in these cases the direction of trawls follow the depth contours. The deep-sea sector is prohibited from operating in waters shallower than 110 m or within five Nm of the coastline.

The inshore fishery consists of 31 vessels, which operate on the South Coast mainly from the harbours of Mossel Bay and Port Elizabeth. Inshore grounds are located on the Agulhas Bank and extend towards the Great Kei River in the east. Vessels also target sole close inshore between Struisbaai and Mossel Bay, between the 50 m and 80 m isobaths. Hake is targeted further offshore in traditional grounds between 100 m and 200 m depth in fishing grounds known as the Blues located on the Agulhas Bank.

The activity of the fishery is restricted by permit condition to operating within the confines of a historical “footprint” – an area of approximately 57 300 km^2 and 17 000 km^2 for the offshore and inshore fleets, respectively. Trawl depth records ranged from approximately 20 to 980 m. Figure 22 (and b) shows an overview of the spatial distribution of demersal trawling activity in relation to the proposed cable route within the EEZ.

Figure 23 shows the demersal trawling activity in the vicinity of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). At a seabed depth range of approximately 30 m to 120 m, the proposed routing passes through trawling grounds fished by the inshore demersal trawl sector in the Algoa Bay area.

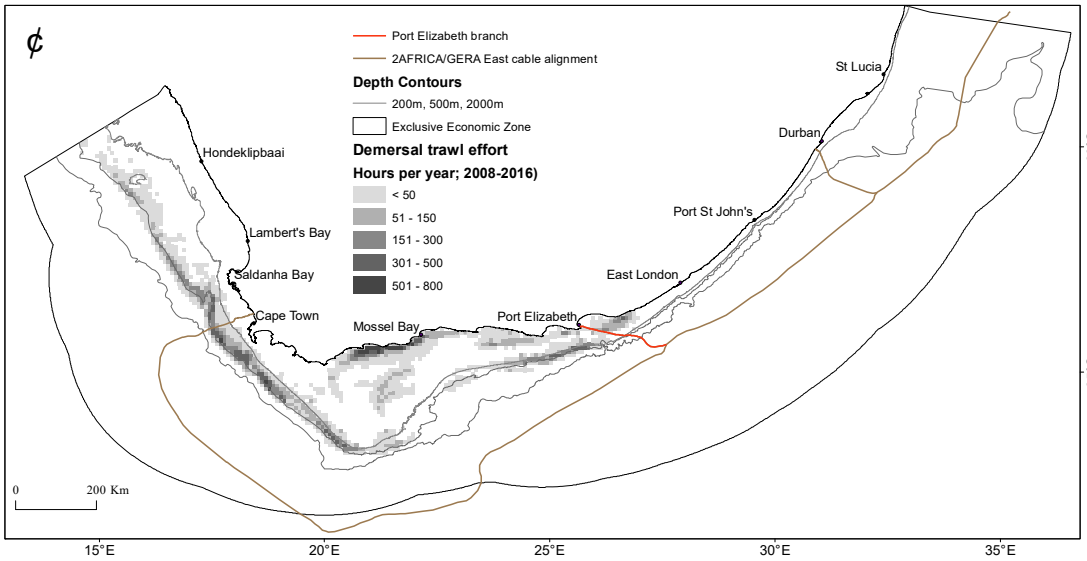


Figure 22a Overview of the spatial distribution of fishing effort expended by the demersal trawl sector within the South African EEZ and in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (*Source - Capmarine, 2021*)

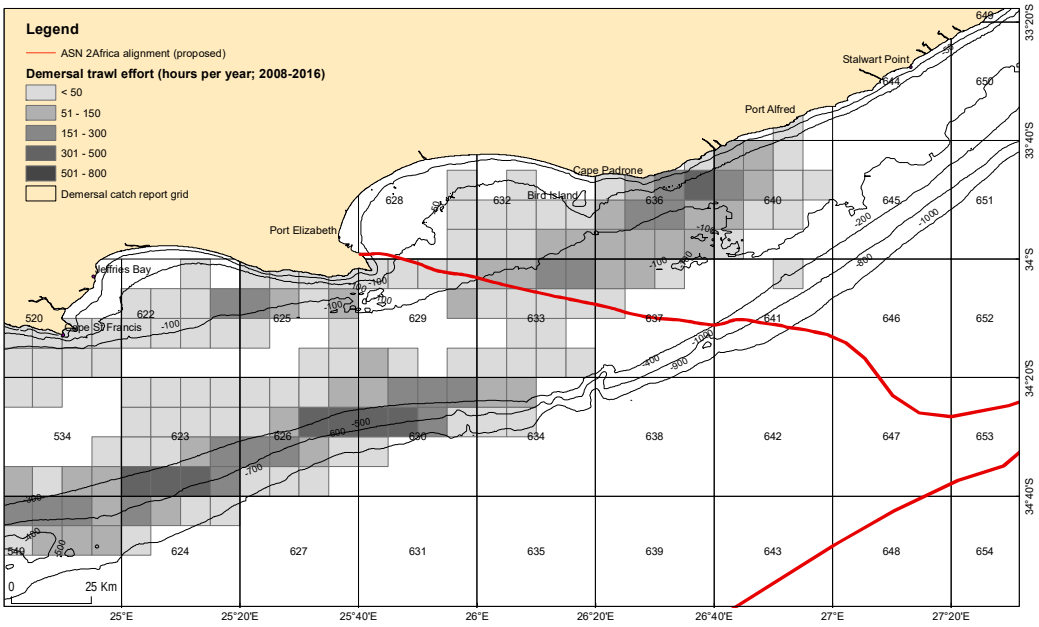


Figure 22b Spatial distribution of fishing effort expended by the demersal trawl sector in relation to the proposed 2AFRICA/GERA (East) cable landing at Gqeberha. Fishing effort is shown hours of trawling effort over the period 2008 to 2016. (*Source - Capmarine, 2021*)

6.1.5.2 Mid-Water Trawl

This sector includes 6 vessels and 34 rights holders which target adult horse mackerel (*Trachurus capensis*) of which a total catch of 19,555 tons were landed in 2019. Mid-water trawl is defined as any net which can be dragged by a fishing vessel along any depth between the seabed and the surface of the sea without continuously touching the bottom. In practice, mid-water trawl gear does occasionally come into contact with the seafloor. Mid-water trawling gear configuration is similar to that of demersal trawlers, except that the net is manoeuvred vertically through the water column.

The fishery operates predominantly on the edge of the Agulhas Bank, where shoals are found in commercial abundance. Figure 23 shows the spatial extent of grounds fished by mid-water trawlers within the EEZ and Figure 24 shows effort expended in relation to the proposed Gqeberha cable landing. The fishery operates continuously throughout the year, with no clear seasonality.

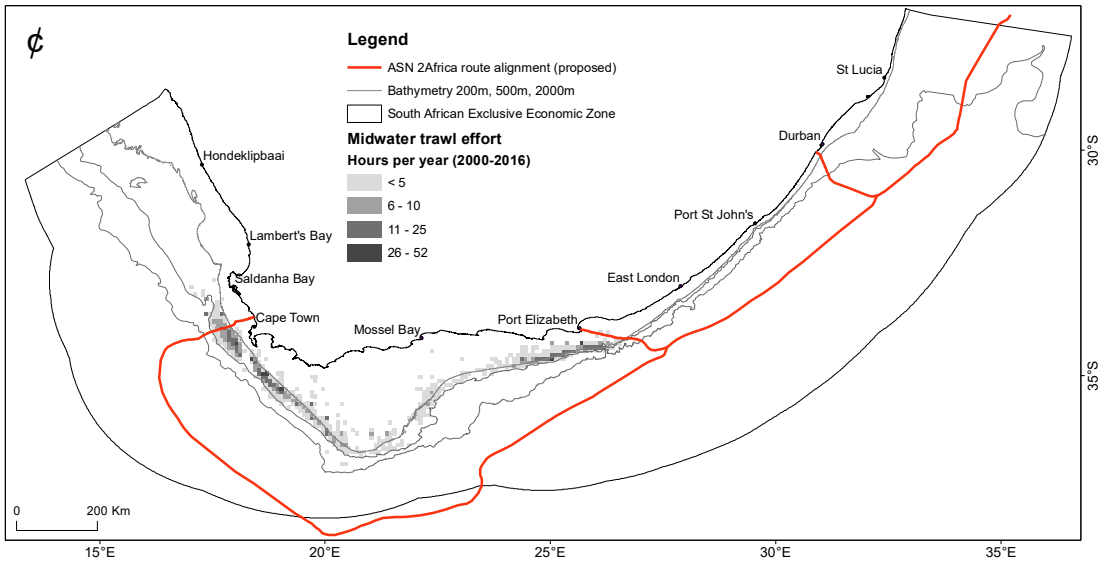


Figure 23 Overview of the spatial distribution of fishing effort expended by the mid-water trawl sector targeting horse mackerel within the South African EEZ and in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (*Source - Capmarine, 2021*)

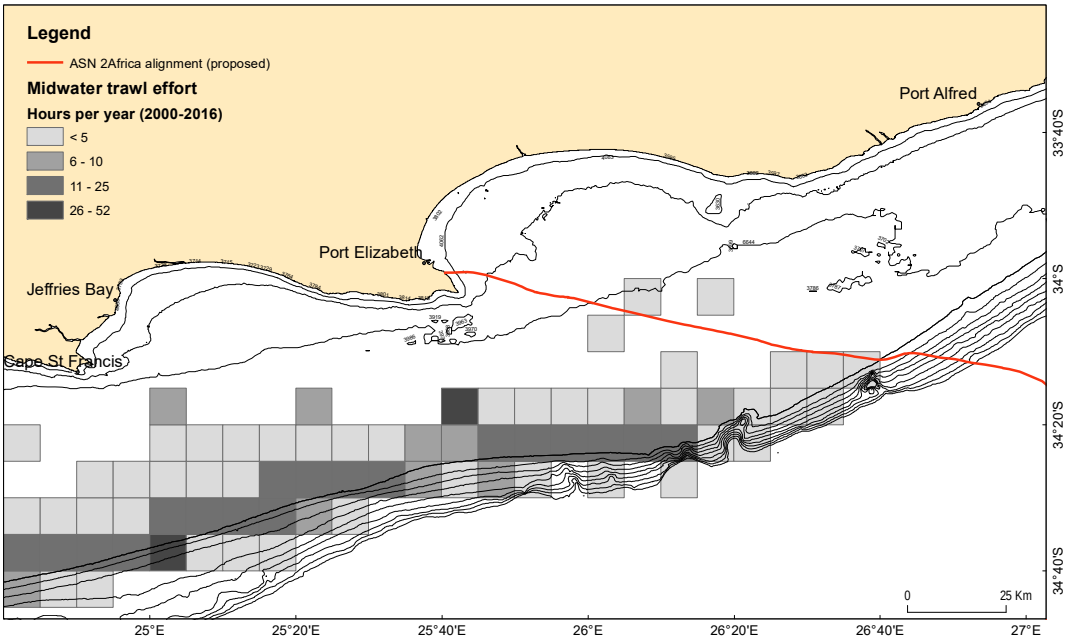


Figure 24 Spatial distribution of fishing effort expended by the mid-water trawl sector in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). Effort is shown as the number of fishing hours at a gridded resolution of 5x 5 minutes (resolution of approximately 85 km²). (*Source - Capmarine, 2021*)

6.1.5.3 Demersal Longline

Like the demersal trawl fishery, the target species of the longline fishery is the Cape hakes, with a small non-targeted commercial by-catch that includes kingklip. Currently, 64 hake-directed vessels are active within the fishery, most of which operate from the harbours of Cape Town and Hout Bay. Fishing grounds are similar to those targeted by the hake-directed trawl fleet.

Figure 25 shows the spatial extent of demersal longline grounds within the South African EEZ and Figure 26 shows the amount of fishing effort in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). **Demersal longline grounds do not coincide with the proposed routing.** Records from 2000 to 2019 indicate that the closest activity is situated at least 30 km from the routing.

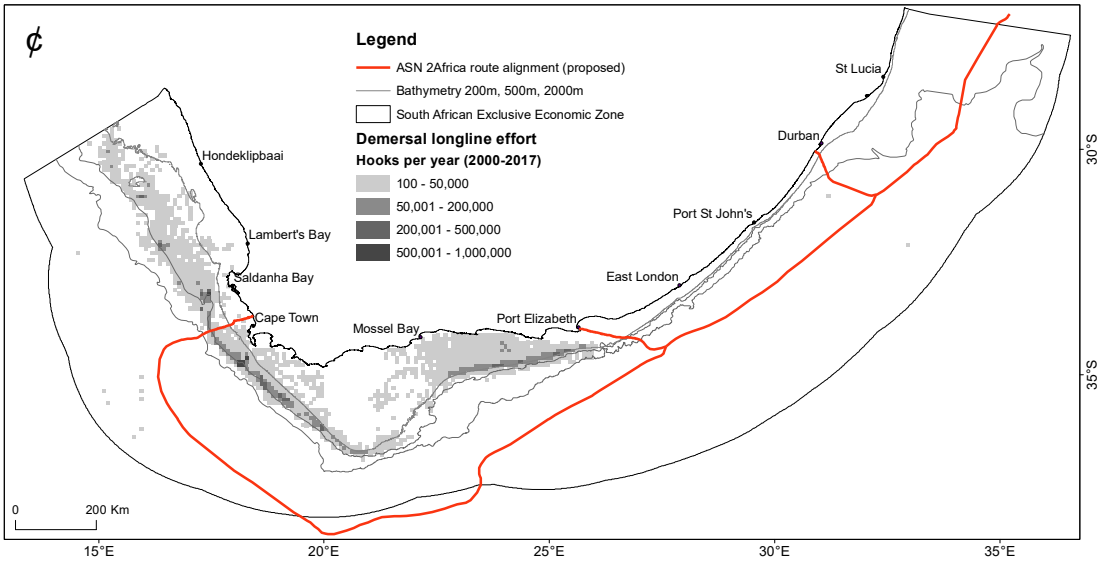


Figure 25 **An overview of the spatial distribution of fishing effort expended within the South African EEZ by the demersal longline sector and in relation to the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (*Source - Capmarine, 2021*)**

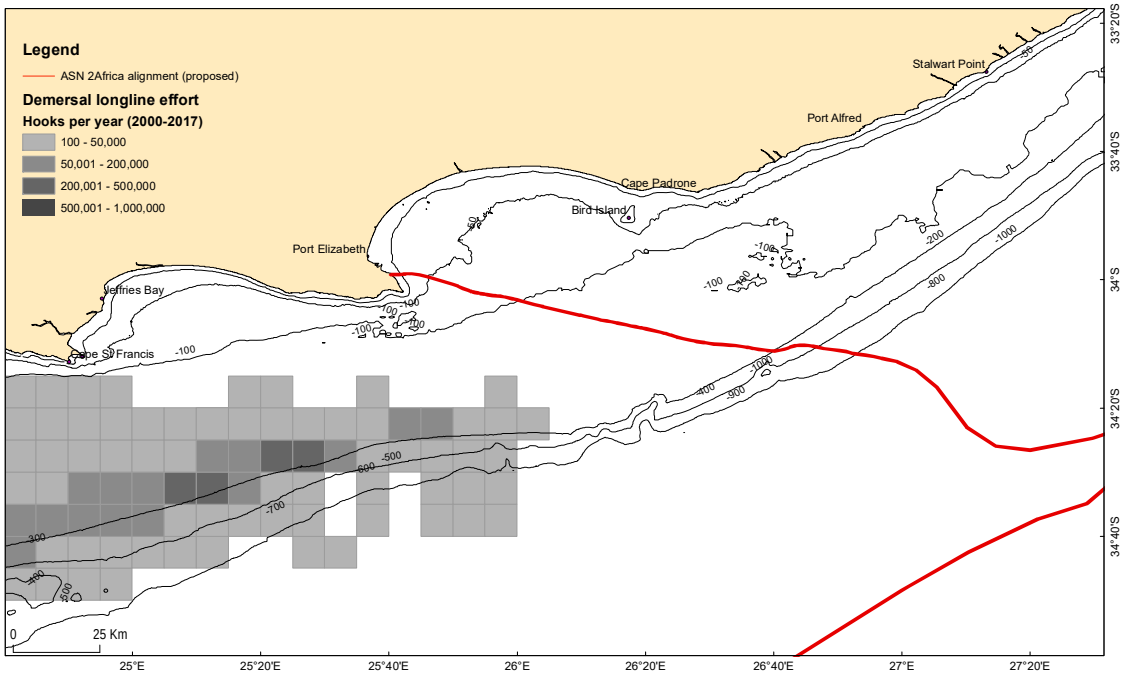


Figure 26 **Spatial distribution of fishing effort expended by the longline sector targeting demersal fish species in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). Effort is shown as the number of hooks set at a gridded resolution of 5x 5 minutes (each grid block covers an area of approximately 85 km^2). (*Source - Capmarine, 2021*)**

6.1.5.4 Small Pelagic Purse-Seine

The pelagic-directed purse-seine fishery targeting pilchard (*Sardinops sagax)*, anchovy (*Engraulis encrasicolus*) and red-eye round herring (*Etrumeus whitheadi*) is the largest South African fishery by volume (tons landed) and the second most important in terms of economic value. The targeted species are surface-shoaling and once a shoal has been located the vessel will steam around it and encircle it with a large net, extending to a depth of 60 m to 90 m. It is important to note that after the net is deployed, the vessel has no ability to manoeuvre until the net has been fully recovered on board and this may take up to 1.5 hours. The majority of the fleet operate from St Helena Bay, Laaiplek, Saldanha Bay and Hout Bay with fewer vessels operating on the South Coast from the harbours of Gansbaai, Mossel Bay and Port Elizabeth.

The abundance and distribution of small pelagic species fluctuates considerably in accordance with the upwelling ecosystem in which they exist. Fish are targeted in inshore waters, primarily along the West and South Coasts of the Western Cape and the Eastern Cape coast, up to a maximum offshore distance of about 100 km.

Figure 27 shows the spatial extent of fishing grounds within the South African EEZ and Figure 28 shows fishing grounds in relation to the proposed cable route landing at Gqeberha.

Fishing activity may occur across the proposed routing at a seafloor depth range of up to 200 m; however, the majority of fishing effort is centred inshore of the 100 m depth contour. The proposed cable routing passes through six reporting grid blocks, the combined landings recorded within these blocks amounted to 0.9% (3788 tons) of the total landings recorded by the fishery and 1.7% (190 throws) of the overall effort expended by the fishery (CAPmarine, 2021- Appendix B).

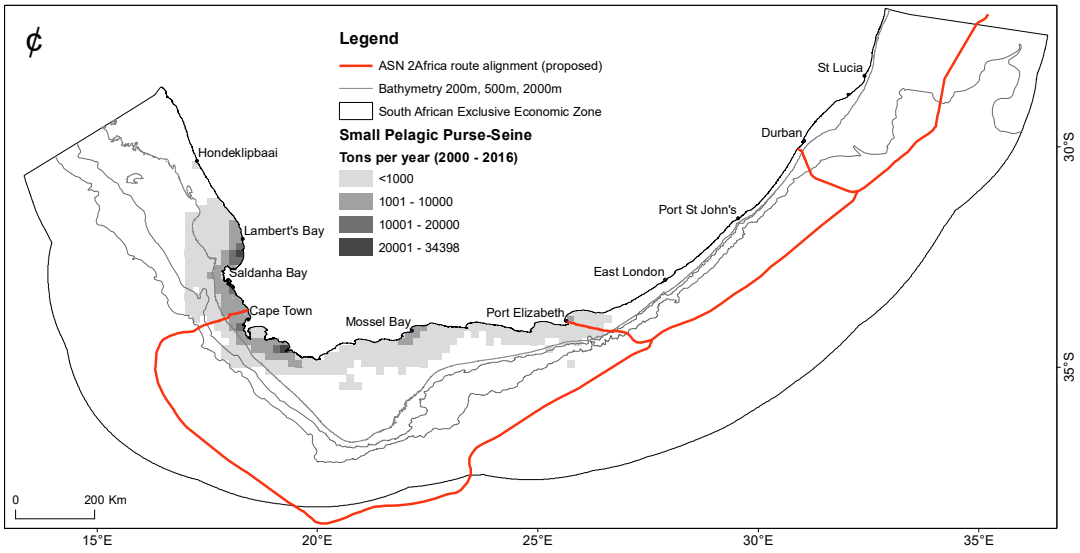


Figure 27 An overview of the spatial distribution of catch reported by the purse-seine sector targeting small pelagic species in the South African EEZ and in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (*Source - Capmarine, 2021*)

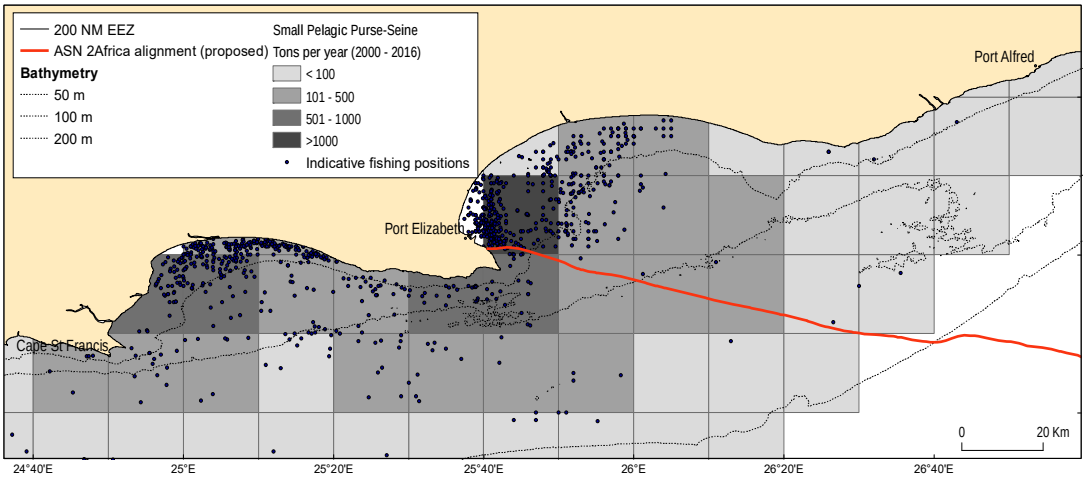


Figure 28 Spatial distribution of catch landed by the purse-seine sector targeting small pelagic species in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). Catch is shown in tons per year at a gridded resolution of 10x 10 minutes. (*Source - Capmarine, 2021*)

6.1.5.5 Large Pelagic Longline

Highly migratory tuna and tuna-like species are caught on the high seas and seasonally within the South African EEZ by the pelagic longline and pole fisheries. Targeted species include albacore (*Thunnus alalunga*), bigeye tuna (*T. obesus*), yellowfin tuna (*T. albacares*) and swordfish (*Xiphias gladius*). The total number of active long-line vessels within South African

waters is 22, 18 of which fished in the Atlantic (West of 20°E) during 2017. These were exclusively domestic vessels, with three Japanese vessels fishing exclusively in the Indian Ocean (East of 20°E) during 2017. Gear consists of monofilament mainlines of between 25 km and 100 km in length which are suspended from surface buoys and marked at each end. As gear floats close to the water surface it would present a potential obstruction to surface navigation as well as a snagging risk to the gear array towed by the seismic survey vessel. Lines are usually set at night, and may be left drifting for a considerable length of time before retrieval, which is done by means of a powered hauler at a speed of approximately one knot. During hauling, vessel manoeuvrability is severely restricted. In the event of an emergency, the line may be dropped and hauled in at a later stage.

The fishery operates extensively within the South African EEZ, primarily along the continental shelf break and further offshore. Fishing effort within the South African EEZ and in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) is shown in Figure 29 and Figure 30 respectively. Fishing activity can be expected offshore of the 200 m depth contour, where lines are set and drift with surface currents in a south-westerly direction.

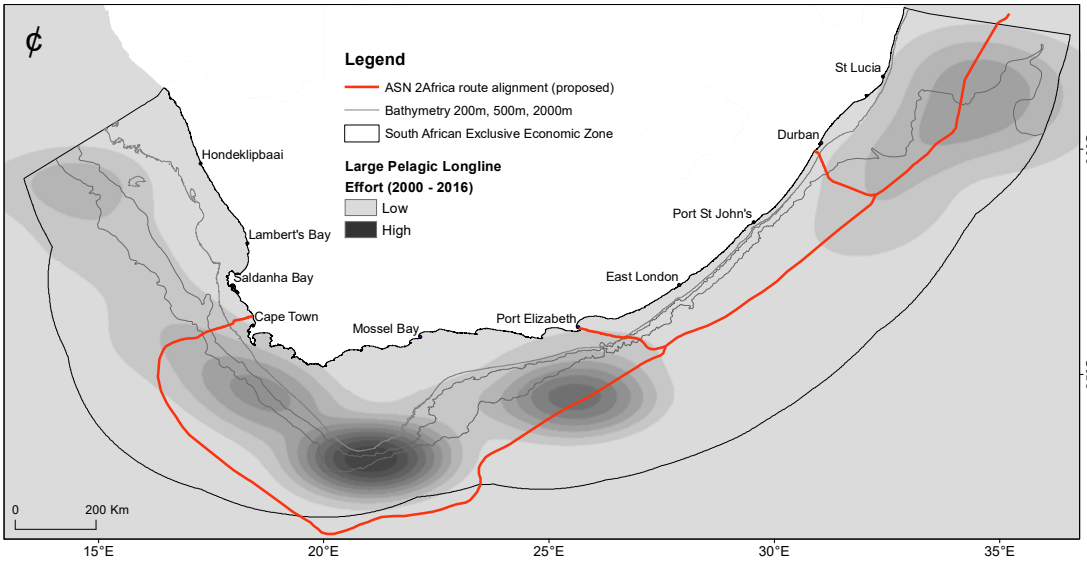


Figure 29 An overview of the spatial distribution of fishing effort expended by the longline sector targeting large pelagic fish species in the South African EEZ and in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

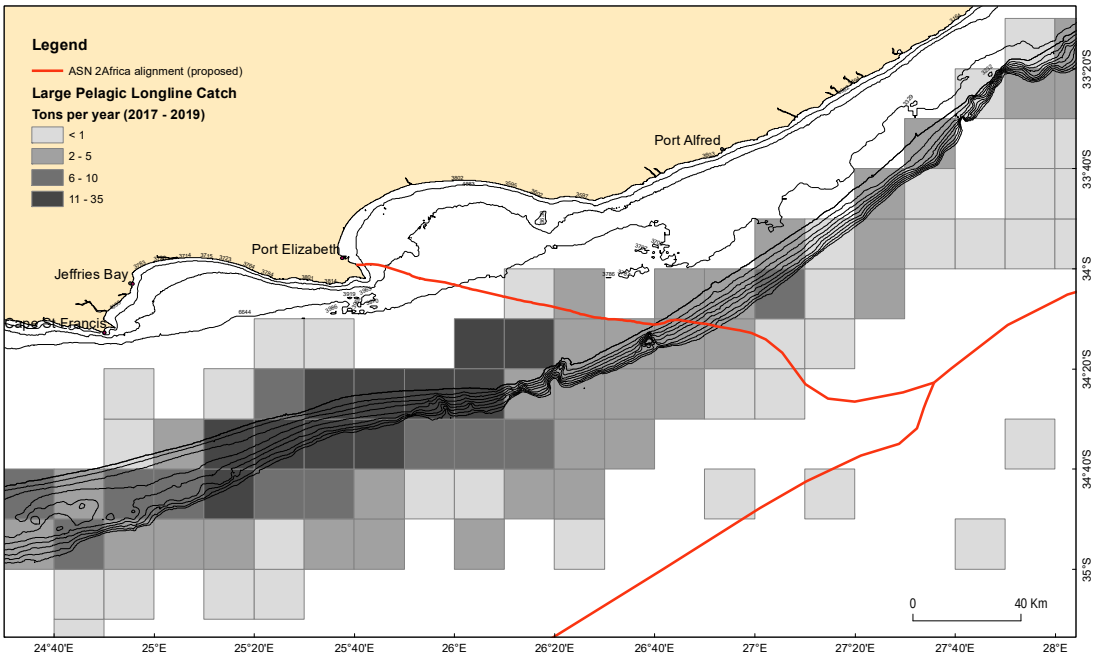


Figure 30 Spatial distribution of fishing effort expended by the long-line sector targeting large pelagic fish species in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (*Source - Capmarine, 2021*)

6.1.5.6 Traditional Linefish

The traditional line fishery is the country's third most important fishery in terms of tonnage landed and economic value. It is a long-standing, nearshore fishery based on a large assemblage of different species using hook and line but excludes the use of longlines. Within the Western Cape the predominant catch species is snoek (*Thyrsites atun*), while other species such as Cape bream (hottentot) (*Pachymetopon blochii*), geelbek (*Atractoscion aequidens*), kob (*Argyrosomus japonicus*), and yellowtail (*Seriola lalandi*) are also important. Towards the East Coast the number of catch species increases and includes resident reef fish (*Sparidae* and *Serranidae*), pelagic migrants (*Carangidae* and *Scombridae*) and demersal migrants (*Sciaenidae* and *Sparidae*).

The traditional line fishery is a boat-based activity and has since December 2000 consisted of 3450 crew operating from 455 commercial vessels. DFFE proposed an increase in the apportionment of TAE to small-scale fishing from 13% to 50% commencing in 2021 in order to boost economic possibilities for coastal communities.

Crew use hand line or rod-and-reel to target approximately 200 species of marine fish along the full 3 000 km coastline, of which 50 species may be regarded as economically important. Most of the catch (up to 95%) is landed by the Cape commercial fishery, which operates on the continental shelf from the Namibian border on the West Coast to the Kei River in the Eastern Cape. Figure 31 shows the spatial extent of traditional linefish grounds at a national scale and Figure 32 shows linefish catch in relation to the proposed cable routing at Gqeberha[19].

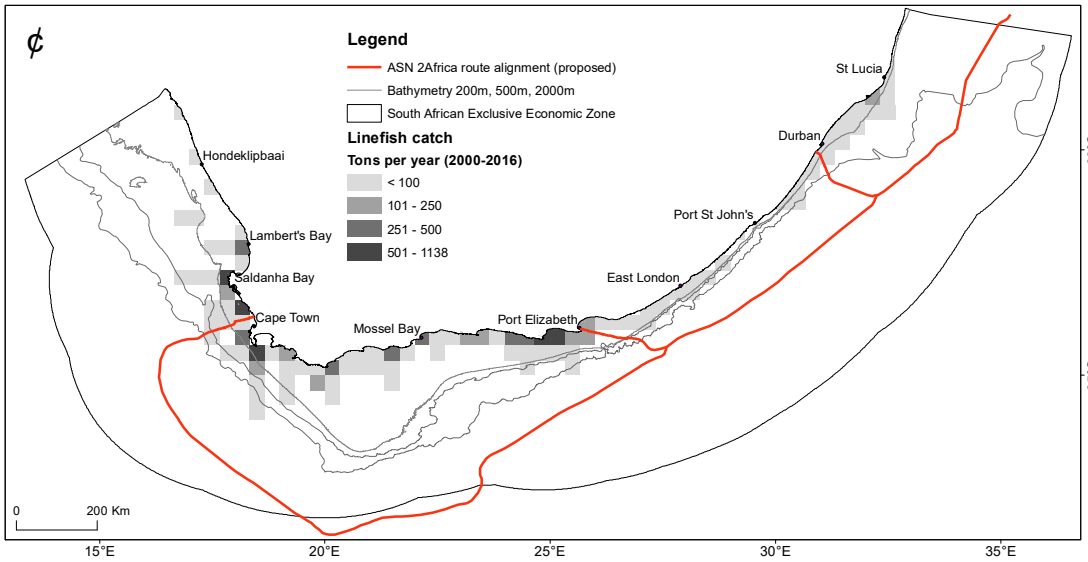


Figure 31 An overview of the spatial distribution of catch taken by the line-fish sector in the South African EEZ and in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (*Source - Capmarine, 2021*)

[19] Spatial mapping of effort and catches in the line fishery is less accurate than in other sectors because of the reporting structure implemented by DFFE. Fishing locations are described by skippers in relation to numbered sections along the coast and estimated distance offshore. No bearings are given, and no GPS data are recorded. Furthermore, due to the large number of vessels, associated reporting complexities and also the unwillingness of local fisherman to share fishing locations, inaccuracies in the spatial representation are to be expected. This fishery's operational footprint may at times be limited by operating costs and is sensitive to local reports of fish availability.

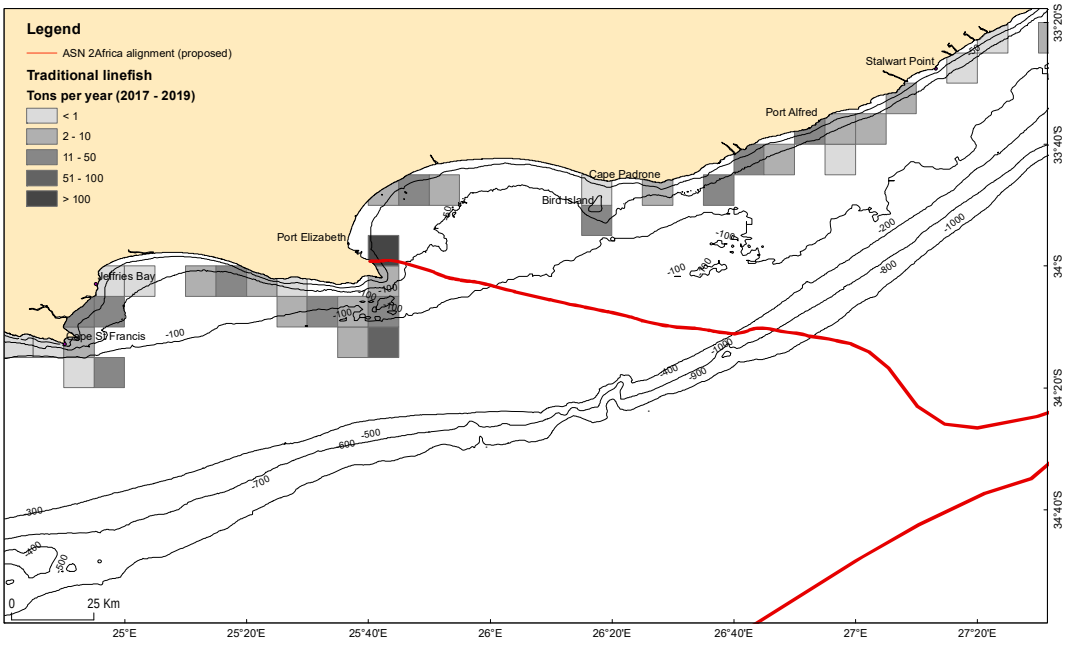


Figure 32 Spatial distribution of catch (2017 – 2019) by the linefish sector in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (*Source - Capmarine, 2021*)

6.1.5.7 South Coast Rock Lobster

The South Coast rock lobster fishery is a deep-water long-line trap fishery. Barrel-shaped plastic traps are set for periods ranging from 24 hours to several days. Each vessel typically hauls and resets approximately 2 000 traps per day in sets of 100 to 200 traps per line. They will set between ten lines and 16 lines per day, each of which may be up to 2 km in length. Each line is weighted to lie along the seafloor and will be connected at each end to a marker buoy at the sea surface. Vessels are large, ranging from 30 m to 60 m in length. Those that have on-board freezing capacity will remain at sea for up to 40 days per trip, while those retaining live catch will remain at sea between seven and 10 days before discharging at port. The fishery operates year-round with comparatively low activity during October. There are currently seven vessels operating within the fishery which landed a total lobster tail weight of 340 t in 2018. During the 2018/19 season, eight vessels were active in the fishery.

South Coast Rock Lobster (*Palinurus gilchristi*) occurs on the continental shelf of the South Coast between depths of 50 m and 200 m. The stock is fished in commercially viable quantities in two areas off the South Coast, the first is on the Agulhas Bank approximately 200 km offshore and the second is within 50 km of the shoreline between Mossel Bay and East London.

Figure 33 shows the spatial distribution of fishing grounds on a national scale and Figure 34 shows grounds in the vicinity of the proposed cable routing. The routing passes through seven fishing grid blocks which, over the period 2007 to 2016 yielded 19 tons (5.6% of the total landings for the sector). An average of 106,000 traps per year were set within these blocks which is equivalent to 4.4% of the overall effort expended by the fishery. A 500 m safety/exclusion zone would cover 80 km^2 of lobster fishing grounds (CAPMarine, 2021-Appendix B).

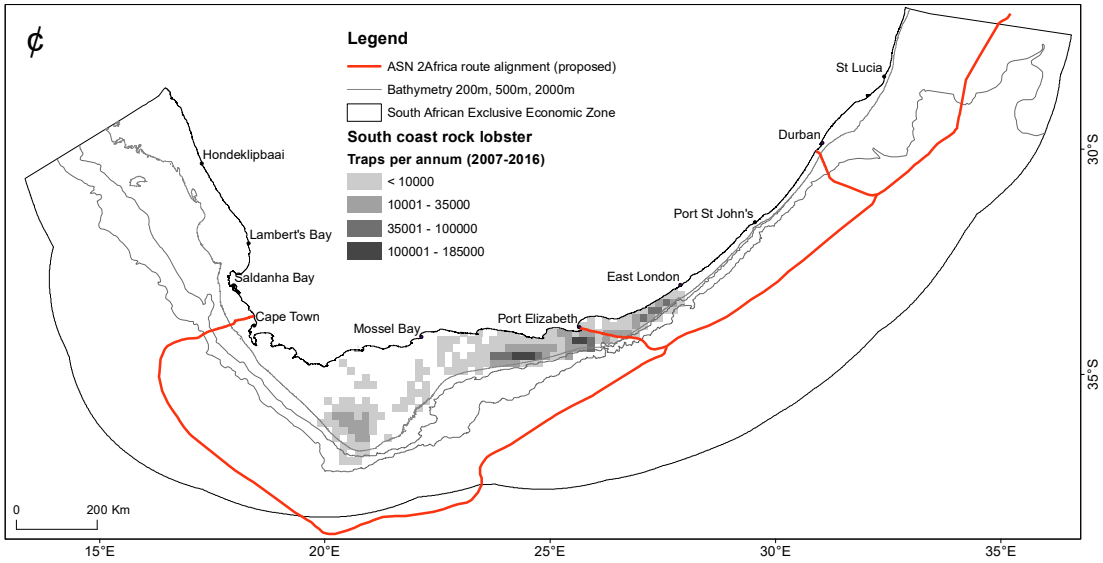


Figure 33 **Overview of spatial distribution of fishing effort expended by the trap fishery targeting South Coast rock lobster within the South African EEZ and in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (Source - Capmarine, 2021)**

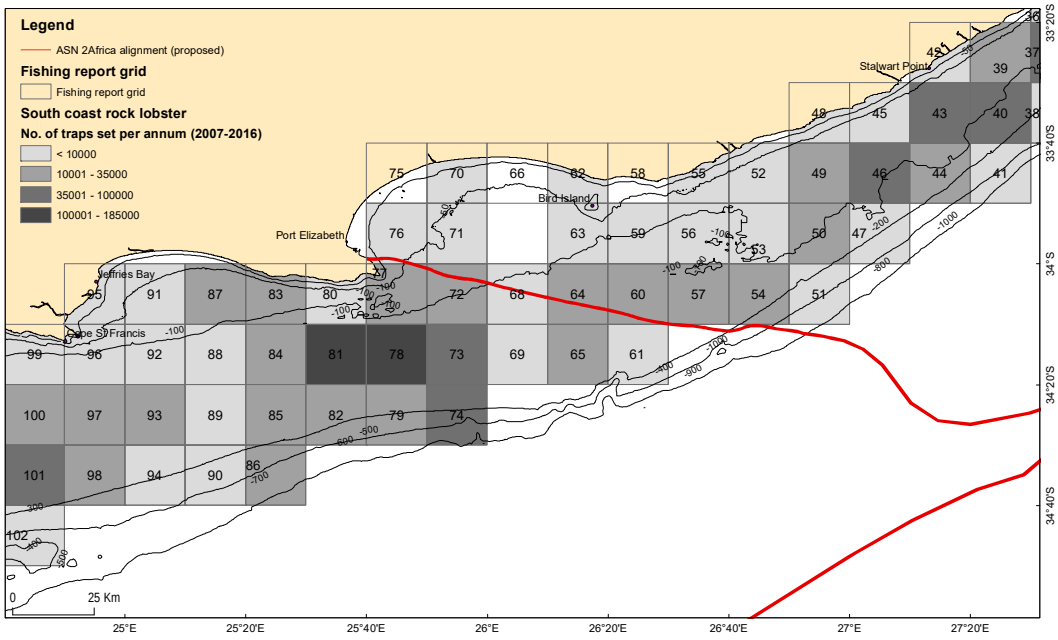


Figure 34 **Spatial distribution of effort expended by the south coast rock lobster trap fishery in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (Source - Capmarine, 2021)**

6.1.5.8 Squid Jig

Chokka squid (*Loligo vulgaris reynaudii*) is distributed from the border of Namibia to the Wild Coast. It occurs extensively on the Agulhas Bank out to the shelf edge, increasing in abundance towards the eastern boundary of the South Coast, especially between Plettenberg Bay and Algoa Bay. Along the South Coast adult squid is targeted in spawning aggregations on shallow-water fishing grounds extending from Plettenberg Bay to Port Alfred between 20 m and 130 m depths. The most important spawning grounds are between Plettenberg Bay and Algoa Bay, these having been linked to specific spawning habitat requirements. The method of fishing involves hand-held jigs and bright lights which are used to attract squid at night. Vessels predominantly operate out of Cape St Francis and Port Elizabeth harbours. This fishery has various closed seasons during the year (mostly April-June). According to Mr Andrew Kaye (I&AP involved in the industry) the most critical period for the industry is from end November to end February, which is when 50% of the squid is landed. In October/ November the squid larvae beds are spawned- these are found mainly from Port Alfred to below Port St Francis and can be as low as Plettenberg Bay.

The spatial distribution of squid jig fishing grounds is shown in Figure 35 and catch in the vicinity of the proposed cable routing is shown in Figure 36. The routing coincides with squid fishing grounds between the coastline and the 100 m depth contour where, over the period 2012 to 2020, catches of 633 tons of squid were reported by the sector. This is equivalent to 8.9% of the total landings of the sector (CAPMarine, 2021- Appendix B).

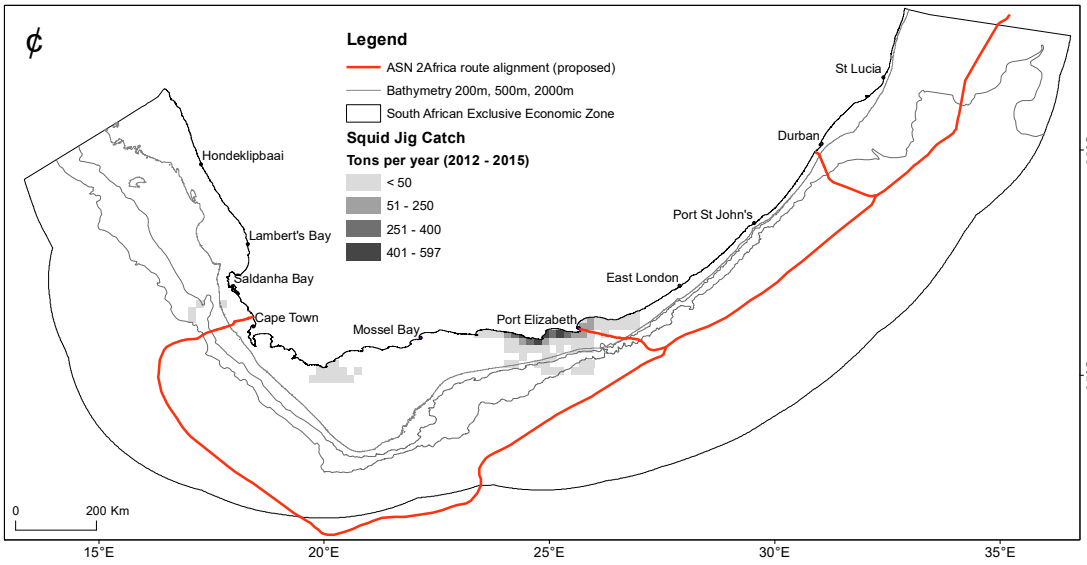


Figure 35 Overview of spatial distribution of effort expended by the squid jig fishery within the South African EEZ and in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (Source - Capmarine, 2021)

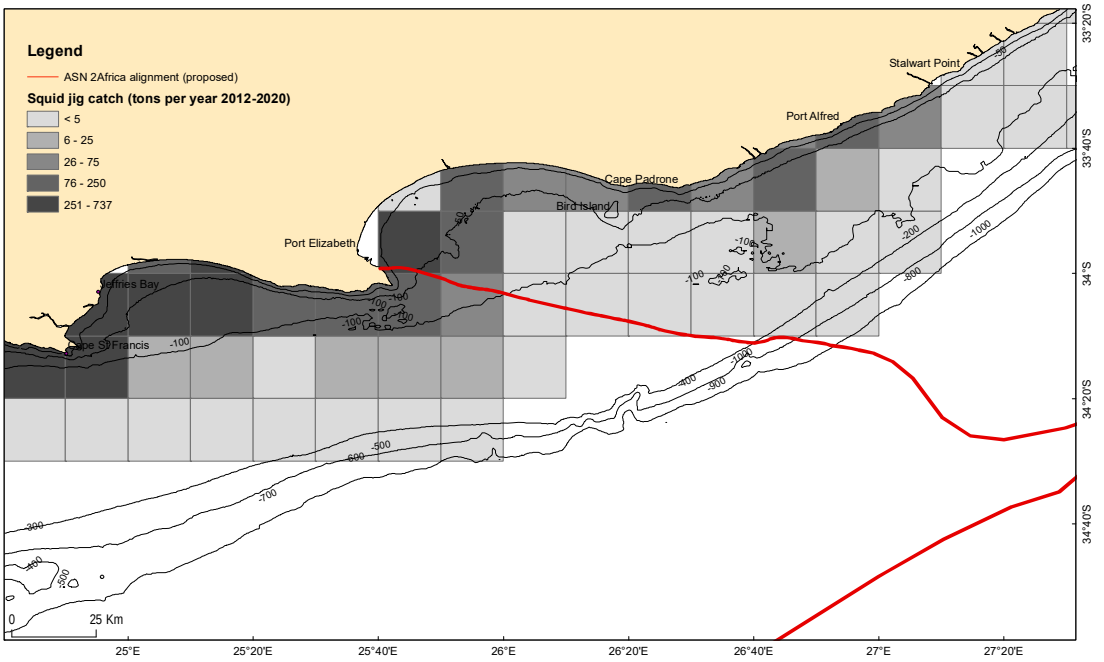


Figure 36 Spatial distribution of catch reported by the squid jig sector in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (Source - Capmarine, 2021)

6.1.5.9 Small-Scale Fisheries

The term “small-scale” is usually used to distinguish between capital intensive commercial fisheries and low technology, labour intensive fishing activities. Small-scale fishers fish to meet food and basic livelihood needs, and may also directly be involved in fishing for commercial purposes. These fishers traditionally operate on nearshore fishing grounds, using traditional, low technology or passive fishing gear to harvest marine living resources on a full-time, part-time or seasonal basis. Fishing trips are usually of short-duration and fishing/harvesting techniques are labour intensive[20].

Small-scale fishers are an integral part of the rural and coastal communities in which they reside, and this is reflected in the socio-economic profile of such communities. In the Eastern Cape, KwaZulu-Natal and the Northern Cape, small scale fishers live predominantly in rural areas while those in the Western Cape live mainly in urban areas. A small-scale fishing right is the right to catch different species of fish in the near shore. These rights are allocated to communities and not to individuals. More than 270 communities have registered an Expression of Interest with the Department. The location of these coastal communities and the number of fishers per community are shown in Figure 37.

[20] The equipment used by small scale fishers includes rowing boats in some areas, motorized boats on the south and west coast and simple fishing gear including hands, feet, screw drivers, hand lines, prawn pumps, rods with reels, gaffs, hoop nets, gill nets, seine/trek nets and semi-permanently fixed kraal traps.

Approximately 10,000 small-scale fishers have been identified along the entire coast. Of these, there are 261 small-scale fishers registered in the local municipalities of Nelson Mandela Bay and Koukamma, these being the communities closest to Gqeberha. The small-scale fishery rights cover the nearshore area (defined in section 19 of the MLRA as being within close proximity of the shoreline). In practice these are unlikely to extend beyond 3 nm from the coast.

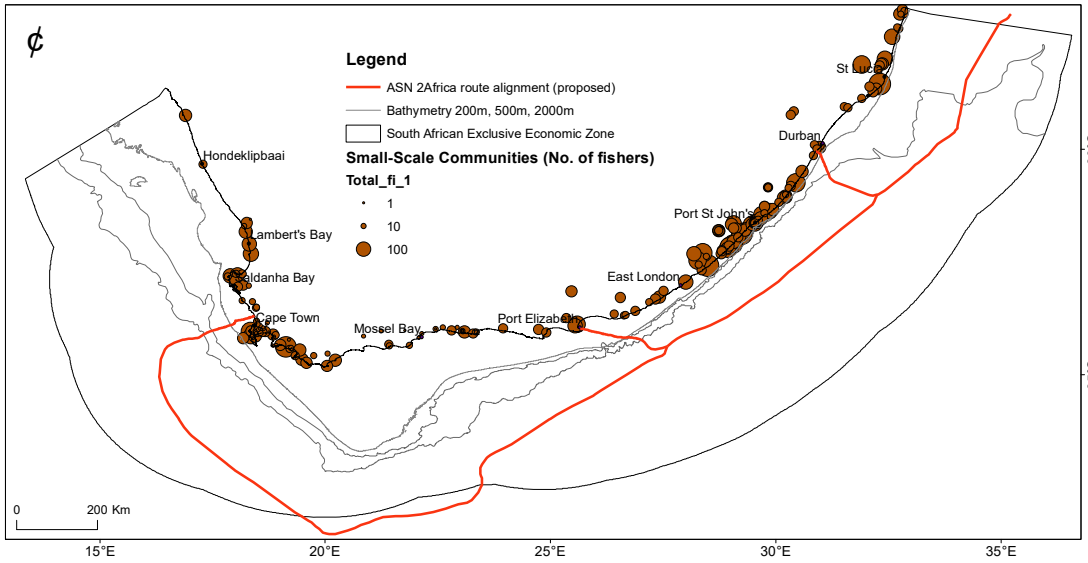


Figure 37 Overview of spatial distribution of small-scale fishing communities and number of participants per community along the South African coastline and in relation the proposed 2AFRICA/GERA (East) Submarine Cable System (*Source - Capmarine, 2021*)

6.1.6 Offshore research survey activities

Swept-area trawl surveys of demersal fish resources are carried out twice a year by DFFE in order to assess stock abundance. Results from these surveys are used to set the annual TACs for demersal fisheries. First started in 1985, the West Coast survey extends from Cape Agulhas (20°E) to the Namibian maritime border and takes place over the duration of approximately one month during January. The survey of the Southeast coast (20°E – 27°E longitude) takes place in April/May. Following a stratified, random design, bottom trawls are conducted to assess the biomass, abundance and distribution of hake, horse mackerel, squid and other demersal trawl species on the shelf and upper slope of the South African coast. Trawl positions are randomly selected to cover specific depth strata that range from the coast to the 1 000 m isobath. Figure 38 shows the distribution of research trawls undertaken within the South African EEZ and Figure 39 shows research trawl effort in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing).

The biomass of small pelagic species is assessed bi-annually by an acoustic survey. The first of these surveys is timed to commence in mid-May and runs until mid-June while the second starts in mid-October and runs until mid-December. The timing of the demersal and acoustic surveys is not flexible, due to restrictions with availability of the research vessel as well as

scientific requirements. During these surveys the survey vessels travel pre-determined transects (perpendicular to bathymetric contours) running offshore from the coastline to approximately the 200 m isobath. The surveys are designed to cover an extensive area from the Orange River on the West Coast to Port Alfred on the East Coast and the DFFE survey vessel progresses systematically from the Northern border Southwards, around Cape Agulhas and on towards the east coast. Figure 40 shows the distribution of sampling stations around the coastline and the number times these stations were sampled between 1988 and 2013. Figure 41 shows the distribution of sampling stations and indicative survey transects in relation to the proposed cable routing to Gqeberha.

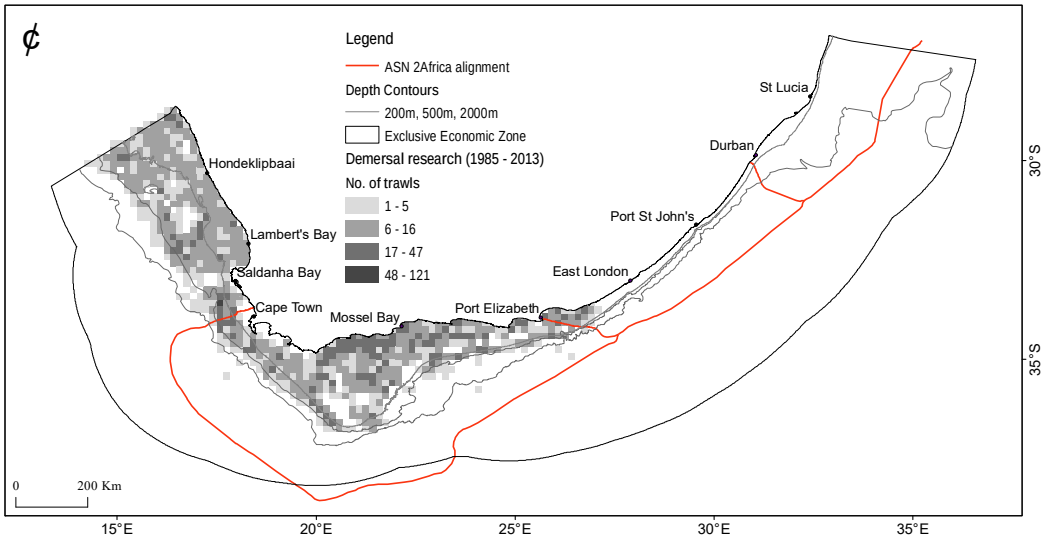


Figure 38 Spatial distribution of trawling effort expended during research surveys undertaken by DFFE to ascertain biomass of demersal fish stocks

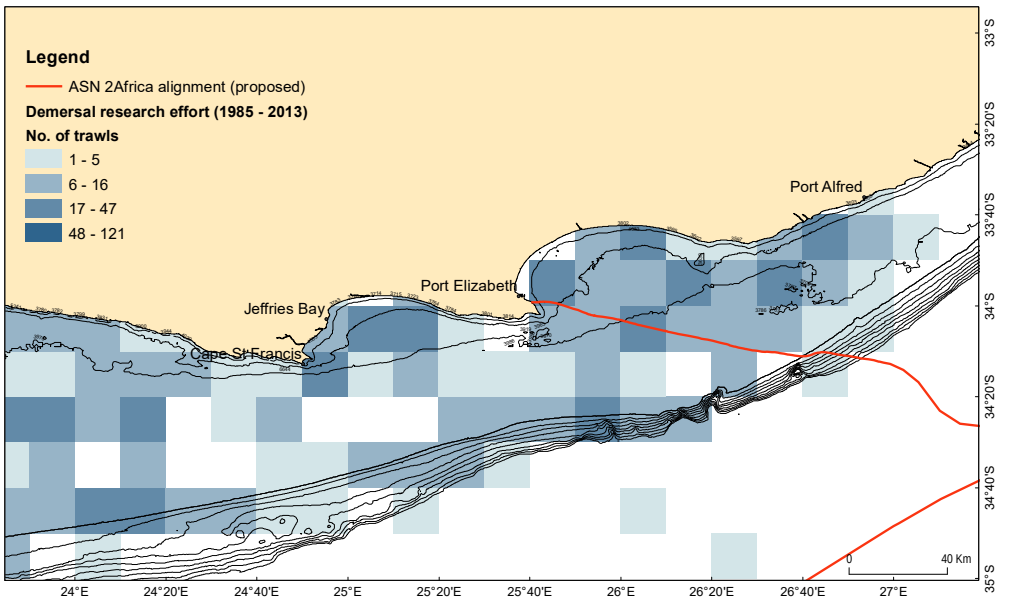


Figure 39 Spatial distribution of trawling effort expended during research surveys undertaken by DFFE to ascertain biomass of demersal fish species. Fishing grounds are shown in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

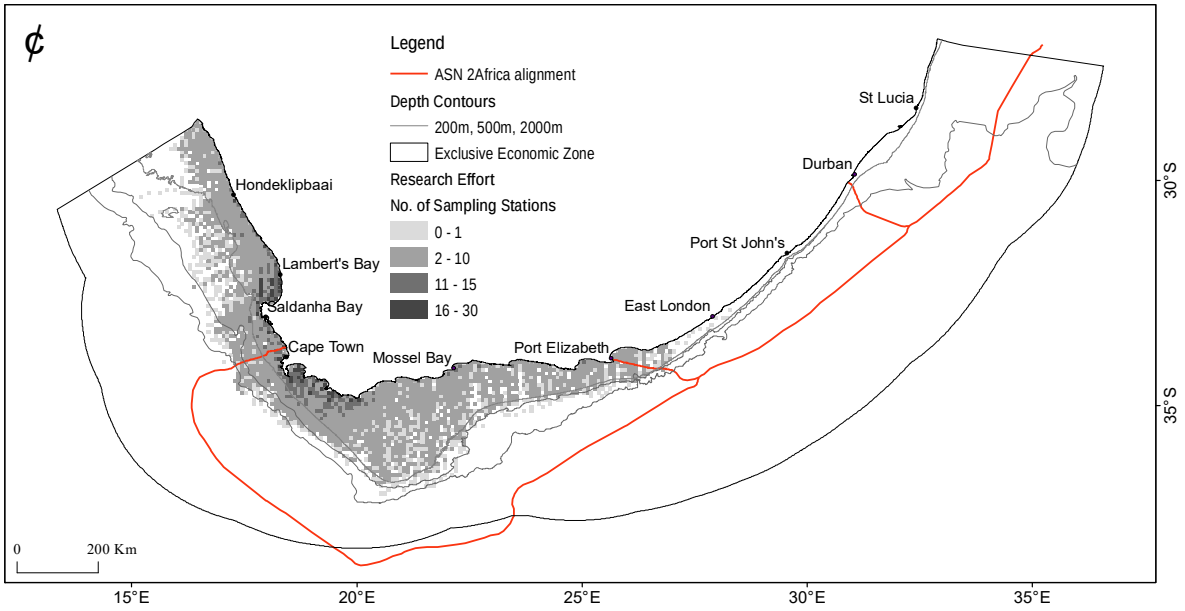


Figure 40 Spatial distribution sampling stations for acoustic surveys of the biomass of small pelagic species (1988 – 2013)

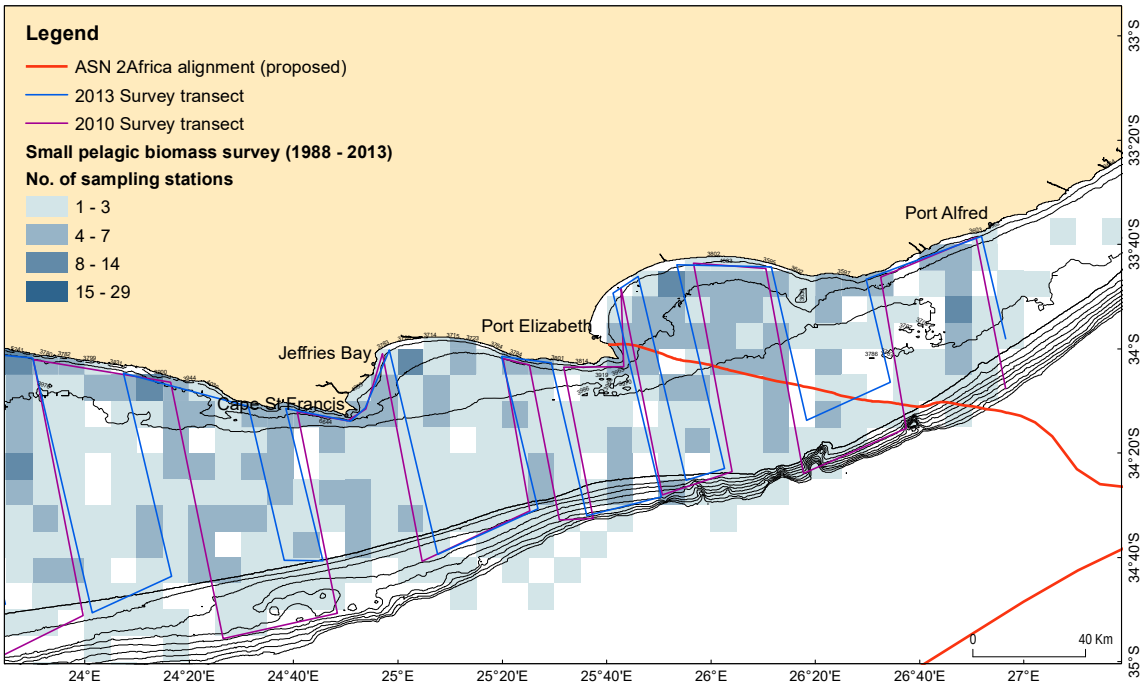


Figure 41 Spatial distribution sampling stations for acoustic surveys of the biomass of small pelagic species (1988 – 2013) and indicative survey transects in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

6.1.6.1 Summary of seasonality of catches for commercial fishing sectors

The seasonality of each of the main commercial fishing sectors that operate in the vicinity of the proposed branch cable routing to Gqeberha, is indicated in Table 9; also presented is the relative intensity of fishing effort on a month-by-month basis.

Table 9 Summary table showing seasonal variation in fishing effort in the vicinity of the project area

Sector	Fishing Intensity by Month H = High; M = Low to Moderate; N = None											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Demersal Trawl	H	H	H	H	M	M	M	M	M	H	H	H
Midwater Trawl	M	M	M	M	M	M	M	M	M	M	M	M
Small Pelagic Purse-Seine	M	H	H	H	H	H	H	H	H	H	H	M
Large Pelagic Longline	M	M	M	H	H	H	H	H	H	H	M	M
Traditional Linefish	H	M	M	M	M	M	M	M	M	M	M	H
South Coast Rock Lobster	H	H	H	H	H	M	M	M	M	H	H	H
Squid Jig	H	H	M	N	N	N	M	M	M	N	N	H
Small-scale	M	M	M	M	M	M	M	M	M	M	M	M
Demersal Research Survey (trawl)	M	N	N	N	M	M	N	N	M	M	N	N
Pelagic Research Survey (acoustic)	N	N	M	M	M	M	N	N	N	M	M	M

6.1.7 Recreational fishing

Recreational fishing along the shoreline by rock and surf anglers is concentrated along a relatively short stretch of coastline between Schoenmakerskop and Flat Rocks. The coast between Schoenmakerskop and Cape Recife is exposed to the open ocean and is characterized by jagged ridges of quartzitic sandstone running parallel to the shore, with numerous pools and gullies. Within Algoa Bay, from Cape Recife to Flat Rocks, the shore is sheltered and consists of a gently sloping rock platform of calcareous sandstone (ACER, 2021).

In addition to shore angling the recreational fishery also includes the offshore recreational fishery which generally use small boats (less than 10 m in length). The recreational fisheries are reported to catch over 250 marine species, although fewer than 5% of these are actively targeted by commercial fisheries, which comprise 90% of the landed catch. Common species encountered within these waters include Elf, Musselcracker, Blacktail and Bronze bream.

6.1.8 Offshore mining and exploration concessions holders

Approximately 98% of South Africa's EEZ is subject to a right or lease for offshore oil and gas exploration or production[21]. The Petroleum Agency South Africa (PASA) is responsible for the 'promotion and regulation of offshore exploration and production' and maintains a national database of petroleum exploration and production. Over the past decade (since 2006) this database has shown a rapid increase in the application and grant of offshore rights and leases. The South African government has also actively promoted offshore oil and gas exploration through Operation Phakisa, which seeks to support the rapid development of the offshore oil and gas sector by "*creating an environment that promotes exploration*".

The offshore O&G lease areas crossed by the marine cable (Gqeberha branch line) are New Age, OK Energy and Impact Africa (Figure 42). Exploration rights holders have been notified of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) during the environmental authorisation process and agreements are being drawn up with the O&G lease holders.

6.1.9 Offshore marine telecommunications and marine pipelines infrastructure

Available evidence suggests that there are no other cables landing in Algoa Bay. According to Fugro (2020) the proposed Gqeberha branch cable has no cable or pipeline crossings. The nearest cable to the proposed 2AFRICA/GERA (East) trunk cable is the SAFE cable (Figure 43).

[21] https://www.seafoodsource.com/news/environment-sustainability/proposed-oil-exploration-raises-concerns-from-south-africa's-fishing-industry.

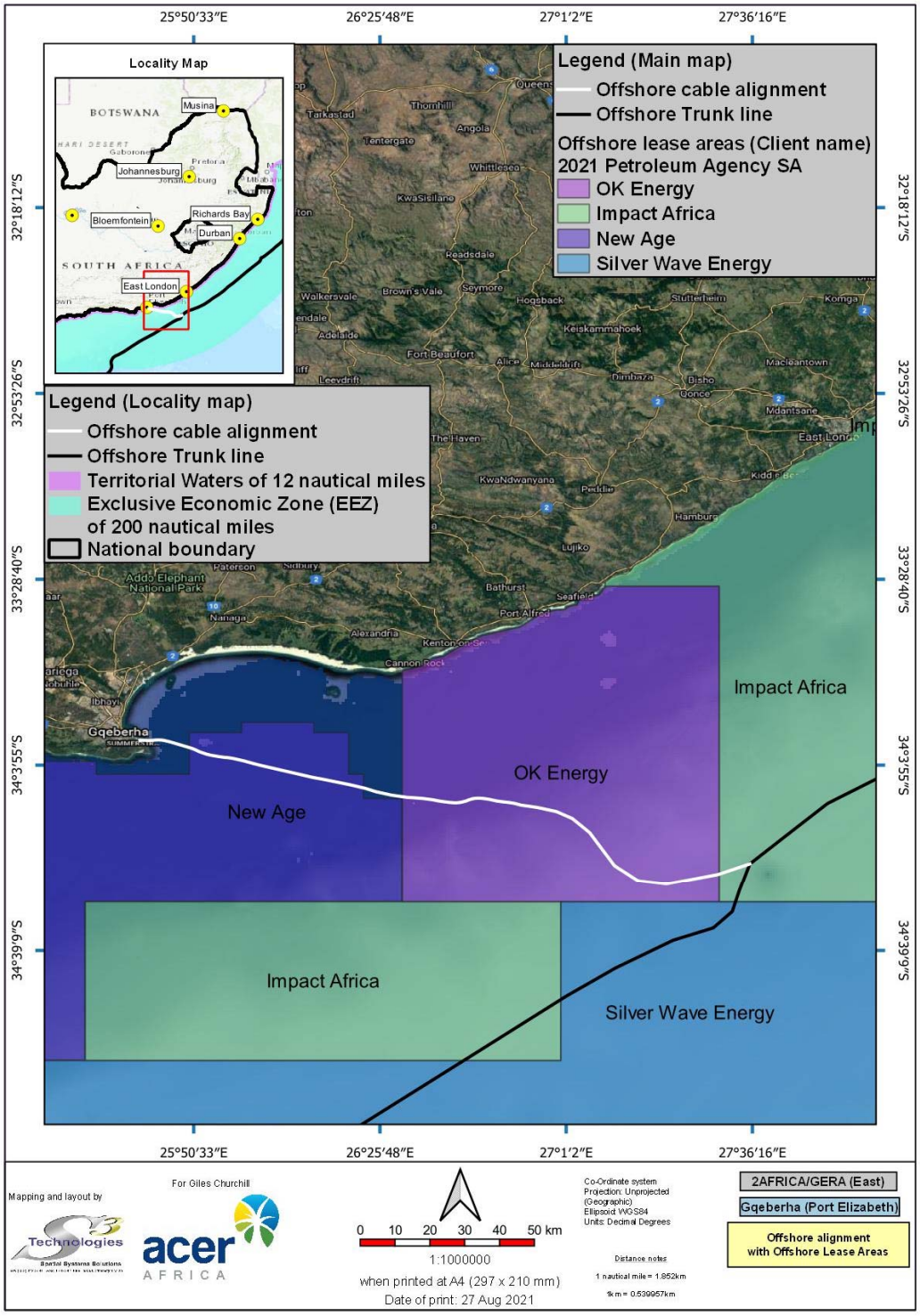


Figure 42 Offshore Oil and Gas lease areas in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

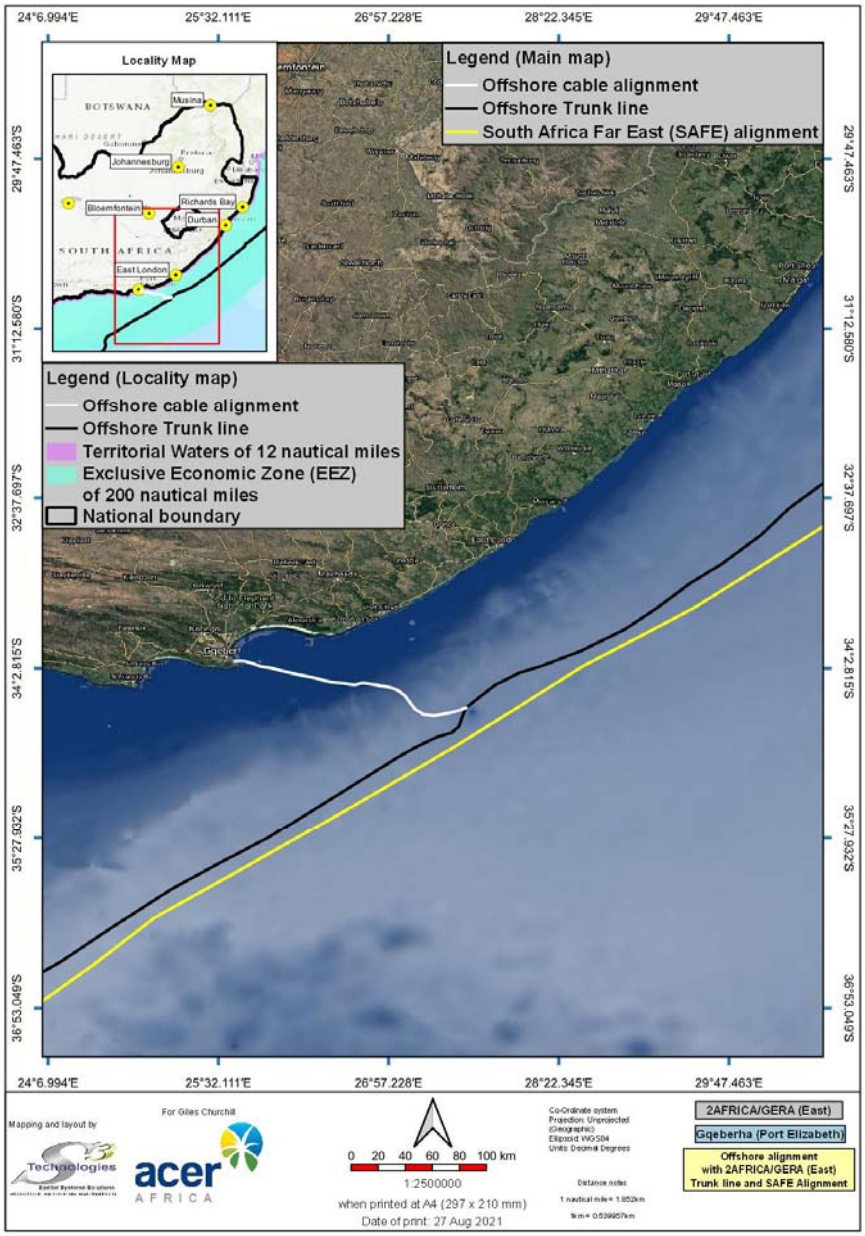


Figure 43 The Gqeberha branch cable of the 2AFRICA/GERA (East) Cable System in relation to other submarine cables along the southeast coast of South Africa

6.1.10 Shipping and ports

South Africa is positioned on a major shipping route and has 8 commercial ports and 44 non-commercial harbours (CSIR, 2016). A large number of vessels in transit navigate their way around the southern African subcontinent, including tankers, cargo, commercial and fishing vessels (Figure 44). Algoa Bay has two ports; the Port of Ngqura, also known as Coega, is situated 20 km northeast of the Port of Port Elizabeth (https://africaports.co.za). Figure 45 shows the anchor zones for ships in Algoa Bay in relation to the alignment of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing).

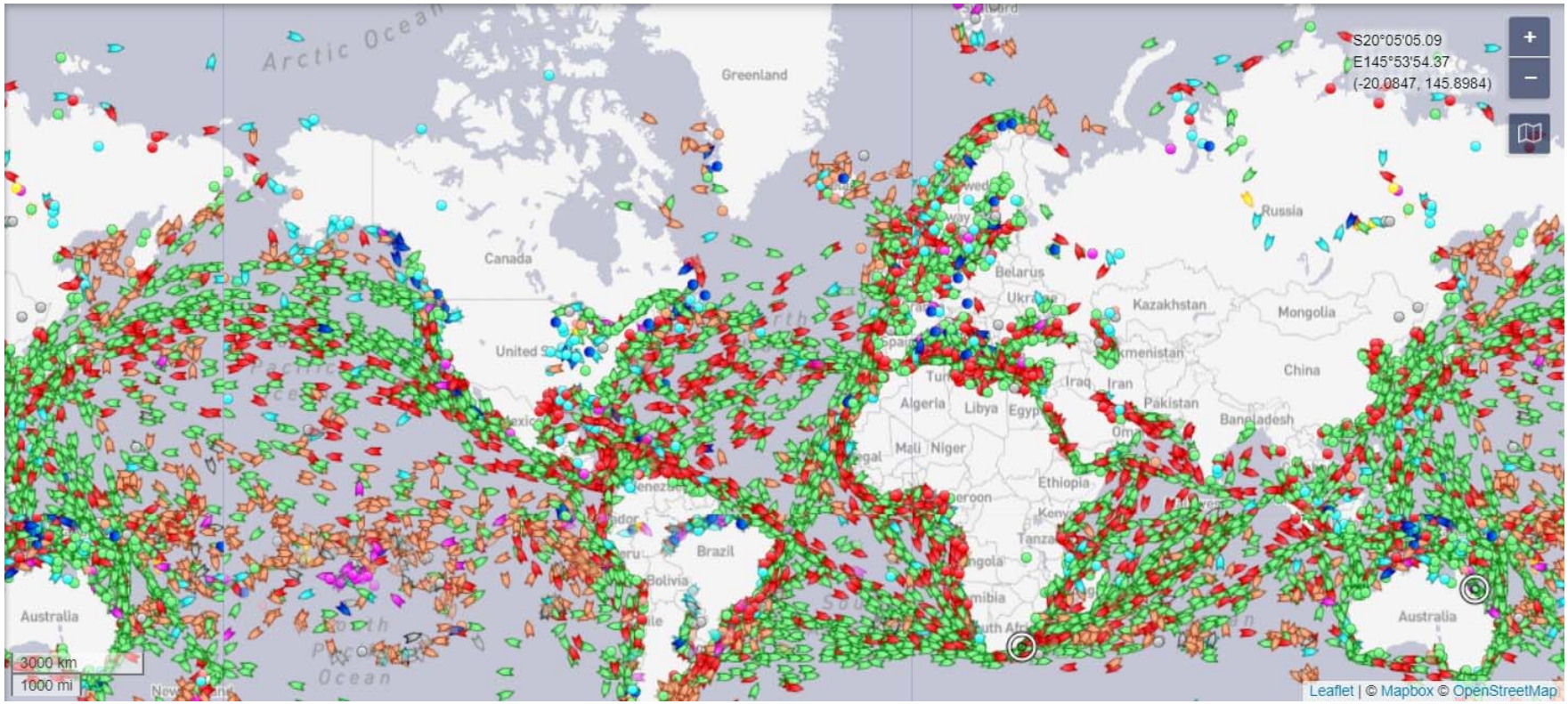


Figure 44 Screenshot of world marine traffic (live map 27 August 2021, source https://www.marinetraffic.com)

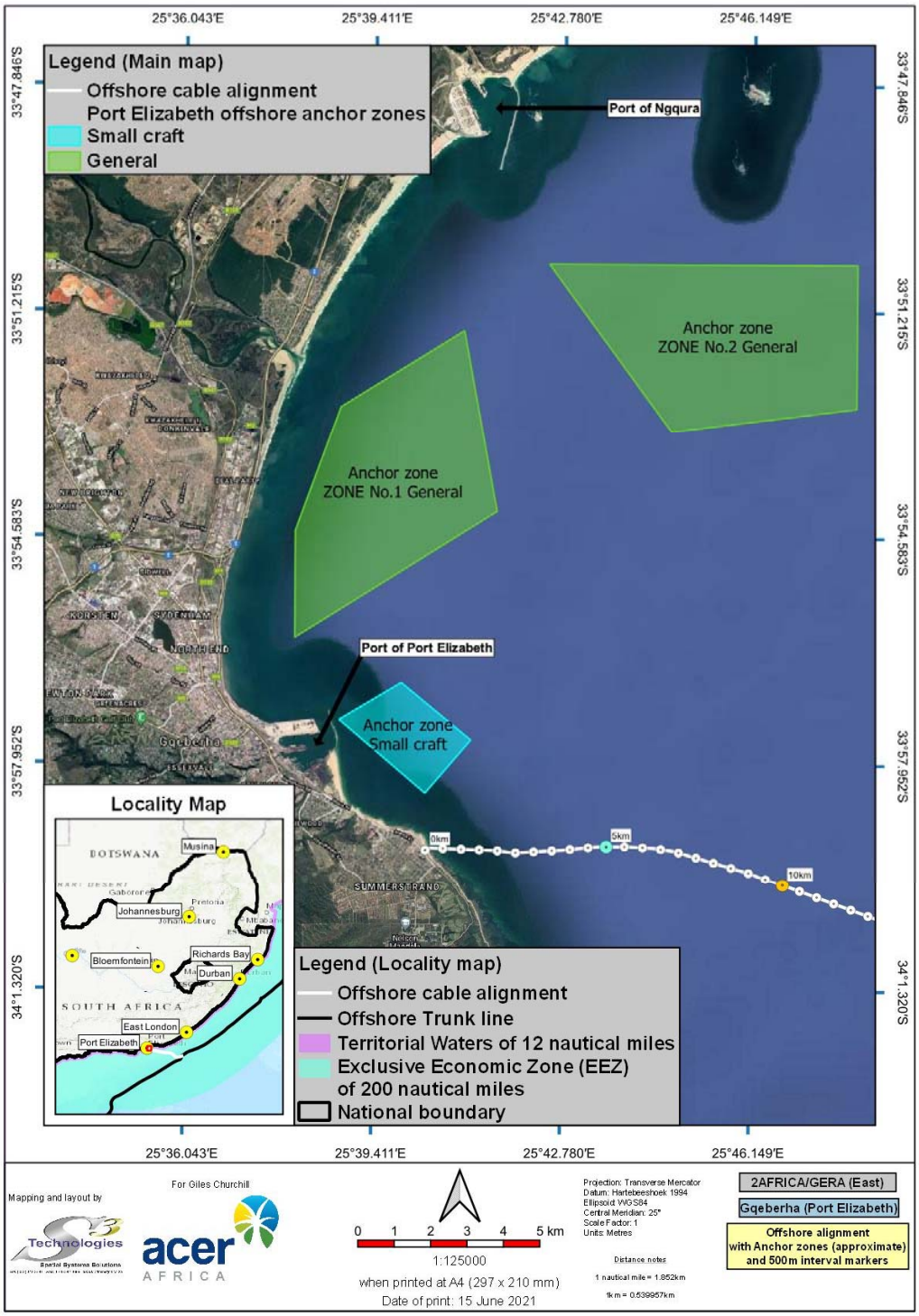


Figure 45 Anchor zones in Algoa Bay, in relation to the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (adapted from http://fishing-app.gpsnauticalcharts.com)

6.1.11 Offshore aquaculture

A number of mariculture activities are prevalent in Algoa Bay and at the Port Elizabeth harbour including the following:

- A private fish breeding facility at the harbour, producing only fish for bait purposes.
- A small oyster breeding station about 2 km from the harbour, maintained by the Nelson Mandela Metropolitan University (NMMU) for research purposes.

Aquaculture is one of the sectors that form part of Operation Phakisa under the Ocean's Economy in South Africa. Operation Phakisa is an initiative of the South African government which aims to implement priority economic and social programmes better, faster and more effectively (Anchor, 2019). Recently, environmental authorisation was granted for an offshore aquaculture site called the Algoa Bay Sea-Based Aquaculture Development Zone which has been identified as a possible site for bivalve and/or finfish culture (Algoa 1). The site measures approximately 312 ha in size and lies approximately 2 km offshore from the popular beaches of the southern suburbs of Gqeberha (King's Beach, Humewood Beach, Hobie Beach, and Pollock Beach). Findings from the studies conducted have identified Algoa 1 as a suitable site for bivalve culture and not finfish culture due to possible impacts on the receiving environment and potential economic losses in the tourism and water sports sectors of Gqeberha.

While the proposed alignment of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) will traverse the Algoa 1 Aquaculture Development Zone, it must be noted that the proposed cable alignment has been shifted as far south as possible, to the outer edge of the Zone, to minimise impacts (Figure 46). The cable alignment passes through the southernmost section of the site (approximately 845 m in length) and the cable will be buried to a target depth of 2 m below the substrate. Engagements between Vodacom and DFFE will continue as required regarding the establishment and layout of the Algoa 1 aquaculture zone. Vodacom has been invited to a consultative forum with the ADZ where future planning and implementation of the ADZ will be shared between parties.

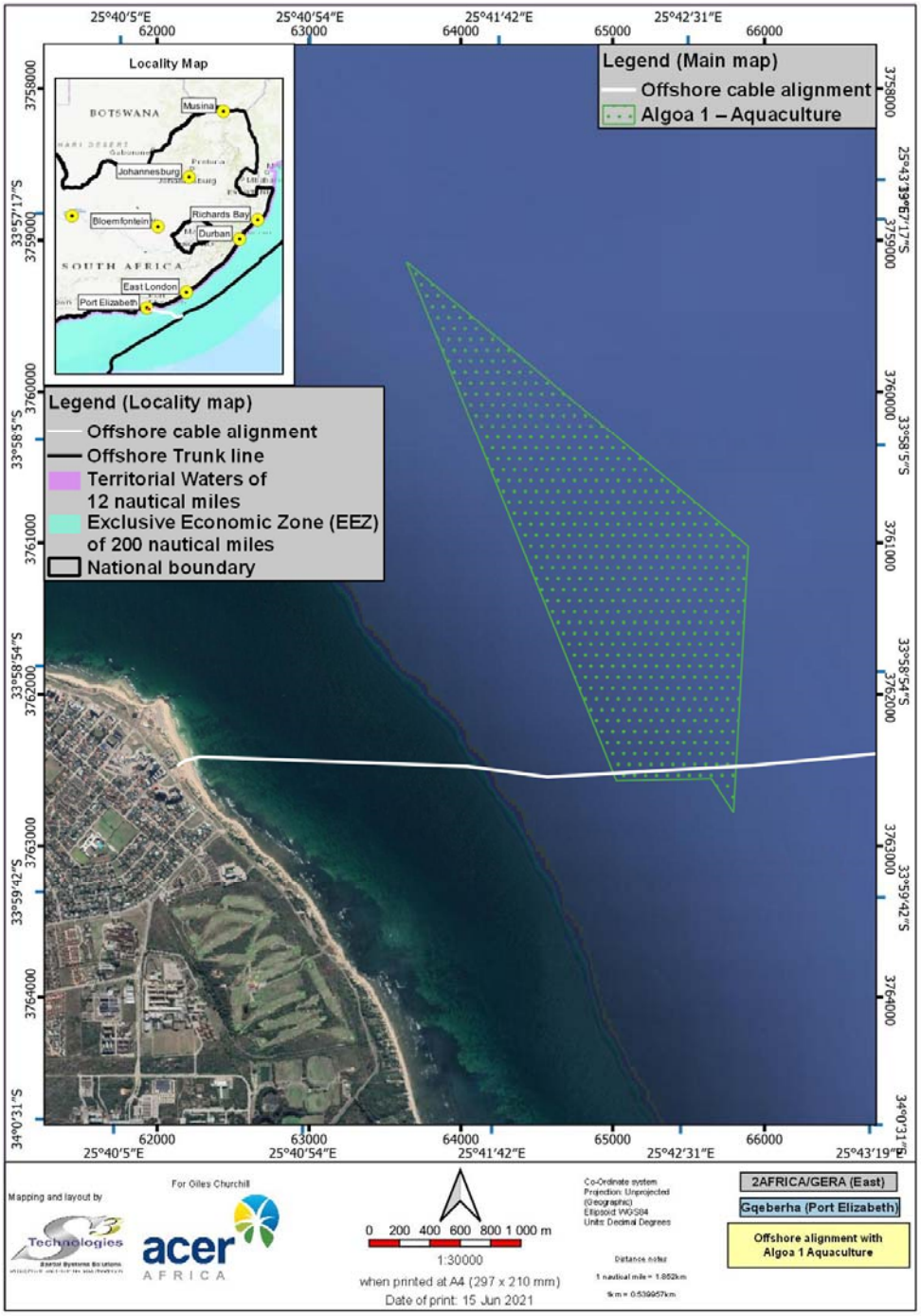


Figure 46 Algoa 1 Offshore Aquaculture Block in relation to the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (with cable realignment)

6.1.12 Offshore recreation

Algoa Bay (also known as Nelson Mandela Bay) is a favoured destination for beach and water sport enthusiasts, with a reputation of being South Africa's water sport capital as it offers activities throughout the year.

6.1.12.1 Non-motorised water sports

Water sports such as surfing, kite boarding, surf-ski paddling, stand up paddle boarding, open water swimming and sea kayaking have seen significant growth in Nelson Mandela Bay over recent years. These activities are regularly undertaken at Pollock Beach where the proposed landing site of the 2AFRICA/GERA (East) cable system will make landfall.

6.1.12.2 Yachting

Gceberha is an important destination for yachting, although it is reported that many of the yacht clubs and marinas are currently being evicted from the Port of Port Elizabeth and other yacht clubs on other parts of the nearby coastline are being used. A portion of the proposed 2AFRICA/GERA (East) cable will traverse an area used by yachts (Figure 47) and cognisance must be taken of scheduled sailing events when scheduling installation of the cable. The main sailing season is September to June.

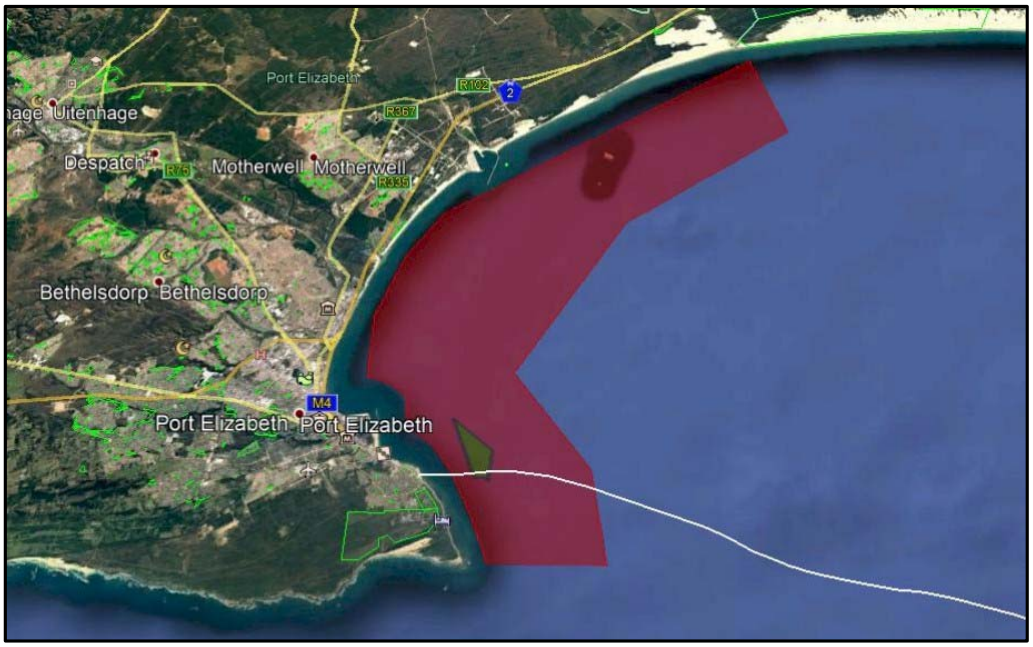


Figure 47 Regular yacht sailing area within Algoa Bay (Source: http://abyc.co.za)

6.1.12.3 Scuba diving

Recreational scuba diving is a popular activity within Algoa Bay and there are a number of dive shops located within Gqeberha that supply equipment and training. There are an estimated 18 popular diving spots off Gqeberha, with 5 of these within 500 – 1,000 m from the border of Algoa 1. Considering that a portion of the proposed 2AFRICA/GERA (East) submarine telecommunications cable will traverse Algoa 1, diving activities in these areas may be affected.

Popular diving events include the Noordhoek Dive Festival which is held every June at the Noordhoek dive and boating club on Marine drive. Divers from all over South Africa gather for a three-day festival of Scuba diving. The sardine run and squid spawning periods are also popular dive times where divers can get to see these biological phenomena.

6.1.12.4 Recreational Ski boat fishing

A recreational ski boat fishing club, (Port Elizabeth Deep Sea Angling Club) operates out of the Port Elizabeth harbour and the Noordhoek skiboat club has a slipway some 6 km west of Cape Recife. Recreational boat fishing takes place throughout Algoa bay. Chalmers (2012) estimated annual recreational ski boat fishing effort in the Algoa Bay at 2,118 boat days. Most vessels carried an average of four crew and a resultant 61,074 angler hours of recreational line fishing effort takes place annually with an estimated retained catch of approximately 21,000 fish from 26 different species (Chalmers 2012).

Most recreational fishing tends to be concentrated around reefs or on substrate with rocky bottoms where fishing is generally better due to the presence of bait fish on which many of the targeted species feed.

6.1.13 Military Bases

Various military bases are situated in Gqeberha, including the Naval Base at the Port of Port Elizabeth, Area Military Health Unit and South African Airforce base further inland, near the Port Elizabeth International Airport. It is not anticipated that the cable installation or operation would impact negatively on military bases or operations. The South African National Defence Force and the South African Navy Hydrographic Office have been notified about the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing).

6.2 Beach and terrestrial environment

6.2.1 Reference vegetation types and national, provincial and local conservation planning (terrestrial)

As reported by ENVASS (2021a) (Appendix B), the proposed development was recorded to fall within the St. Francis Dune Thicket and a small portion in the Cape Seashore vegetation types (Figure 48a) of the Albany Thicket and Azonal Vegetation Biomes (SANBI, 2006-18). In the previous National Vegetation Map (SANBI, 2012; Mucina & Rutherford, 2006) the dominant vegetation type, St. Francis Dune Thicket, fell within the large extent of the Algoa Dune Strandveld unit, which has subsequently been removed from the refined 2018 vegetation map (SANBI, 2006-2018).

At present, the St Francis Dune Thicket is classified as Endangered within the NMBMM (NMBM, 2010). At a national scale, the proposed development does not fall within a threatened ecosystem (SANBI, 2011). According to both the Eastern Cape Biodiversity Conservation Plan (DEDEAT, 2015) and the Nelson Mandela Bay Conservation Assessment and Plan (NMBM, 2010; BGIS, 2021) the terrestrial vegetation of the study area does not fall within a CBA or Ecological Support Area (ESA) (Figure 48b).

6.2.2 Ecological drivers

The key ecological drivers in coastal ecosystems and of relevance to this project include:

- The natural oceanic wave climate.
- Wind.
- Mobility of sand.
- Nearshore sand circulation, and offshore sediment transport.
- The deposition and decomposition of organic material.
- Colonisation of dune vegetation.

6.2.3 Pollock beach and coastal dunes

Pollock Beach is located within Algoa Bay, a crenulate bay, supporting shallow rocky reefs and a narrow beach backed by transgressive, but incised dunes. Pollock Beach is located on the north face of the bay, near Cape Recife and is situated on a highly urbanised, transformed, section of coastline (Plate 18). Figure 49 presents an image of the site and also indicates the prevailing winds and wave roses for the region.

The shoreline and dune cordon at the cable landing site comprises of a narrow, but dissipative beach, which is backed by a mix of narrow but steep dunes which have been artificially stabilised using geofabric bags and related sea defence structures (Plate 19). The frontal dune cordon, where not altered by urban development, presents typical Cape Seashore vegetation. However, the dune environment at the landing point has minimal vegetation cover and is used by the public for beach access.

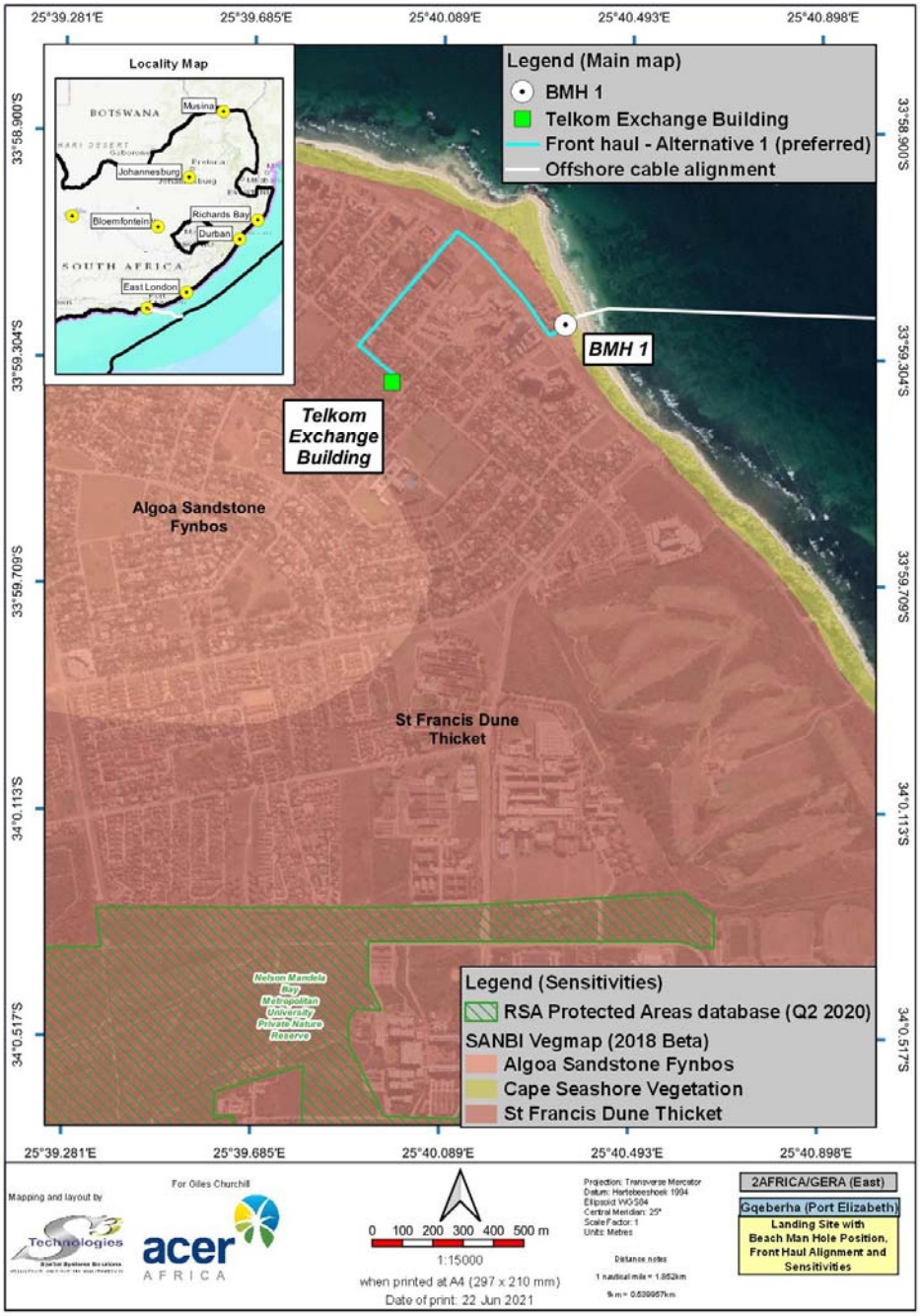


Figure 48a Reference Vegetation Types in the study area (SANBI, 2018)

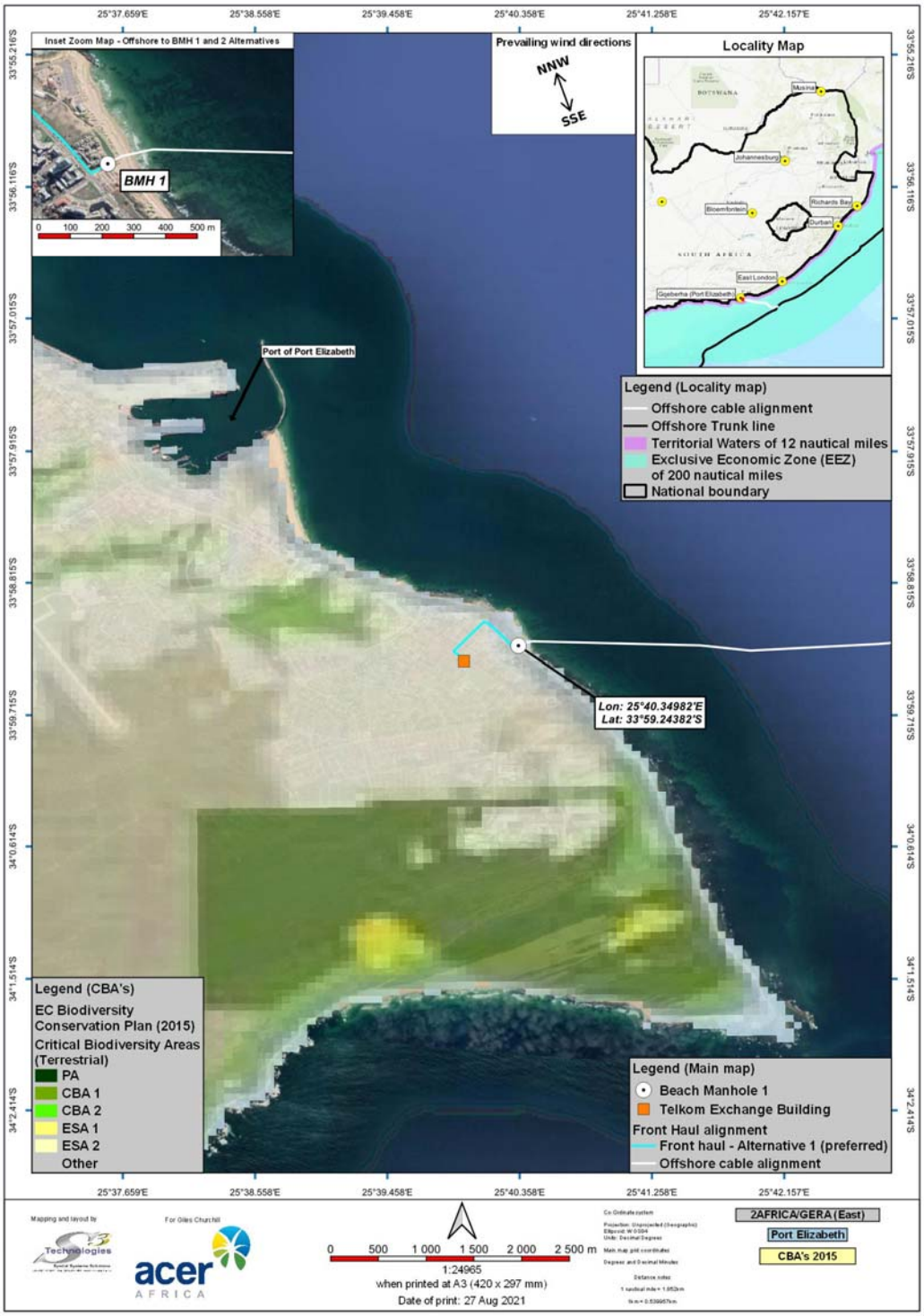


Figure 48b Critical Biodiversity Areas in the study area according to the Eastern Cape Biodiversity Conservation Plan (DEDEAT, 2015). (Note no data available for this area in the 2019 version)

Plate 18 King's Beach, the Shark Rock Pier, Humewood Pillars and tidal pool that lie ~1.5 km northwest of the proposed cable landing site at Pollock Beach (left) and the stormwater pipe that discharges into the surf zone at Pollock Beach ~70 m south of the proposed beach crossing of the Gqeberha cable landing (Source cited in Pisces, 2021)

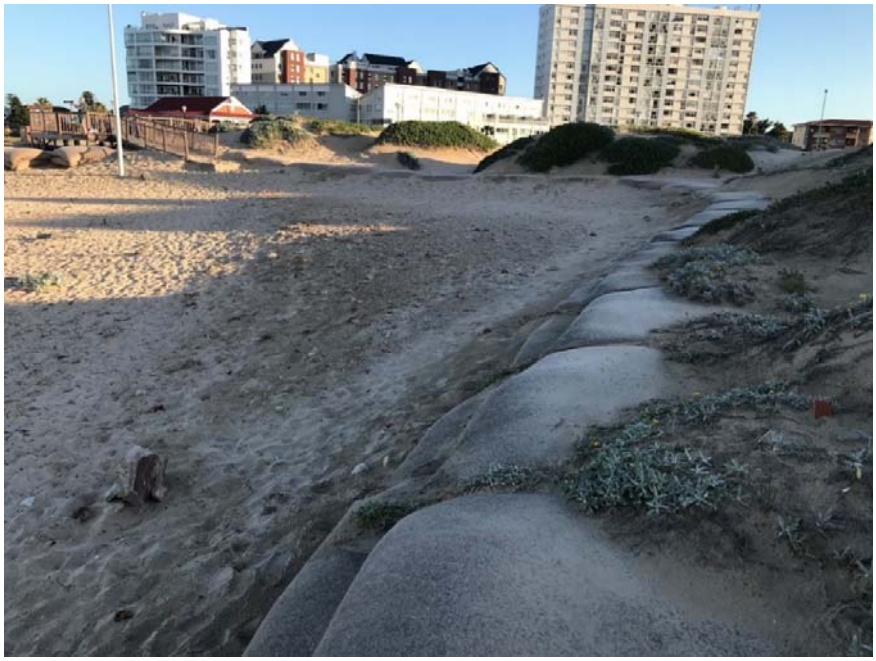


Plate 19 Beach and coastal dunes at Pollock beach, Summerstrand, in the vicinity of the cable landing site (geofabric bags are being used for stabilisation)

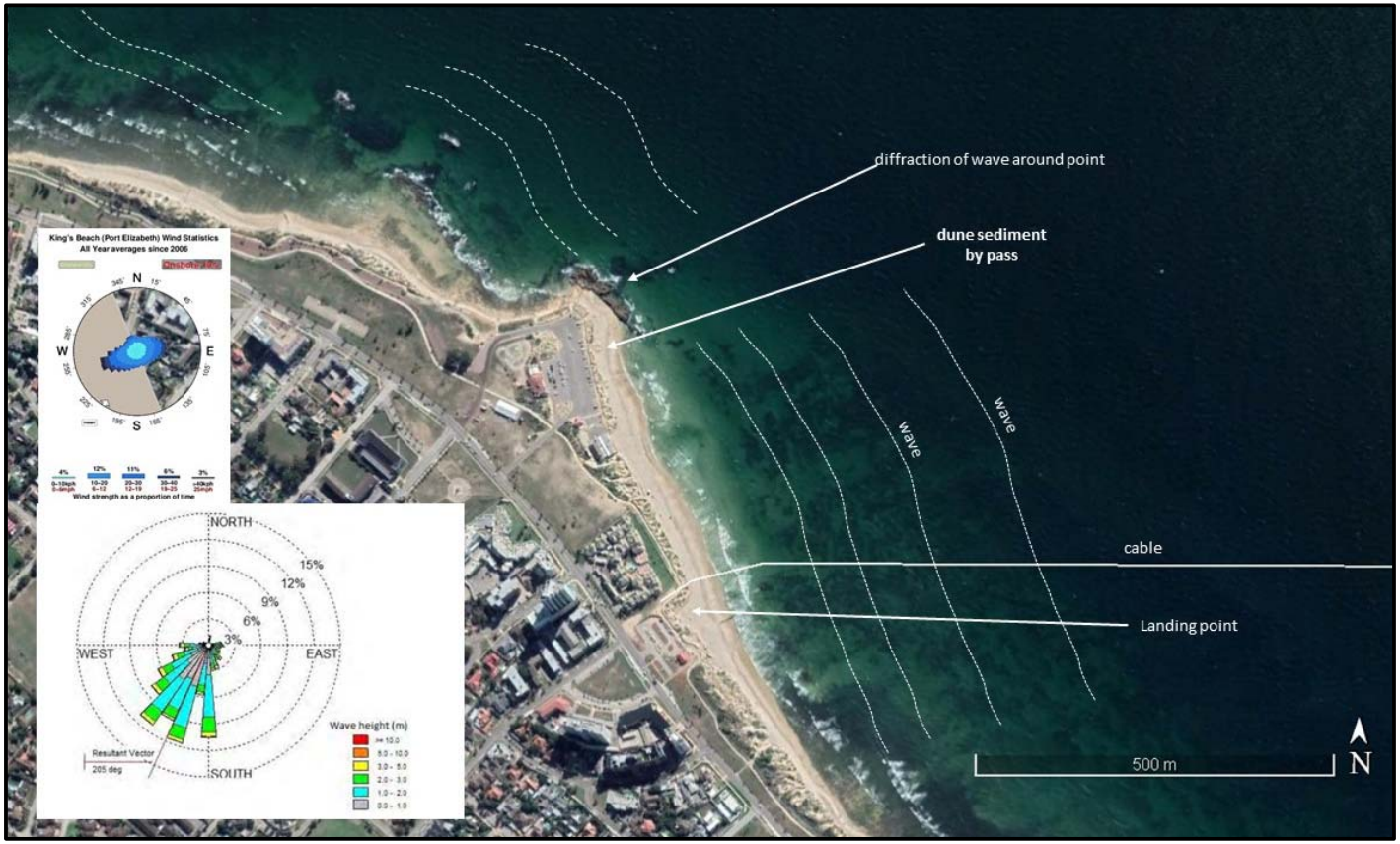


Figure 49 Aerial photograph showing features and coastal dynamics at site of cable landing, Pollock Beach, Gqeberha (source: SDP, 2021)

6.2.4 Vegetation on site

The beach has no plant life and the dunes where the cable will land are significantly transformed. Along the route of the cable trenching to the CLS are urban lawns, pavements, tarred driveways and species presumably planted to increase the aesthetic appeal of the pavement and walkways within the study area (Plate 20).

Plate 20 Photos showing existing (transformed) vegetation along sections of the preferred terrestrial alignment of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

6.2.5 Freshwater resources and wetlands

As confirmed by ENVASS (2021b) (Appendix B), there are no watercourses within 500 m of the proposed terrestrial components of the 2AFRICA/GERA (East) Submarine Cable System.

6.2.6 Fauna

Given the urban setting, the transformed nature of the site and lack of natural vegetation, faunal populations have largely been displaced from the study area. No species of conservation significance or niche habitats were observed on site (ENVASS, 2021c). (Appendix B).

6.3 Climate

6.3.1 Prevailing climate

As reported in ACER (2021), Gqeberha has a mild/temperate climate, which is to a large extent dependant on the warm ocean conditions which aid in moderating climate extremes. Temperatures in Gqeberha seldom drop below 8°C, with the average temperature in the coldest winter month of July being 13.8°C and the warmest month of February being 21.3°C. Rainfall occurs all year round but is slightly heavier and more frequent during the winter months. Gqeberha has an average yearly rainfall of 561 mm with the driest month being January with an average rainfall of 36 mm and the wettest month being October with an average rainfall of 58 mm.

6.3.2 Climate change

According to SDP (2021) (Appendix B), a significant background factor affecting the Eastern Cape coastline is that of climate change, giving rise to increasing storminess and sea level rise. The Eastern Cape region is classified as warm temperate: fully humid: warm summer region with expectations of increasing aridity, reduced winter rainfall periods, and more severe storm events In association with the abovementioned expectations, is the impact of sea level rise, which according to Blake (2011, cited in SDP, 2021), varies between 0.42 and 1.87 mm/year for the region. The National Oceanographic and Atmospheric Administration (NOAA) identifies a sea level rise rate of 2.12mm/year for Gqeberha, a slightly higher rate of increase than that reported by South African authors. Given the above, marine inundation along low lying areas of the Eastern Cape coastline during storm surges is anticipated by authorities. Beach and dune erosion is anticipated to also escalate with climatic shifts, exacerbated at points by sediment deficits within the bay, where coastal processes have been interrupted by anthropogenic activities.

6.4 Topography and geology

The project area is generally flat and lies below 40 m asl (https://en-za.topographic-map.com/maps/778p/Port-Elizabeth/). The shoreline surface supports a combination of shelly material and coarse grained sands, which have accumulated over a wider portion of beach environment. Excavation of the beach indicated that the bedrock underlying these sands are located at a shallow level, with a shingle layer lying at approximately 0.5m below the modal beach surface level. However, the back of beach and dune environment exhibits a predominantly wind-swept, fine-grained beach (SBP, 2021).

6.5 Socio-economic overview of the receiving environment

This section focuses mainly on the cable's shore landing area, located in Wards 1 and 2 of the NMBMM.

6.5.1 Development planning context

There are several national, provincial and local policies and plans relevant to the study area, which have been discussed in detail in the Scoping Report (ACER, 2021), in as far as they relate to the development of telecommunications infrastructure in the country.

Notably, in South Africa, the Presidential Infrastructure Coordinating Commission (PICC) launched the national SIP 15: Expanding Access to Communication Technology. This is led by the Department of Communications and supported by the Department of Public Enterprises and Department of Science and Technology. SIP 15 aims to ensure universal service and access to reliable, affordable and secure broadband services by all South Africans, prioritising rural and under-serviced areas and stimulating economic growth. This project, although not registered with the South African Government as a SIP project, will support SIP 15.

The NMBM Integrated Development Plan (2017/18 – 2021/22). aligns with national and provincial planning strategies. The IDP identifies various priorities, which include technological advances to improve the environments in which people live and the services that cities and governments offer. Stated in the IDP is that *"Our citizens will witness the impact of improved and technology based solutions. Currently, the most obvious technology is communication*

technology, through the mobile networks. The city is committed to seeing broadband rollout and access that allows all of our citizens to take part in the mobile technology revolution and the advantages that offers."

6.5.2 Key institutions and role-players and affected property

The project is located in Wards 1 and 2 of the NMBMM in the Eastern Cape Province of South Africa. The coastal zone between the high-water mark of the sea and residential areas at Summerstrand is under the administration of the Department of Public Works. DEDEAT is the key authority with respect to biodiversity and conservation issues in the Eastern Cape, as well as to obtain a Sea Shore lease Permit. NMBMM is responsible for general municipal administration and services provision at Summerstrand.

Property details are provided in Appendix C.

6.5.3 Land use

Summerstrand is a central suburb of Gqeberha, located close to several beaches, shopping malls, golf courses, the airport and the Nelson Mandela Metropolitan University (NMMU). As such, this suburb is popular with tourists as they can access the numerous facilities available at and near the beaches. The proposed landing point is located directly adjacent to beach front apartments and the Raddison Blu Hotel which is one of the premier hotels in Gqeberha.

6.5.4 Economy and employment

The NMBMM (Area: 1,959 km^2) is a Category A municipality and is the largest single economy in the Eastern Cape province. The main economic sector in the municipality is manufacturing providing 31% of formal employment, with one of the biggest sectors being the automotive industry, which includes two of the six vehicle assemblers in South Africa, viz. General Motors and Volkswagen.[22] The Coega Industrial Development Zone and two Ports are amongst the major economic role-players. However, there is a high level of unemployment and poverty. In the first quarter of 2018, unemployment in the Metro stood at 36,3% at 36,6% despite the contributing economic sectors viz. manufacturing, finance, community services and transport (https://www.cogta.gov.za/ddm/wp-content/uploads/2020/07/District_Profile_NELSONMANDELABAY-1.pdf).

Approximately 81 % of the population within Ward 2 are in the formal sector, whilst 10 % occupy businesses within the household. The unemployment within the Ward is still relatively low when compared to the other wards and other Municipalities within the province. The average income within the ward is between R150,000 and R300,000 (ACER, 2021).

6.5.5 Demographics and socio-economic profile

Wards 1 and 2 of the NMBMM have a population of 18,765 and 17,235, respectively. Most of the onshore infrastructure required for the cable landing is located within Ward 2, whose socio-economic profile can be summarised as follows (ACER, 2021):

[22] https://www.nelsonmandelabay.gov.za/DataRepository/Documents/yVeEsNMBM%20SOER%20Feb%202011.pdf

- Average population age of 33 which is higher than the rest of the Eastern Cape province which has an average age of 22.
- English (46%), Afrikaans (25%) and IsiXhosa (13%) are the predominant languages spoken, accounting for 84% of the population.
- The average annual household income in Ward 2 is R 115,000.00 which is double that of the rest of the Eastern Cape province and South Africa in general.
- 96.5% of households have access to running water and 99% of households have access to flush or chemical toilets.

The NMBMM is noted for having achieved a relatively high level of access to basic services to both formal and informal households, viz. water, sanitation, electricity, solid waste management and housing (NMBMM IDP, 2017/18-2021/22).

6.5.6 Tourism activities

Gqeberha is referred to as the "friendly city" or the "water sports capital of Africa" and hosts many local, regional and international sporting events. The Eastern Cape province has numerous areas of natural beauty, wildlife destinations and beaches and oceans well suited to numerous water based recreational activities. The timing of installation of the cable will need to take into account the timing of major offshore sports and recreational events in the vicinity of Algoa Bay.

6.6 Cultural Heritage

The marine portion of the cable route to the BMH is under the jurisdiction of SAHRA. SAHRA is the relevant heritage authority for all heritage resources located below the high-water mark of the sea up to a distance of 24 Nm seaward whilst the terrestrial portion of the cable route inland of the BMH falls under the jurisdiction of the Eastern Cape Provincial Heritage Resources Authority (ECPHRA). South Africa's record of maritime and underwater cultural heritage resources is based on a mix of information derived from historical documents and other secondary sources, and from very limited primary sources such as geophysical data and other field-based observations and site recordings (ACO Associates, 2021) (Appendix B).

6.6.1 Submerged prehistoric archaeological resources

According to the heritage specialist report (Appendix B), since the start of the Quaternary, approximately 2.6 million years ago, the world has been subject to a series of cooling and warming climatic cycles in which sea level has generally been lower than it is today. Periods of low sea level would have added a large coastal plain to the South African land mass, where parts of the continental shelf were exposed as dry land (Figure 50). The exposure of the South African continental shelf would have been most pronounced on the wide Agulhas Bank off the southern Cape coast, and it is estimated that a new area of land, as much as 80,000 km^2 in extent, was exposed.

Figure 50 The south coast continental shelf showing the water depths of 45, 75, 120 and 400 m. The 2AFRICA/GERA (East) branch cable to Gqeberha will be installed in the area highlighted in red on the right of the image (Source: cited in ACO Associates, 2021)

The exposed continental shelf was quickly populated by terrestrial flora and fauna, and also by our human ancestors who were dependant on these resources. As a result, for periods numbering in the tens of thousands of years on at least three occasions during the last 500,000 years, our ancestors inhabited areas of what is now seabed around the South African coast. This means that a large part of the archaeological record of the later Earlier, Middle and early Late Stone Age is located on the continental shelf and is now “inundated and for all practical purposes absent from [that] record”.

Until relatively recently there was little or no access to the submerged prehistoric landscapes and sites on the continental shelf, although evidence from various parts of the world of drowned, formerly terrestrial landscapes hinted at the tantalising prospect of prehistoric archaeological sites on and within the current seabed.

There have, to date, been no specific studies of the submerged prehistory of Algoa Bay. However, the archaeological evidence for a hominin presence in the Algoa Bay region in the Earlier, Middle and Later Stone Age is plentiful, including stone age artefacts and large numbers of coastal shell middens. Outcrops of a late Quaternary of consolidated, calcareous aeolianite, known as the Nahoon Formation, is known to preserve vertebrate trackways, estimated to be approximately 124 000 years old.

The rivers that currently feed into Algoa Bay would, during times of lower sea level in the past, have flowed across the exposed floor of the bay and are likely to have been an activity and resource focus for hominins.

According to the specialist heritage report, there is a potential for the occurrence of pre-colonial archaeological sites and material in the study area.

6.6.2 Palaeontological features and fossil material

The onshore or landfall site for the fibre cable is in the Nanaga Formation aeolianites. Dunefields with crossbedding would not preserve any fossils because the sands are windblown, in alternating directions. Cemented sands in wet pockets or seeps might preserve shells, worm burrows or root traces but these tend to be very fragmentary and very recent. Offshore, the younger sediments are nearer the coastline and become older away from the coast, in general, but the pattern is disrupted by the major bathymetric features such as canyons and troughs.

6.6.3 Maritime archaeological resources

South Africa has a rich and diverse underwater cultural heritage. Strategically located on the historical trade route between Europe and the East, South Africa's rugged and dangerous coastline has witnessed more than its fair share of shipwrecks and maritime dramas in the last 500 years. At least 2400 vessels are known to have sunk, grounded, or been wrecked, abandoned or scuttled in South African waters since the early 1500s. This does not include the as yet unproven potential for shipwrecks and other sites that relate to pre-European, Indian Ocean maritime exploration, trade and interactions along the South African coast.

In its crossing of the contiguous zone and territorial waters, the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) will be routed across the approaches to Algoa Bay which, next to Table Bay, was historically one of the busiest shipping hubs on the South African coast. The first European observation of the bay was by Bartholemeu Dias in 1488. Port Elizabeth owes its foundation, and Algoa Bay its position as South Africa's second port, to the arrival in 1820 of 5,000 British immigrants, brought to the eastern Cape as part of a colonial government scheme to strengthen the eastern boundary of the colony. With people came trade and commerce and Algoa Bay soon became a busy port providing a link for the eastern Cape with Cape Town and England. Many ships were wrecked due to the south easterly gales at Algoa bay before proper harbour works were undertaken and completed around 1931 and there are records of more than 300 potential wrecks in the western half of Algoa Bay between Cape Recife and Bird Island. While 11 known wrecks are recorded in the vicinity of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) (Table 10), there are potentially other unrecorded wrecks in this area.

According to comments received from SAHRA, on the approach to the proposed landing site, the cable runs close to Despatch or Roman Rock. There are two vessels listed as lying close to these rocks; the Balaclava which wrecked on the rocks in 1867, and the Haerlem which was scuttled in 1987. Just north of the cable landing site, closer to the harbour mouth, lies the Paris Maru, a fishing vessel which wrecked in 1934. To the south of the landing site is Cape Recife which has seen an estimated 16 vessels wrecked in the vicinity around the point. The approximate positions of some of these vessels are known but some are just recorded as wrecking in the general area of the cape.

Table 10 List of possible wrecks in the vicinity of the proposed cable route alignment

Ship Name	Place	Date Wrecked	Latitude / Longitude	Confidence	Event Type
Argalie	Algoa Bay	1869/09/18	-33.9646 / 25.6602	Estimated - low	Unknown
Fidelia	1.7 km north of Cape Recife lighthouse (400m offshore)	1873/04/07	-34.0089 / 25.6967	Approximate	Wrecked
Haerlem (SAS)	Humewood Beach / Near Roman Rock	1987/11/01	-33.9810 / 25.6966	Estimated	Scuttled
Knysna	Cape Recife	1952/03/31	-33.9913 / 25.6873	Approximate	Scuttled
Balaclava / Balaklava	Roman Rock (near bell buoy)	1867/06/15	-33.9816 / 25.6975	Approximate	Wrecked
Colonial Empire	Thunderbolt Reef (south west of). Near lighthouse	1917/09/17	-34.0251 / 25.7071	Approximate	Wrecked
Dane (RMS)	Cape Recife / Great Fish Point - between	1865/12/	-34.0190 / 25.7020	Approximate	Wrecked
Itzehoe / Itzahoe	North of Cape Recife Lighthouse	1911/05/24	-34.0227 / 25.7025	Accurate	Wrecked
Zephyr	1 mile east of North Jetty	1889/10/16	-33.9647 / 25.6518	Estimated - low	Wrecked
Unknown stranded wreck	Summerstrand	Unknown	-34.006 / 25.6923	Approximate	
Dangerous wreck	East of Humewood	Unknown	-34.0072 / 25.7105	Accurate	Unknown
Obstruction	Summerstrand	Unknown	-33.9681 / 25.705	Approximate	

* See Appendix 2 of the specialist HIA for more detail about these wrecks

6.6.4 Archaeology of the terrestrial cable route

Most archaeological sites found in the Gqeberha area are Late Stone Age, date from the past 10,000 years and are associated with the San hunter-gatherers and Khoikhoi pastoralists. The most common archaeological sites along the nearby coast are shell middens found usually concentrated opposite rocky coasts, but also along sandy beaches. Along the developed portions of the south coast of Algoa Bay, which includes the cable route landfall, urban development has probably largely destroyed any archaeological sites that may have formerly been present. South of the proposed terrestrial cable route alignment, Binneman (2016) reports finding 19th century historical dump material. This material is probably an exposure of a large historical dump dating from 1893-1909 in the Driftsands area, which stretches from west of Schoenmakerskop to the borders of Walmer and Summerstrand. Refer to the HIA (Appendix B) for further detail.

7 ENVIRONMENTAL ASSESSMENT PROCESS AND METHODOLOGY

7.1 Scoping

Scoping was undertaken between February 2020 and October 2020. The primary product of Scoping was the FSR. An important part of the FSR was the Plan of Study for Impact Assessment, which provided information on which specialist studies would be undertaken, what would be investigated within each specialist study, how the investigations would be conducted, how potential impacts would be assessed, and impact significance determined, public participation activities, and applicable time lines.

7.2 Impact Assessment

The aim of the Impact Assessment was to investigate the environmental issues and concerns that were identified during Scoping. The technical and public participation processes continued to interact at important stages to ensure that both processes built towards a comprehensive investigation of the issues identified. The main activities during this phase were to:

- Undertake focused scientific studies to assess the issues of concern.
- Maintain ongoing communication and participation with stakeholders.
- Integrate the findings into an EIA Report, inclusive of mitigation measures to ameliorate the effects of negative impacts and optimise positive ones.
- Prepare an EMPr.

7.2.1 Technical process

To provide scientifically sound information in regard to the various issues raised, a number of specialist studies were commissioned. Where applicable, specialists were encouraged to interact and share information to inform the assessment of potential impacts. To address the key issues, each specialist was tasked with assessing the possible impact from their angle of expertise. An integrated approach was adopted to consider direct, secondary and cumulative impacts wherever applicable.

Importantly, technical information on certain project components and activities were fed into this EIA process from other project team members who did not necessarily form part of the EIA specialist study group. In addition, the EAP took into consideration information from other existing documentation, for example, spatial planning documents. Thereafter, the findings (along with relevant input from the public participation process described in Chapter 8) were integrated by the EAP to provide a comprehensive understanding of the issues and associated potential impacts.

An important component of the FEIAR is the associated EMPr. The EMPr (Appendix F) outlines the mitigation and monitoring measures for avoiding or minimising negative impacts and optimising benefits during project implementation. In this regard, the EMPr provides a critical link between mitigation measures described in the FEIAR and their actual implementation.

7.3 Specialist studies and terms of reference

The specialist studies were undertaken by professionals regarded as experts in their specific disciplines. Arising from Scoping and the distillation of issues and associated potential impacts, the need for the following specialist studies was identified:

- ❑ Terrestrial Ecology (Vegetation/ Freshwater water resources/ Fauna) Specialist Assessment.
- ❑ Fisheries Specialist Assessment.
- ❑ Marine Ecology Specialist Assessment.
- ❑ Marine (shallow water) Benthic Specialist Assessment.
- ❑ Beach and Coastal Dune Dynamics Assessment.
- ❑ Heritage Specialist Assessment.

Note that at the beginning of Scoping, the application of the Department's Screening Tool recommended several specialist studies, some of which were not undertaken as part of the Impact Assessment. A motivation for excluding these studies is provided in the table below (as previously indicated in the Draft and Final Scoping Reports).

Identified Specialist Studies as per the DEA Screening Tool	**Reason why we have or have not commissioned the study**
1. Archaeological and Cultural	These specialist assessments were undertaken to ensure compliance with the National Heritage Resources Act, 1999 (Act 25 of 1999).
2. Palaeontology	
3. Aquatic Biodiversity	Although screening did not identify any wetlands within 500 m of the proposed development, an aquatic assessment was conducted to confirm if any wetlands occurred within 500 m of the site to ensure compliance with the National Water Act, 1998 (Act 36 of 1998).
4. Marine Impact Assessment	A marine ecological impact assessment was undertaken, in addition to a marine fisheries impact assessment.
5. Geotechnical	A dune and beach geomorphologist was appointed to assess the Eco morphology of the beach and dune environment and provide mitigation measures for inclusion in the EMPr. This study is not a geotechnical assessment but provided a description of the environmental drivers and processes at play on the beach and foredunes at the proposed landing site.
6. Defence Assessment	This study was not undertaken as the proposed 2AFRICA/GERA (East) cable system will not impact on any military installations or training areas. The cable alignment also does interfere with the ports of Port Elizabeth and Ngqura and avoids the offshore anchorages of both ports.
7. Avian	DEFF – O&C have raised concerns with regards to bird mortalities associated with cable laying operations on previous marine telecommunication projects. As such, an assessment was undertaken to assess the possible impact on offshore bird species.
8. Plant species	An ecological assessment including vegetation and fauna species was conducted. A separate study was undertaken to investigate the possible impact of marine telecommunications cables during installation and operation on marine mammals.
9. Animal species	

The results of the specialist studies were used by the EAP when undertaking the integrated assessment. The outcomes of integration and assessment have been documented in this FEIAR, which will be submitted to DFFE for decision making.

7.4 Integration, impact description and assessment conventions

Taking into account the specialist findings and information from other sources, the EAP assessed all identified impacts (positive and negative), using the following assessment conventions to determine their significance:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity.

- **Cumulative impacts** are those that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

- **Nature** – the evaluation of the nature of the impact. Most negative impacts will remain negative, however, after mitigation, significance should reduce:
  - Positive.
  - Negative.

- **Spatial extent** – the size of the area that will be affected by the impact:
  - Site specific.
  - Local (limited to the immediate areas around the site; <2 km from site).
  - Regional (would include a major portion of an area; within 30 km of site).
  - National or international.

- **Duration** – the timeframe during which the impact will be experienced:
  - Short-term (0-3 years or confined to the period of construction).
  - Medium-term (>3-10 years).
  - Long-term (the impact will only cease after the operational life of the activity).
  - Permanent (beyond the anticipated lifetime of the project).

- **Intensity** – this provides an order of magnitude of whether or not the intensity (magnitude/size/frequency) of the impact would be negligible, low, medium or high:
  - Negligible (inconsequential or no impact).
  - Low (small alteration of systems, patterns or processes).
  - Medium (noticeable alteration of systems, patterns or processes).
  - High (severe alteration of systems, patterns or processes).

- **Frequency** – this provides a description of any repetitive, continuous or time-linked characteristics of the impact:
  - Once off (occurring any time during construction).
  - Intermittent (occurring from time to time, without specific periodicity).
  - Periodic (occurring at more or less regular intervals).
  - Continuous (without interruption).

- **Probability** – the likelihood of the impact occurring:
  - Improbable (very low likelihood that the impact will occur).
  - Probable (distinct possibility that the impact will occur).
  - Highly probable (most likely that the impact will occur).
  - Definite (the impact will occur).

- **Irreplaceability** – of resource loss caused by impacts:
  - High irreplaceability of resources (the project will destroy unique resources that cannot be replaced).
  - Moderate irreplaceability of resources (the project will destroy resources, which can be replaced with effort).
  - Low irreplaceability of resources (the project will destroy resources, which are easily replaceable).

- **Reversibility** – the degree to which the impact can be reversed/the ability of the impacted environment to return/be returned to its pre-impacted state (in the same or different location):
  - Impacts are non-reversible (impact is permanent).
  - Low reversibility.
  - Moderate reversibility of impacts.
  - High reversibility of impacts (impact is highly reversible at end of project life).

- **Significance**[23] – the significance of the impact on components of the affected environment (and, where relevant, with respect to potential legal infringement) is described as:
  - Low - the impact will not have a significant influence on the environment and, thus, will not be required to be significantly accommodated in the project design.

[23] This excludes positive impacts on the environment. In these cases, the level of significance should be denoted as Low**, Moderate** or High**.

- Medium - the impact will have an adverse effect or influence on the environment, which will require modification of the project design, the implementation of mitigation measures or both.
- High - the impact will have a serious effect on the environment to the extent that, regardless of mitigation measures, it could block the project from proceeding.

- **Confidence** – the degree of confidence in predictions based on available information and specialist knowledge:
  - Low.
  - Medium.
  - High.

8 PUBLIC PARTICIPATION PROCESS

The public participation process was designed to comply with the requirements of the EIA Regulations (Sections 41 to 44 of GNR 326) and NEMA. Important elements are:

- The manner in which I&APs were notified of the application for environmental authorisation. This includes on-site notice boards, giving written notice to landowners, letters, Background Information Documents (BID) and advertisements in the media (Section 41).
- Opening and maintaining a register containing the names and addresses of I&APs. These include all persons who have submitted comments, attended meetings, and are organs of State who have jurisdiction in the assessment process, and all those who have requested that they be placed on the register as registered I&APs (Section 42).
- Registered I&APs are entitled to comment, in writing, on all written submissions made to the competent authority by the applicant or the EAP managing the application, and to bring to the attention of the competent authority any issues, which that party believes may be of significance when the application is considered for authorisation (Section 43).
- The comments of registered I&APs and responses thereto must be recorded and included with the reports submitted to the competent authority (Section 44).

Public participation in an EIA process aims to provide sufficient and accessible information to I&APs, in an objective manner, to assist them to:

- During the Scoping Phase.
  - Identify issues of concern and provide suggestions for enhanced benefits and alternatives.
  - Contribute local knowledge and experience.
  - Verify that their issues have been considered.

- During the Impact Assessment.
  - Verify that their issues have been considered either by the EIA Specialist Studies, or elsewhere.
  - Comment on the findings of the DEIAR, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones.

All relevant public participation documentation is provided in Appendix D and Appendix E.

Due to the Covid-19 National State of Disaster and Lockdown in the country, the DFFE requires Environmental Assessment Practitioners to undertake public participation in ways that respect social distancing and other measures to contain the spread of the Corona virus. The public participation process was compiled to comply with the “Directions regarding measures to address, prevent and combat the spread of COVID-19 relating to National Environmental Management Permits and Licenses” in Government Notice (GN) No. 650 dated 5 June 2020.

8.1 Notification of the application

Stakeholders were informed of Vodacom's intention to apply for environmental authorisation via a Background Information Document (BID), media advertisements and on-site notice board. The application is also posted on ACER's website for stakeholder review.

8.2 Identification and registration of Interested and Affected Parties (I&APs)

Key stakeholders and other I&APs were identified, and their contact details incorporated into a project database. They included representatives of a variety of sectors, as shown in Table 11. A copy of the stakeholder database is provided in Appendix D.

Table 11 Sectors of society represented by I&APs on the direct mailing list

Government (National, Provincial and Local, Management Authorities)
Parastatals (Eskom, SAMSA, Transnet National Ports Authority)
Representative Associations: ❑ NMBMM Rate Payers Association ❑ South African Deep Sea Trawling Industry Association ❑ South African Squid Management Industrial Association (SASMIA) ❑ Offshore Mining Concession Holders ❑ Conservation Organisations ❑ Tourism and Watersport related Organisations
Non-Governmental Organisations
Landowners and Local Residents Associations
Conservation Authorities and Conservation Groups
Business and Industry

While consultation has taken place with representatives of different sectors of society, special efforts have been made to obtain the contributions of all people who may be directly affected by the proposed project. These efforts will be on-going for the duration of the EIA.

8.3 Project announcement

The opportunity to participate in the EIA[24] was announced as follows:

- ❑ Advertisements in local and provincial newspapers:
  - The Herald English and Afrikaans (05 November 2020)
- ❑ A Background Information Document (BID) was compiled and emailed to all key stakeholders on 5 November 2020. All I&APs who registered following the project announcement adverts were sent the BID for their records. Copies of the BID were submitted to all government departments and other relevant commenting authorities.
- ❑ Notifications by telephone.
- ❑ Placement of an on-site notice board at Pollock Beach on the 5 November 2020 (photos of the onsite notices are provided in Appendix D).

8.4 Obtaining and dealing with comments from I&APs

Opportunities provided to I&APs to contribute comments included:

[24] All relevant project documents were loaded onto ACER's website at the applicable time and were available for public review.

- Completing and returning Registration and Comment Sheets.
- Providing comments telephonically or by email.
- Due to a lack of interest by I&APs no virtual Public Open Day was held during the Draft Scoping Report review period.

Responses in writing or by telephone were provided directly to I&APs where relevant, and/or in the Comments and Responses Report circulated with the FSR and DEIAR (see below).

8.5 Comments and Responses Report and summary of issues raised

Issues and concerns raised by I&APs, and responses thereto, have been captured in a Comments and Responses Report (CRR) provided in Appendix E. To date, the comments received from I&APs and relevant authorities relate to the following topics:

- Stakeholder registration details.
- Requests for documents and mapping.
- DFFE's environmental authorisation application process requirements, including requirements for specialist assessments and cumulative impact assessments.
- Comments and recommendations from DFFE (Oceans and Coasts) relating to the protection of the coastal environment and access to the coastal public property, in line with the ICMA.
- Heritage authority requirements.
- Maritime heritage information from SAHRA.
- Queries regarding the data provision associated with the fibre optic cable.
- Comments from O&G Rights Holders relating to exploration of hydrocarbon activities offshore in relation to their Exploration Right Blocks.
- Impacts on commercial fishing operations including the squid industry, hake long line and deep-sea trawl.
- Participation of local SMMEs.
- Noise pollution resulting from cable installation.
- Confirmation that Sasol pipelines are not affected.
- Effect on the planned Algoa 1 Aquaculture development.
- Effects on the local surfing community and surfing spot known as Pipe, at Pollock Beach.
- Comments from NMBMM regarding lease agreements and land development rights applications.
- Coastal Navigation Safety.

8.6 Draft and Final Scoping Report

The purpose of the Draft Scoping Report (DSR) and FSR was to enable I&APs and authorities to verify that their contributions had been captured, understood and correctly interpreted. The issues identified by I&APs and by the environmental technical specialists were used to define the terms of reference for the specialist studies for this impact assessment.

The availability of the Draft Scoping Report for public comment was advertised as follows:

- All registered Interested and Affected Parties (I&APs) were notified in writing on 12 March 2021 of the availability of the Draft Scoping Report for their review and comment.
- The Draft Scoping Report was made available on ACER's website and at the Walmer Public Library on the 12 March 2021, for the reviewing period (12 March 2021 – 14 April 2021).

- All registered I&APs were notified in writing on the 12 March 2021 of the availability of the Draft Scoping Report for their review and comment.
- Notification letters were sent to all registered I&APs on the 12 March 2021 and notices were placed at strategic points (local shops, library, etc.) within and around Summerstrand notifying the public of the availability of the Draft Scoping Report for review and comment.
- The Draft Scoping Report was uploaded to ACER's website where members of the public can download the report for review and comment.
- The EAP engaged with I&APs who do not have access to the internet telephonically, to:
  - Disseminate information regarding the proposed project to I&APs.
  - Provide I&APs with an opportunity to interact with the relevant project team members.
  - Discuss the studies to be undertaken during the Environmental Impact Assessment.
  - Supply more information regarding the EIA process.
  - Answer questions regarding the project and the EIA process.
  - Receive input regarding the public participation process and the proposed development.
  - Provide I&APs not previously registered on the project database with an opportunity to be formally registered and, therefore, be informed of progress for the remainder of the project.

Comments submitted during this period were taken into account when compiling the FSR. They were included in the Final CRR which was submitted to DFFE with the FSR on 23 April 2021. I&APs were notified of the submission and an electronic copy of the FSR was uploaded to the ACER website for review and comment by I&APs.

DFFE approved the FSR on 04 June 2021, allowing the Impact Assessment to follow in accordance with the Plan of Study.

8.7 Draft and Final Environmental Impact Assessment Reports and Environmental Management Programme

The DEIAR and accompanying draft EMPr were made available for public and authority review at appropriate and accessible local public venues and by placing documentation on ACER's website. Following the 30-day public review period, the DEIAR and EMPr were amended according to comments received, and then finalised along with the Final CRR. This FEIAR has been submitted to DFFE for decision making and has also been made available to I&APs for review and comment (should comments be received these will be forwarded on to DFFE for consideration).

8.8 Notification of I&APs of DFFE 's decision making

Once DFFE has issued (or refused) an environmental authorisation on the proposed project, registered I&APs will be notified via post or email of the decision, including details on the appeal procedure.

9 SUMMARY OF SPECIALIST STUDY FINDINGS

The specialist studies produced by each specialist are listed in Table 12 and contained in Appendix B, as referenced. Note that the reports on Avifauna and Marine Mammals were commissioned as additional overview reports for the use of all of the 2AFRICA landings in South Africa, in response to comments raised by DFFE-OC. They are therefore additional to the Plan of Study for Impact Assessment as outlined in the FSR for the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing).

The approach, findings and conclusions of the specialist reports, as they apply to the selected alternatives that are assessed in this EIA, are summarised below. Note that the environmental baseline referenced from specialist reports, where applicable, has been included in Chapter 6 of this report.

Table 12 Specialist studies and specialists

	Specialist Study	Specialist	Organisation
1	Terrestrial biodiversity and plant species compliance statement (Appendix B1a)	Mr Wayne Westcott	Environmental Assurance (Pty) Ltd
2	Aquatic biodiversity compliance statement (Appendix B1b)	Mr Wayne Westcott	Environmental Assurance (Pty) Ltd
3	Terrestrial animal species compliance statement (Appendix B1c)	Mr Wayne Westcott	Environmental Assurance (Pty) Ltd
4	Commercial Fisheries Specialist Study (Appendix B2)	Mr David Japp and Ms Sarah Wilkinson	Capricorn Marine Environmental (Pty) Ltd (CapMarine)
5	Coastal Impact Assessment (beach and dunes) (Appendix B3)	Mr Simon Bundy	SDP Ecological & Environmental Services
6	Marine Ecology Assessment (Appendix B4)	Dr Andrea Pulfrich	Pisces Environmental Services (Pty) Ltd
7	Marine benthic shallow water impact assessment (Appendix B5)	Dr Russell Chalmers and Dr Shirley Parker-Nance	Aquatic Ecosystem Services
8	Heritage Impact Assessment (Appendix B6)	Mr John Gribble and Ms Gail Euston-Brown	ACO Associates cc
9	Submarine Telecommunications Cables Environmental Impact Assessment. Generic Avifaunal Impact Assessment (Appendix B7)	Mr Jon Smallie	WildSkies Ecological Services (Pty) Ltd
10	A review of the potential effects of submarine telecommunications cables on marine mammals in Southern Africa (Appendix B8)	Mr Simon Elwen	Sea Search Research and Conservation

9.1 Ecological impact assessment (vegetation, wetlands/watercourses & fauna)

During Scoping, it was evident that the terrestrial components of the project will occur in a transformed area. Compliance statements verifying the low sensitivity with respect to vegetation ecology, aquatic ecology and fauna on site, were compiled by the specialist in accordance with Government Notice (GN) no. 320 published in Government Gazette no. 43110 of March 2020. Refer to Appendix A1, Appendix A2 and Appendix A3.

9.1.1 Vegetation and plant species

Subsequent to generating the DFFE screening tool report for the proposed development, inclusive of all alternatives, it was observed that the proposed development site was classified as Very High and Medium Sensitivity in terms of the Terrestrial Biodiversity and Plant Species themes, respectively (DFFE, 2021). In accordance with GN no. 320, a site verification of the proposed development was conducted, during which it was observed that the entirety of the proposed development footprint had been transformed in comparison to the reference state. The verification determined that the site can be considered of Low Sensitivity for both terrestrial biodiversity and plant species theme, and thus the need for a Compliance Statement was triggered.

The report confirms that:

- No CBA or ecological important area intersects the proposed development footprint.
- No natural features that are synonymous with the reference state, or of conservation importance, are present within the direct construction footprint of the proposed development.
- The land can be rehabilitated to the current state, or better, within two (2) years of the proposed development being constructed.
- The overall impact of the proposed development on the receiving terrestrial biodiversity and plant species features is considered to be low to negligible after mitigation measures have been implemented.

General mitigation measures from this specialist report have been carried across to Section 10.2 of this report and incorporated into the EMPr (Appendix F), as relevant.

9.1.2 Aquatic biodiversity (wetlands/watercourses)

Subsequent to generating the DFFE screening tool report for the proposed development it was observed that the proposed development site was classified as Low Sensitivity in terms of the Aquatic Biodiversity theme (DFFE, 2021). This was confirmed during the initial site sensitivity verification field survey and desktop study. In accordance with GN no. 320, the proposed development triggers the need for an Aquatic Biodiversity Compliance Statement.

The report confirms that:

- There are no watercourses identified on site, or within the 32 m regulatory area applicable to the NEMA: EIA Regulations (2014, as amended).
- The proposed development is not situated with the 100 m or 500 m regulatory areas around a riparian zone or wetland, respectively, as defined under the National Water Act (Act no. 36 of 1998).

- There will be no impact on aquatic features.
- The land can be rehabilitated to the current state, or better, within two (2) years of the proposed development being constructed.

General mitigation measures from this specialist report have been carried across to Section 10.2 of this report and incorporated into the EMPr (Appendix F), as relevant.

9.1.3 Terrestrial animal species

Subsequent to generating the DFFE screening tool report for the proposed development it was observed that the proposed development site was classified as Medium Sensitivity in terms of the Terrestrial Animal Species theme (DFFE, 2021). In accordance with GN no. 320, a site verification of the proposed development was conducted during which it was observed that the entirety of the proposed development footprint had been transformed in comparison to the reference state. The site verification determined that the study area could be considered of Low Sensitivity for animal species theme, and thus the need for a Compliance Statement was triggered.

The report confirms that:

- The study area, which consisted of a 10 metre (m) construction corridor around the proposed development (5 m either side of the cable), was predominantly urbanised with tar roads, pavement and pedestrian walkways dominating the area.
- No fauna species of conservation significance were observed on site and the likelihood of their occurrence within the urbanised terrestrial environment was determined to be low.
- The land can be rehabilitated to the current state, or better, within two (2) years of the proposed development being constructed.
- The overall impact of the proposed development on the receiving terrestrial animal species features is considered to be low to negligible after mitigation measures have been implemented.

General mitigation measures from this specialist report have been carried across to Section 10.2 of this report and incorporated into the EMPr (Appendix F), as relevant.

9.2 Fisheries assessment

9.2.1 Introduction

The report (Appendix B2) provides an assessment of the potential impacts of 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) on the commercial fishing industry.

9.2.2 Approach

The applicable legislation specifying safety and exclusion zones around submarine cables and cable laying vessels was outlined. An overview of South African fisheries was provided and thereafter a detailed description of those fisheries whose fishing grounds coincide with the proposed cable routing. For each of these fishing sectors, the report identified (where the information was available):

- Target species.
- Wholesale economic value of the sector.
- Nominal catch.
- The vessels, gear, methods and timing involved in the fishing activity and the way in which this may impact or be impacted by the proposed cable.
- The location and extent of the fished areas in relation to the proposed cable.
- An estimation of the fishing effort affected by the exclusion zones applied during installation and operation of the cable, in relation to the overall effort recorded by the sector.
- Possible mitigation.

Taking the above into account, the report identified and assessed the potential impacts of each stage of the cable installation (survey, installation and operation) on affected fishing sectors.

9.2.3 Findings

9.2.3.1 Exclusion zones

Under the Convention on the International Regulations for Preventing Collisions at Sea (COLREGS, 1972, Part A, Rule 10), a vessel that is engaged in cable laying is defined as a "vessel restricted in its ability to manoeuvre" which requires that power-driven and sailing vessels give way to a vessel restricted in her ability to manoeuvre. Furthermore, under the Marine Traffic Act, 1981 (No. 2 of 1981), a vessel used for the purpose of cable laying falls under the definition of an "offshore installation" and as such it is protected by a 500 m safety zone. It is an offence for an unauthorised vessel to enter the safety zone. In practice a 1,500 m exclusion zone will be requested around the cable laying vessel during cable installation.

Once installed, a subsea cable is protected by a 500 m exclusion zone on either side of the cable, and it is an offence for any anchoring or trawling within this zone.

9.2.3.2 Commercial fisheries which intersect with the marine cable alignment

As described in detail under the description of the receiving environment (Section 6.1.5), fishing activity for the following commercial fishing sectors overlaps to varying extents with the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) marine cable alignment:

- Demersal Trawl.
- Mid-Water Trawl.
- Small Pelagic Purse Seine.
- Large Pelagic Longline.
- Traditional Linefish.
- South Coast Rock Lobster.
- Squid Jig.
- Small Scale Fisheries.

Of the above sectors, the biggest players in terms of fishing effort and wholesale value of production are the **demersal trawl** (targeting hake) and the **pelagic purse-seine** (targeting anchovy, sardine, and herring), as illustrated in Figure 51.

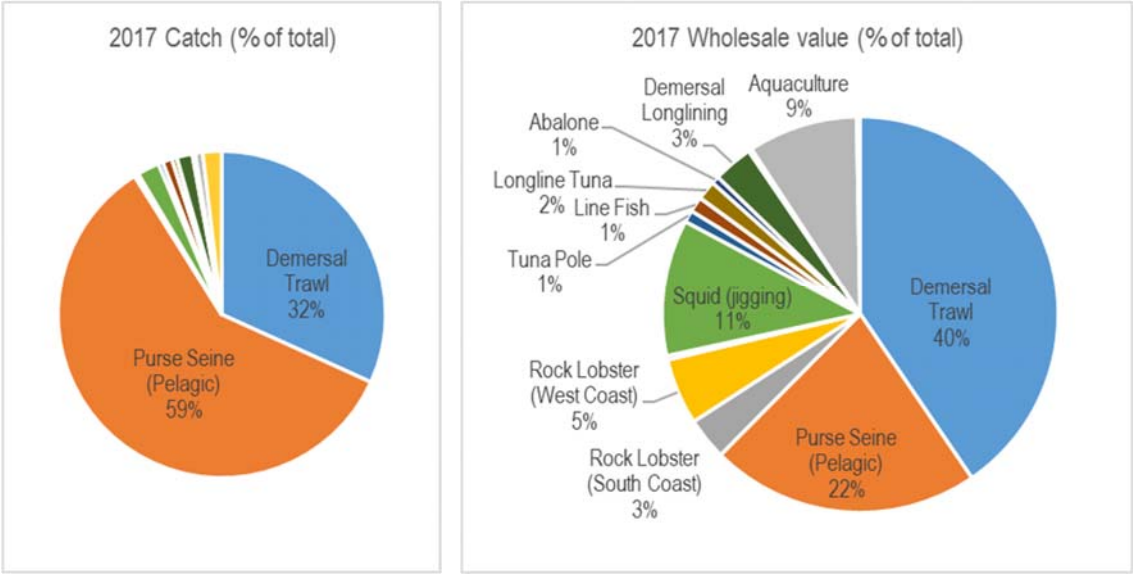


Figure 51 Pie chart showing percentage of landings by weight (left) and wholesale value (right) of each commercial fishery sector as a contribution to the total landings and value for all commercial fisheries sectors combined (2017). Source: DEFF, 2019, cited in CapMarine, 2021)

As explained and illustrated by the figures shown in Section 6.1.5 of this report, various fisheries have operations that will overlap with the proposed cable route. The demersal trawl fishery would be affected by the proposed project mainly due to its operation directly on the seabed and the trawling grounds overlapping with areas of the proposed cable alignment. The other fishing sectors mentioned above would also be affected by the proposed project as their operations overlap with part of the proposed marine cable alignment and in some cases, the gear used may occasionally contact the seabed.

9.2.3.3 Potential impacts of the project on fisheries

The causes of potential impacts of the project on the fishing industry were identified as:

- ❑ Noise emissions generated during geophysical survey activities which may harm or temporarily displace fish.
- ❑ Temporary exclusion from fishing ground during geophysical survey and cable-laying operations.
- ❑ Long-term exclusion of anchoring and trawling around the cable during operation.

NOISE EMISSIONS DURING THE GEOPHYSICAL SURVEY

The presence and operation of the survey vessel will introduce a range of underwater noises into the surrounding water column that may potentially contribute to and/or exceed ambient noise levels in the area.

Elevated noise levels could impact marine fauna by:

- ❑ Causing direct physical injury to hearing or other organs, including permanent or temporary threshold shifts in hearing.

- Masking or interfering with other biologically important sounds (e.g. communication, echolocation, signals and sounds produced by predators or prey).
- Causing disturbance to the receptor, resulting in behavioural changes or displacement from important feeding or breeding areas.

Should the above negatively affect populations of target species, this may in turn negatively impact the catch of commercial fisheries. However, assessments by Pisces (2021) indicate that the noise generated by the acoustic equipment utilised during geophysical surveys would not coincide with the hearing range of fish and crustaceans. Based on the rapid attenuation of high-frequency sound in the ocean, the spatial extent of the impact of noise on catch rates is expected to be localised. Additionally, due to the short-term duration and the low intensity of noise generated by the acoustic equipment utilized during geophysical surveys, the specialist report considers the significance of the impact to be very low. The impact is highly reversible, as any disturbance of behaviour that may occur as a result of survey noise would be temporary. No mitigation measures are possible or considered necessary for the generation of noise by the geophysical survey methods proposed.

TEMPORARY EXCLUSION FROM FISHING GROUND DURING GEOPHYSICAL SURVEY AND CABLE-LAYING OPERATIONS DUE TO TEMPORARY SAFETY ZONE AROUND VESSELS

By law, vessels engaged in surveying as well as vessels engaged in laying of subsea cables are protected by a 500 m safety zone. The demersal trawl, midwater trawl, small pelagic purse-seine, large pelagic longline, traditional linefish, south coast rock lobster, squid jig and small-scale fisheries sectors have historically operated across the proposed Gqeberha landing route and are all currently active to a greater or lesser degree.

All unauthorised vessels would be excluded from entering the safety zone. The implementation of the safe operational zone will effectively exclude fishing vessels from portions of their fishing grounds when the vessels are on site. The temporary exclusion of fisheries from the safety zone will effectively reduce fishing grounds, which in turn could potentially result in a loss of catch and/or displacement of fishing effort (direct negative impact).

For all fishing sectors, the impact is considered to be short-term (limited to the duration of the survey and cable laying operations) with the extent being localised. The intensity of the impact on each sector will be based on the proportion of fishing effort and catch within the affected area, relative to total effort and catch reported by each sector. The intensity of the impact is assessed to be low for all sectors. While there is little scope for mitigation, the assessment indicates that the overall impact of temporary exclusion is of very low significance.

EXCLUSION FROM FISHING GROUND DUE TO PERMANENT EXCLUSION ZONE AROUND CABLE

Once installed, a subsea cable is protected by a 500 m exclusion zone on either side of the cable, and it is an offence to anchor or trawl within this zone. The proposed project therefore presents an impact on the fishing industry via exclusion of demersal trawl operations.

Demersal trawling activity takes place across the proposed cable route alignment to Gqeberha at a seabed depth range of 30 m to 120 m. Since permit restrictions prevent the offshore fleet from fishing shallower than the 110 m depth contour east of Cape Agulhas, the activity across this section of the cable routing is likely to be attributed to the inshore rather than offshore fleet of trawlers. Over the period from 2008 to 2016, an average of 341 trawls per year (or 922 fishing hours) were recorded across the proposed cable route. Catches in the vicinity amounted to an average of 134 tons of hake and 1.3 tons of sole per year. This is equivalent to 0.1% and 0.4% of the total overall landings of hake and sole, respectively.

A 500 m exclusion zone would cover 56 km^2 (0.3%) of inshore trawl fishing grounds. Once an exclusion zone is in place, skippers would raise their ground gear off the seabed as they transit the exclusion zone in order to avoid potential contact with the cable. This would result in a loss of fishing time within the area.

Based on the historical record of fishing in the area, the probability that impact would occur is definite, and the duration of the impact would be long-term (for the duration of the operational lifespan of the cable). The intensity of the impact is considered to be medium (where fishing may continue in a modified way), and the overall significance is considered to be low.

Mitigation measures from this specialist report have been carried across to Section 10.4 of this report and incorporated into the EMPr (Appendix F), as relevant.

9.2.4 Conclusion

The report concludes with a summary table listing a significance of very low or low, for each of the identified project impacts on affected fisheries, before and after the implementation of mitigation measures (Table 13).

Table 13 Summary of the impacts on fisheries of each of the identified project activities

Ref:	Potential Impact Source	Project Phase	Impact Significance	
			Pre-Mitigation Impact	Residual Impact
1	Noise effects on catch rates during geophysical survey (multi-beam echo sounder, side-scan sonar, sub-bottom profiler)	Pre-Installation	Very Low	Very Low
2	Temporary safety zone around geophysical survey vessel	Pre-Installation	Very Low	Very Low
3	Temporary safety zone around cable-laying vessel	Installation	Very Low	Very Low
4	Permanent exclusion zone around cable	Operation Demobilisation	Low	Low

9.3 Beach and coastal dune dynamics

9.3.1 Introduction

The report (Appendix B3) provides an assessment of the potential impacts of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) on the beach and dune cordon, within and adjacent to the proposed landing point.

9.3.2 Approach

The investigation utilised desk-top assessments and field reconnaissance to investigate various selected parameters and to identify biophysical factors associated with the area that may be considered drivers that determine the status and ecological function of the beach and dune cordon. In addition, the investigation considers the ecological impacts that may arise within the dune system from the establishment of the cable, the most appropriate routing for the cable, as well as mitigation and management measures that may be employed during and post the installation phase. Where applicable, the Government Gazette 43110 “Protocol for the specialist assessment and minimum reporting content requirements” and consideration of the DFFE Screening Tool was used.

9.3.3 Findings

During most of the 20th century, urban expansion along the Summerstrand beach front has seen the stabilisation of much of the frontal dune cordon which has interrupted and altered the sand sharing system along the coastline at this point and beyond. Much of the terrestrial components of the sand sharing system have become highly transformed. In addition, other broader factors influence the sediment transport and coastal dynamics within Algoa Bay, including the operations of the nearby harbour, as well as influences arising from terrestrial activities within the various catchments associated with the bay. In addition a significant background factor affecting the Eastern Cape coastline is that of climate change, giving rise to increasing storminess and sea level rise.

The shoreline and dune cordon at the subject site comprises of a narrow, but dissipative beach, which is backed by a mix of narrow but steep dunes which have been artificially stabilised using geofabric bags and related sea defence structures. Much of the dune cordon at this point has been rendered dysfunctional through the establishment of urban infrastructure, including parking bays, roadways, and residential development. At the point of the proposed cable landing, the dune has been subject to excavation, effectively placing much of this portion of the dune in an early seral[25] state, dominated by *Tetragonia decumbens*, an early colonizer of sand dunes.

Eco-morphological processes have thus been disrupted in and around the cable landing point and the supra tidal dune cordon and back beach can be considered to be dysfunctional in terms of its influence and response to coastal processes.

It follows from the above that the establishment of a submarine telecommunications cable at Pollock Beach will have little impact on the eco-morphology of the sand sharing system and the coastline in general.

[25] A **sera** community is an intermediate stage found in ecological succession in an ecosystem advancing towards its climax community. These can also be described as the pioneer community.

Despite the highly transformed nature of the coastline, with the establishment of the cable, management interventions should be implemented to minimise anticipated impacts. These management/mitigation measures have been carried across to Section 10.5 of this report and incorporated into the EMPr (Appendix F), as relevant.

9.3.4 Conclusion

It is contended that the landing of a telecommunications cable and the establishment of related anchor mechanisms along the shoreline and beach-dune interface at Pollock Beach will, if implemented with the conditions and recommendations presented in this report, give rise to negligible ecological repercussions in the subject area.

9.4 Marine ecology assessment

9.4.1 Introduction

The report (Appendix B4) was compiled as a desktop study and provides an assessment of the potential impacts of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) on the marine environment. The study focused on benthic habitats and biota but also took into account impacts on marine fauna in the water column, as well as seabirds and shorebirds.

9.4.2 Approach

The specialist adopted a ‘desktop’ approach. The landing site at Gqeberha is characterized by a stretch of dissipative-intermediate sandy beach, no different from other similar beaches in the Agulhas Bioregion, and which have been adequately described in the scientific literature. A detailed site investigation was thus not deemed necessary and no new data were collected.

Although no protocols and formal screening tools have been developed for the marine environment as part of GNR No 320, of 20 March 2020, the approach to the study by default includes a site sensitivity verification, comprising a desktop analysis using satellite imagery of the coastal zone, as well as marine spatial information contained in the National Biodiversity Assessment: Marine Component (Sink *et al.,* 2019).

The study provides a description of the natural baseline environment in the marine study area based on a review and collation of existing information and data from the scientific literature, and various internal reports. The information for the identification of potential impacts was drawn from various scientific publications, and information sourced from the Internet. The report identified and assessed the potential impacts of each stage of the cable installation (survey, installation and operation) on benthic habitat, marine fauna and water and sediments. All identified marine impacts were summarised, categorised and ranked in impact assessment tables, which have been translated into the impact assessment tables in Chapter 10 of this report, as applicable.

9.4.3 Findings

9.4.3.1 Sensitive areas encountered along the marine cable route alignment

The route of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) passes through a number of ecologically sensitive areas, with differing levels of protection, including:

- Threatened ecosystems (Near threatened and Vulnerable), ranging from poorly protected to not protected).
- The Algoa to Amathole EBSA.
- CBA1, CBA2 and ESA areas in terms of the National Coastal and Marine Spatial Biodiversity Plan (2020).
- Algoa Bay Hope Spot.
- The proposed Alexandria coastal belt/Algoa Bay Islands Nature Reserve Marine IBA.

No MPAs are crossed by the proposed cable landing.

9.4.3.2 Disturbance of the coastal zone[26]

Installation of the subsea cable through the surf-zone and across the beach would require the subsea cable to be buried to sufficient depth to ensure it is not exposed during seasonal variation of the beach levels. Excavated material would be disposed of onto the beach and into the surf-zone down-current of the construction site. Subtidal trenching would result in the mobilisation and redistribution of sediments in tidal currents and the littoral drift. This would result in localised increased suspended sediment concentrations in the water column. Where burial cannot be achieved and additional cable protection is required, an articulated split-pipe may be used to maximise cable security. The trenching and cable burial process would result in disturbance of high shore, intertidal and shallow subtidal sandy beach habitats and their associated macrobenthic communities through displacement, injury or crushing. Mobile organisms such as fish and marine mammals, on the other hand, would be capable of avoiding the construction area. Any shorebirds feeding and/or roosting in the area would also be disturbed and displaced for the duration of construction activities. On a high-energy coastline the recovery of the physical characteristics of intertidal and shallow subtidal unconsolidated sediments to their pre-disturbance state following trenching and cable burial will occur within a few tidal cycles under heavy swell conditions and will typically result in subsequent rapid recovery of the invertebrate epifaunal and infaunal communities to their previous state. If, following the disturbance, the surface sediment is similar to the original surface material, and if the final long-term beach profile has similar contours to the original profile, the addition or removal of layers of sand does not have enduring adverse effects on the sandy beach benthos.

9.4.3.3 Disturbance of nearshore benthic habitats

Trenching of the subsea cable in the littoral zone beyond 10-15 m depth would result in the mobilisation and redistribution of sediments in tidal currents and the littoral drift. This would result in localised increased suspended sediment concentrations in the water column. Where burial cannot be achieved and additional cable protection is required, an articulated split-pipe may be used to maximise cable security. Within the wave-base (0 – 50 m), the subsea cable and/or articulated split-pipes may be held in place with saddle clamps at specific locations. This

26 The coastal zone is defined as the coastal strip from 500 m inland of the high water mark to the 30 m depth contour (Cited in Pisces, 2021)

would require drilling into the bedrock to secure the clamps. The subsea cable burial and/or securing process would result in disturbance of subtidal unconsolidated sediments and their associated macrobenthic communities through displacement, injury or crushing. Although recovery is site specific and dependent on different modes of cable burial and varied sediment environments, studies have shown that on the inner and middle shelf, recovery of benthic communities following cable burial by plough typically occurs within 1-2 years and conclude that the physical presence of the cable and the disturbance caused by its burial had little effect on the benthic communities along the cable route.

9.4.3.4 Disturbance of offshore habitats

The grapnel used during the PLGR, and the subsea cable plough and/or tracked jet-trenching/burial ROV implemented during subsea cable laying would result in the disturbance and turnover of unconsolidated sediments along a swath of seabed. The plough blade disturbs a swath of seabed ≤1 m wide but potentially extending to a depth of 3 m. Jetting techniques create a trench typically ≤1 m wide, however sediment disturbance is extensive and redeposition can spread to hundreds of metres from the trench, with plumes of the suspended mud fractions potentially extending to 2 km from the cable route, thereby creating a larger impact footprint.

As the cable is typically only 17 mm to 50 mm in diameter, the disturbance associated with laying it on top of the sediment or consolidated substrate is limited to the footprint of the cable itself and any protective encasing material. Impacts associated with placing the cable directly onto the seabed include crushing, damaging or displacement of organisms. Unless cables traverse habitats supporting vulnerable slow-growing species (e.g. glass sponges, deep-water corals), the loss of substratum would be temporary as the cable itself would provide an alternative substratum for colonising benthic communities or provide shelter for mobile invertebrates. Once the cable has been laid, the affected seabed areas around the cable would with time[27] be recolonised by benthic macrofauna, with the encrusting epifauna resembling that inhabiting natural reefs in the area. Recovery time will vary depending on the type of benthic community, and is usually much slower in deeper areas, sometimes taking more than 10 years to fully recover. The impacts associated with cable burial are, however, a once-off disturbance, with affected communities able to recover naturally following the cable installation. Where the subsea cable is exposed, colonisation of the cable would commence within a few weeks. Studies from elsewhere have determined that benthic macro- and mega-fauna within 0–100 m of trenched and surface-laid cables showed negligible changes in abundance and distribution following cable installation.

9.4.3.5 Increase in noise

During installation of the subsea cable shore-crossing, noise and vibrations from excavation machinery may have an impact on surf-zone biota, marine mammals and shore birds in the area. The noise generated will, however, be localised and of short duration and mobile animals will be able to move out of the noise affected area.

[27] The time taken will vary depending on the benthic community and can take many years. Recovery rates are usually slower in deep water than in shallower areas.

Further offshore, underwater noise generated during subsea cable installation could affect a wide range of fauna; from benthic invertebrates and demersal species residing on the seabed along the subsea cable route, to those invertebrates and vertebrates occurring throughout the water column and in the pelagic habitat near the surface. Due to their hearing frequency ranges, the taxa most vulnerable to noise disturbance are turtles, pelagic seabirds, large migratory pelagic fish, and both migratory and resident cetaceans.

The cumulative impact of increased background anthropogenic noise levels in the marine environment is an ongoing and widespread issue of concern. The sound level generated by the subsea cable laying vessel and subsea apparatus would fall within the hearing range of most fish and marine mammals and would be audible for considerable ranges (in the order of tens of kms) before attenuating to below threshold levels. However, the noise is not considered to be of sufficient amplitude to cause direct physical injury or mortality to marine life, even at close range. The underwater noise may, however, induce localised behavioural changes or masking of biologically relevant sounds in some marine fauna. As much of the cable route is aligned with the main offshore shipping lanes that pass around southern Africa, the vessel noise component of the ambient noise environment is expected to be significant along the cable route. The noise generated by the cable laying vessel would be no different from that of other vessel traffic throughout the oceans, and from the point of vessel operations no specific mitigation (e.g. avoidance of marine mammal migration periods) is therefore deemed necessary when the vessel is in high seas waters.

9.4.3.6 Increased turbidity

The disturbance and turnover of sediments during the pre-lay grapnel run and during trenching will result in increased suspended sediments in the water column and physical smothering of biota by the re-depositing sediments. The effects of elevated levels of particulate inorganic matter and depositions of sediment have been well studied, and are known to have marked, but relatively predictable effects in determining the composition and ecology of intertidal and subtidal benthic communities. Increased suspended sediments in the surf-zone and nearshore can potentially affect light penetration and thus phytoplankton productivity and algal growth, whereas further offshore it can load the water with inorganic suspended particles, which may affect the feeding and absorption efficiency of filter-feeders. The increased occurrence of turbidity plumes near the surface can also affect the feeding success of visual predators. However, due to the rapid dilution and widespread dispersion of settling particles, any adverse effects in the water column would be ephemeral and highly localised. Any biological effects on nectonic and planktonic communities would be negligible. Turbid water is a natural occurrence along the Southern African coast, resulting from aeolian and riverine inputs, resuspension of seabed sediments in the wave-influenced nearshore areas and seasonal phytoplankton production in the upwelling zones.

Elevated turbidity is thought to negatively affect squid spawning and the survival of paralarvae, as visual cues are important in the formation of spawning aggregations; and paralarvae movement, respiration and feeding are constrained by high turbidity with mortality expected at above 20 mg/l. During natural high turbidity events squid move to offshore spawning grounds. As the cable routing passes within ~400 m of a known spawning area at Cape Recife, and the prevailing nearshore currents tend to flow in a southerly direction there is a risk that sediments suspended during the cable installation process may result in adverse effects on this spawning area.

Rapid deposition of material from the water column and direct deposition of excavated sands on adjacent areas of seabed may result in the physical smothering of resident biota by the depositing sediments.

9.4.3.7 Physical presence of subsea cable

Although the cable is typically only 17 mm – 50 mm in diameter, its presence effectively reduces the area of seabed available for colonisation by macrobenthic infauna in seabed sediments. The subsea cable itself and any protective covering, however, would serve as an alternative substratum for colonising benthic communities or provide shelter for mobile invertebrates and demersal fish (artificial reef effect). Assuming that the hydrographical conditions around the subsea cable and repeaters would not be significantly different to those on the seabed, a similar community to that typically found on hard substrata in the area can be expected to develop over time. The presence of subsea infrastructure (namely cable and repeaters) can therefore alter the community structure in an area, and effectively increase the availability of hard substrate for colonisation by sessile benthic organisms, thereby locally altering and increasing biodiversity and biomass, potentially also attracting mobile macro- and megafauna who utilize the biofouling community as a food source. Although no direct mitigation measures are possible, the negative impact of the subsea cable presence on marine biota is considered to be of low significance. Designated cable protection zones with suitable habitats may in fact help to maintain and improve biodiversity and species abundance, and therefore act as *de facto* marine reserves or sanctuaries, although this concept has yet to be proven.

9.4.3.8 Potential impacts associated with emissions from the cable (e.g. heat, electromagnetic fields, leachate)

HEAT DISSIPATION

While high and medium voltage seabed power transmission cables can emit heat, the voltage associated with telecommunication cables (for powering the repeaters) is very low, and any associated heat emissions are understood to be negligible. Although the potential consequences of this thermal radiation on benthic organisms has not yet been investigated in situ, the narrow footprint of the cables and the expected low temperature differences suggest that impacts are likely to be negligible.

SOUND EMISSIONS

Under normal operations, fibre optics cables do not emit any audible sound. During the laying of the cable, it does vibrate as a result of regular vortex shedding as it descends through the water column. At ~10 Hz, this is a low frequency phenomenon and well below the hearing frequencies of marine fauna. Once the cable comes to rest on the seabed the sound ceases. In areas of high wave or current action on the continental shelf, cables can be exposed and undermined. Where undermining is significant, the suspended cable can vibrate or strum under the water motions. This sound would likewise be of low frequency and would not be of sufficient amplitude to cause auditory or non-auditory trauma in marine animals. The sound is expected to attenuate rapidly to below ambient levels.

ELECTRIC AND ELECTROMAGNETIC FIELDS

Fibreoptics cables carry a constant direct current of 1 - 1.6 Amperes to power the underwater repeaters. There is no external electric field associated with the power on the inner conductor as the polyethylene insulation ensures that the electric field remains only within the cable insulation. The direct current in the inner conductor does, however, set up a stationary magnetic field in the form of concentric rings emanating from the cable. The magnetizing force produced by this field diminishes with increasing radius from the cable such that at a distance of 1 m from the cable, the electromagnetic field (EMF) would be in the order of 0.32 micro Tesla. This is two orders of magnitude lower than the typical magnetic flux densities of the earth, which range from 30 microTesla at the equator to 60 microTesla at the magnetic poles. Animals with the capacity to detect and use constant geomagnetic fields are thus likely to only detect the signal within close proximity to the source (within centimetres).

The marine environment is by no means devoid of electric and magnetic fields. Organisms use internal electric potentials and signals for a wide variety of biological functions (e.g. orientation or prey detection), and in some cases can perceive very small electric and magnetic fields. Perturbations from external electric and magnetic fields on such physiological systems need not necessarily have detrimental biological effects, as the magnitude of the effect will depend on the field intensities and exposure times to them, their frequency content, modulation, etc. A wide variety of taxa are sensitive to electromagnetic fields. Elasmobranchs and chimaerids are the taxa most likely to detect the electrical fields produced by fibre-optic cables because their electroreceptive organs are sensitive to stimuli in the very low frequency range from 0.125 Hz to 8.0 Hz.

The injection of a low frequency electrical signal from the land station is known as ‘toning’ and is undertaken to aid in cable location in the event of a fault or when a safe distance needs to be kept from a cable during other marine work. Toning has been used for many years on submarine cables throughout the world, and no adverse effects on marine life have been reported.

LEACHING OF CONTAMINANTS

Modern deep-water fibre-optic cables are composed of hair-like glass fibres, a copper power conductor and steel wire strength member, all of which are sheathed in high-density polyethylene. Where extra protection is required, as for areas of rocky seabed or strong wave and current action, additional steel wire armour is added. No anti-fouling agents are used. The cable-grade polyethylene used for the sheath is essentially inert in seawater. Oxidation, hydrolysis, and mineralization processes for polyethylene are extremely slow, with the total conversion to carbon dioxide and water estimated to take centuries. The effects of ultraviolet light, the main cause of degradation in most plastics, are minimized using light-stabilized materials, burial of the cable into the seabed and the natural reduction in light penetration through the photic zone. Where the cable is located on the energetic continental shelf and mechanical abrasion of the cable’s plastic sheathing by fine-grained particles is possible, the cable is either armoured or buried.

A study investigating potential leachates of copper, iron and zinc from the conductors and galvanized steel armour, identified that only zinc passed into the seawater, yielding concentrations of less than 6 mg/l for intact cables and less than 11 mg/l for cut cables with exposed wire armour ends[6]. The amount of leaching declined after ~10 days. Although this is above the recommended BCLME water quality guideline value of 5 µg/l (CSIR 2006), dilution of leachates by the surrounding water would be rapid and any negative effects on marine organisms are likely to be highly localised.

Although zinc is an essential food element and occurs as Zn^{II} in dissolved form, it is listed amongst the 129 priority pollutants by the US Environmental Protection Agency as it can have lethal and sub-lethal effects at concentrations as low as 170 µg/l, particularly on the egg and larval stages of marine invertebrates.

9.4.3.9 Pollution and accidental spills

Trenching during installation of the shore-crossing of the subsea cable will involve excavation and construction activities. Vessels will also be used in the nearshore for cable laying and floating and hauling the cable to shore which may be a potential source of pollution. There would thus be potential for or accidental spillage or leakage of fuel, chemicals or lubricants, litter, inappropriate disposal of human wastes and general degradation of ecosystem health on the shoreline. Any release of liquid hydrocarbons has the potential for direct, indirect and cumulative effects on the marine environment through contamination of the water and/or sediments. These effects include physical oiling and toxicity impacts to marine fauna and flora, localised mortality of plankton, pelagic eggs and fish larvae, and habitat loss or contamination. Many of the compounds in petroleum products have been known to smother organisms, lower fertility and cause disease in aquatic organisms. Hydrocarbons are incorporated into sediments through attachment to fine-grained particles, sinking and deposition in low turbulence areas. Due to differential uptake and elimination rates, filter-feeders, particularly mussels, can bioaccumulate organic (hydrocarbons) contaminants.

During construction, litter can enter the marine environment. Marine litter is a cosmopolitan problem, with significant implications for the environment and human activity all over the world. Marine litter travels over long distances with ocean currents and winds. It originates from many sources and has a wide spectrum of environmental, economic, safety, health and cultural impacts. It is not only unsightly, but can cause serious harm to marine organisms, such as turtles, birds, fish and marine mammals.

9.4.3.10 Collisions with and entanglement by marine fauna (including seabirds)

Vessel traffic can affect large cartilaginous fish species, turtles and marine mammals by direct collisions or propeller injuries. The potential effects of vessel presence on turtles and cetaceans include behavioural disturbance, physiological injury or mortality. Most lethal and serious injuries are caused by larger vessels and most vessel strikes occur on the continental shelf and when vessels are moving with speeds in excess of 10 knots. Given the slow speed of the vessels during surveying, the pre-lay grapnel run and the cable installation, ship strikes with marine mammals and turtles are unlikely, and should the impact occur, it would be very infrequent.

Entanglement of whales with old telegraph cables occurred during the telegraph era (1850s to 1950s) at sites where cables had been repaired on the edge of the continental shelf or on the adjacent continental slope in water depths down to 1,135 m. With improved design, laying and maintenance techniques, since development of the coaxial submarine cables in the 1950s and into the fibre-optic era in the early 1980s, no further entanglements with marine mammals have been recorded. Furthermore, as the cable would be buried along much of its length on the continental shelf, entanglements are highly unlikely.

As much of the cable would be installed in the offshore marine environment, the strong operational lighting used to illuminate the survey and cable vessels may disturb and disorientate pelagic seabirds feeding in the area. Operational lights may also result in physiological and

behavioural effects of fish and cephalopods as these may be drawn to the lights at night where they may be more easily preyed upon by other fish and seabirds. The response of marine organisms to artificial lights can vary depending on a number of factors such as the species, life stage and the intensity of the light. Considering the extensive distributions and low numbers of pelagic seabirds likely to be encountered in the offshore environment, the likelihood of collisions would be low.

9.4.3.11 Cumulative impacts

The primary impacts associated with the installation of subsea cables in the Agulhas and Southwest Indian Deep Ocean Ecoregions, relate to physical disturbance of the seabed, either through placing the cable on the seabed (>1,500 m depth) or by burying the cable in a trench excavated by a fit-for-purpose cable plough, diver-operated jet-pump or (where it crosses the beach) a tracked backhoe digger. As the 2AFRICA/GERA (East) cable routing will largely follow that of the existing SAFE cable, cumulative impacts need to be considered.

The proposed cable route, where possible, avoids sensitive reef areas and environments such as MPAs. Consequently, impacts will mostly affect communities in unconsolidated habitats, which are less sensitive to disturbance and recover more quickly than those inhabiting hard grounds. The cable will add to the existing development at and near Pollock Beach. Further offshore on the shelf and beyond the shelf break, the greatest possibility of cumulative impacts would be where the proposed 2AFRICA/GERA (East) cable route meets those of other existing subsea cables. However, available evidence suggests that there are no other cables landing in Algoa Bay and the nearest proposed IOX cable landing at East London has not been installed. Cumulative impacts are assessed to be of low to very low significance as in reality the total cumulative impacted area at any one time would be minimal, due to the natural recovery of benthic communities of unconsolidated habitats over the medium term.

9.4.3.12 Marine impact assessment summary

Potential impacts of the project on the marine environment include:

- Physiological injury or behavioural disturbance of marine fauna caused by noise.
- Potential injury to marine mammals and turtles through vessel strikes.
- Disturbance of sediments and associated fauna.
- Elimination of biota in the cable's structural footprint
- Physical presence of the cable providing an alternative substratum for colonising benthic communities or resulting in faunal attraction to fish and mobile invertebrates.
- Temporary loss of benthic habitat and associated sessile communities in the coastal zone.
- Possible temporary impacts on adjacent habitat health due to turbidity.
- Temporary disturbance of marine biota.
- Possible impacts to marine water quality and sediments through hydrocarbon pollution or contamination by other waste.
- Potential impacts associated with emissions from the cable (e.g. heat, electromagnetic fields, leachate)
- Pollution of the beach and sea due to accidental spills and litter.
- Collisions with and entanglement by marine fauna.
- Cumulative impacts.

A summary of the specialist's assessment of impacts is provided below. Relevant mitigation measures have been carried across to Section 10.3 of this report and incorporated into the EMPr (Appendix F), as relevant.

- Any behavioural or physiological impacts on marine fauna (including avifauna) due to noise from the geophysical survey and cable installation onshore and offshore would be short term, localised, of low intensity and fully reversible. Mitigation potential is very low. **The impact of increased noise on marine fauna during the cable survey and cable installation is considered of VERY LOW significance both without and with mitigation.**
- Disturbance and destruction of sandy beach biota during trench excavation and subsea cable installation would be temporary, once-off and highly localised. The impacts on benthic communities as a result of cable installation through the littoral zone would be of medium intensity. Impacts would be short-term as communities within the wave-influenced zone are adapted to frequent natural disturbances and recover relatively rapidly. If HDD is used, an undersea tunnel will be created and surface sediments will be negligibly impacted. **The potential impacts of the cable's shoreline crossing on benthic organisms is deemed to be of LOW significance without mitigation.**
- The impacts of trenching and increased suspended sediments on benthic communities in nearshore benthic habitats within and beyond the surf-zone would be of medium intensity. Impacts would be once-off and highly localised. Impacts would be expected to endure over the short-term only as communities within the wave-influenced zone are adapted to frequent natural disturbances and recover relatively rapidly. Although the subsea cable route passes through nearshore benthic habitats identified as 'vulnerable' (Eastern Agulhas Bay, Agulhas Inner Shelf Mosaic), the loss of resources would be low and impacts would be fully reversible. Using the total available areas provided for the various marine ecosystem types, and assuming a worst-case disturbance footprint of 5 - 6 m wide, the proportion of vulnerable Agulhas Inner-Shelf Mosaic habitat affected by the subsea cable installation was calculated at 0.0007% and that for Eastern Agulhas Bay habitat at 0.002% of the total 1,854 km^2 and 1,631 km^2 available for these 'vulnerable' nearshore habitats, respectively. This disturbance of benthic habitats can be considered negligible in relation to the available habitat areas. **The potential impacts of cable installation on benthic organisms in the nearshore environments is consequently deemed to be of LOW significance without mitigation.**
- The potential direct impacts of crushing and sediment disturbance on benthic organisms in offshore habitats would be of medium intensity and once off (unless cable repair is necessary). Benthic impacts will be highly localised along the length of the subsea cable route. Impacts would be limited to the medium-term only as recolonisation of disturbed sediments from adjacent areas would occur within a year, but full recovery to functional similarity can take longer (medium- to long-term). The change in habitat from unconsolidated sediments to the hard substratum of the cable itself would, however, be permanent. Although the subsea cable route passes through offshore benthic habitats identified as 'vulnerable' (Agulhas Sandy Outer Shelf and Agulhas Coarse Sediment Shelf Edge) and 'near threatened' (Agulhas Sandy Mid Shelf) the loss of resources would be low and impacts would be partially reversible as unconsolidated habitat will be replaced by hard substratum in areas where the cable is not buried. Furthermore, the proportion of vulnerable habitat affected by the subsea cable installation can be considered negligible in relation to the available habitat area. Using the total available areas provided for the various marine ecosystem types, and assuming a worst-case disturbance footprint of 5 - 6 m wide, the cable would disturb 0.004% and 0.002% of the 'vulnerable' Agulhas Sandy Outer Shelf and Agulhas Coarse Sediment Shelf Edge habitats. For the Agulhas Sandy Mid Shelf, which is considered 'near threatened', the disturbance footprint of the cable installation would amount to 0.006% of the available

habitat. **Consequently, the potential impacts on benthic organisms of cable installation across the continental shelf and abyss is deemed to be of LOW significance without mitigation.**

- Elevated suspended sediment concentrations due to trenching and burial activities associated with the subsea cable installation is deemed of low intensity and would extend locally around the subsea cable route and down-current of the shore-crossing, with impacts persisting only temporarily. Within the wave-base at least, marine biota are typically adapted to periods of elevated turbidity and as suspended sediment concentrations would remain at sub-lethal levels, the loss of resources would be low and impacts would be fully reversible. Mitigation potential is very low. **The impact of increased turbidity on marine biota is therefore assessed to be of VERY LOW significance without mitigation.**
- The physical presence of subsea infrastructure (namely cable and repeaters) can alter the community structure in an area, and effectively increase the availability of hard substrate for colonisation by sessile benthic organisms, thereby locally altering and increasing biodiversity and biomass, potentially also attracting mobile macro- and megafauna who utilize the biofouling community as a food source. Designated cable protection zones with suitable habitats may in fact help to maintain and improve biodiversity and species abundance, and therefore act as *de facto* marine reserves or sanctuaries, although this concept has yet to be proven. The impacts on marine biodiversity through the physical presence of the subsea cable would be of medium intensity and highly localised along the cable itself. As the subsea cable would likely be left in place on the seabed beyond decommissioning of the project, its impacts would thus be permanent. No direct mitigation measures, other than the no-project alternative, are possible. There is no feasible potential for mitigation. **The potential impacts on marine biota due to the physical presence of the cable is deemed to be of LOW significance without mitigation.**
- Based on available information in the literature, the impacts on marine fauna through the generation of heat, sound, EMFs and leachates by the submarine cable would be of negligible intensity and highly localised along the cable itself. As the subsea cable would be in operation for up to 25 years, the impacts would persist over the long-term. No direct mitigation measures, other than the no-project alternative, are possible. **The potential impacts on marine biota, caused by heat dissipation, sound emissions, electric fields, electromagnetic fields and/or leaching of contaminants directly from the cable, are deemed to be of VERY LOW significance without mitigation.**
- Potential hydrocarbon spills and pollution in the intertidal and shallow subtidal zone during installation of the subsea cable are deemed of medium intensity within the immediate vicinity of the construction site, with impacts persisting over the short- to medium-term. Impacts of pollution and accidental spills would be direct, indirect, and cumulative. As the coastal habitats at the shore crossing have been identified as ‘vulnerable’ (Southwestern Cape Mixed Shore) the loss of resources could potentially be medium, with impacts being only partially reversible in the worst-case scenario. Mitigation potential is high. **Pollution and accidental spills on the shoreline during the construction phase is improbable and the impact is therefore assessed to be of LOW significance.**
- Given the slow speed of the vessels during surveying, the pre-lay grapnel run and the cable installation, ship strikes with marine mammals and turtles are unlikely, and should the impact occur, it would be very infrequent. Entanglement with the marine cable is improbable. The likelihood of collision by seabirds as a result of operational lights is low. However, in the event of a collision or entanglement, the impact is deemed of low intensity and would be site specific to the vessel/cable location. Injury through collision and/or entanglement would persist over the short term and considering the slow vessel speed would likely remain at sub-lethal levels. Mitigation potential is medium. **Although**

this direct impact could result in a medium loss of resources, collision with or entanglement of marine fauna is assessed to be of LOW significance without mitigation.

- Due to the relatively small area impacted at any one time and the natural recovery of benthic communities of unconsolidated habitats over the medium term, **cumulative impacts of the cable installation are assessed to be of LOW to VERY LOW significance.**

9.4.4 Conclusion

Installation of the cable will potentially result in localised disturbance of the upper beach and intertidal and shallow subtidal sandy habitats, as well as unconsolidated seabed beyond the surf-zone and across the shelf. Most potentially negative impacts were rated as being of low significance, with only pollution and accidental spills during construction rated as medium significance. As recovery of marine communities over the short- to medium-term can be expected, residual impacts were all considered minor.

The specialist report concludes that, if all environmental guidelines and appropriate management and monitoring recommendations advanced in the report are implemented, there is no reason why the proposed installation of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) should not proceed.

9.5 Marine benthic shallow water impact assessment

9.5.1 Introduction

The report (Appendix B5) provides an assessment of the potential impacts of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) on the marine benthic communities in the shallow (<30m) subtidal environment near the cable landing point at Pollock Beach.

9.5.2 Approach

This specialist study undertook a desktop review of available scientific and grey literature on marine benthic comunities in Algoa Bay, and primary field data collection to obtain information on the community structure of marine benthic biota within the nearshore region (depths 0-30m) of the cable alignment. The objective of the field assessment was to characterise the community compositon along the inshore cable aligment along the depth gradient (0-30m) and to identify Threatened or Protected Species, (TOPS) rare or sensitive species, or Convention on International Trade in Endagered Species (CITES) listed species. The study involved a quantitative assessment and a rapid habitat assessment.

9.5.3 Findings

The substrate of Algoa Bay consists largely of unconsolidated sediments with scattered reef systems. A large proportion on the inshore coastal region between Bird Rock (near the project Landing Site) and Cape Recife point comprises hard reef substrata. The proposed cable route will affect 0.2 % of this inshore reef complex. Along the cable alignment, 58% of the sites assessed were classified as hard or reef substratum with the remaining 42% comprising soft substrata and the cable will therefore traverse approximately 1.9 km of reef substratum and 1.4km of soft sediments. Biotope D was the dominant reef biotope along the cable route

accounting for 25% of the landing site area. This biotope comprises low profile patch reef with adjacent or inundated by sand with dominant biota being hydroids, sea fans and encrusting red algae. No species were identified that had a distribution limited to the current study area. No macro benthic species identified in the current study are known to be Red Data listed, unique, sensitive or range restricted.

The report provides detailed information on anticipated impacts, both quantitative and qualitative, focusing on the benthic communities along the cable alignment at 0-30 m water depths, as outlined in the sections below. Mitigation measures for these impacts, as provided from this specialist report, have been carried across to Section 10.3 of this report and incorporated into the EMPr (Appendix F), as relevant.

9.5.3.1 Physical disturbance and damage to marine benthic biota (0-30m depth) (installation)

Damage to the hard substrata marine macro-benthic communities will occur due to cable movement during landing, and diver activity during pinning and attachment of the articulated split pipe. This will be limited to the immediate area along the cable route, and is not expected to exceed 5m either side of the alignment. The benthic communities to be impacted through these activities include shallow algal covered reef and ascidian and sponge dominated reef. The outcropping rock hosts the greatest diversity of benthic habitats along the route and covers a distance of 2.2 km. The area which may be impacted represents only 0.2% of the nearshore reef area. It is not expected that any major mortality will occur, and damage will mostly be restricted to the larger individuals and species (e.g. sea fans) which may incur breakages. All species encountered within the project servitude occur on adjacent reef areas and are therefore represented elsewhere in the nearshore reef habitats. Once installation is complete the macrobenthos will be able to recover to pre-impact health.

In areas where sand occurs over subcropping rock, cable burial will be undertaken by divers using a purpose-built sledge which is towed along the seafloor by a surface support vessel. The sledge is guided by divers with water being pumped from the surface vessel creating a high volume flow which is used to create a trench and bury the cable to a pre-determined depth. Diver burial will only be attempted along 294m (9%) of the cable route. Plough burial can only be undertaken in water depth >24m where the soft substrate is of sufficient depth. Prior to plough burial a grapnel run will be undertaken to remove any debris over the cable alignment which will disturb the sediment surface. The cable burial plough excavates a narrow trench (<1m) and adjacent damage will occur to the surface either side as a result of the plough skids (<6m total width). Benthic epifauna in these habitats was characterised by very low density sea pens and brittle stars which may be damaged by the plough activities and skids. The majority of biota within this habitat comprised infaunal communities which are unlikely to be impacted by the plough skids on the surface and only affected directly within the narrow trench itself. This habitat is widely distributed throughout Algoa Bay and recovery of damaged areas will likely occur rapidly.

9.5.3.2 Increased turbidity and sedimentation/smothering in the nearshore (installation)

PLGR, use of the plough and diver operated cable burial water jetting activities will lead to elevated suspension of particulate materials during the installation phase. This may lead to two impacts on the marine benthic biota, firstly increased turbidity affecting light penetration and therefore the ability of algae to photosynthesize, and secondly, smothering of biota due to the deposition of the suspended particles. However, due to the sediment type on site, the potential for dispersion is limited and sediment will settle out of the water column quickly. This means that the extent of the impact will be highly localised and of short duration. This nearshore coastal area in Algoa Bay is highly dynamic and is subject to large scale sand movement and suspension of

sediments during rough sea and storm events. The biota are therefore adapted to these conditions. As a result, impacts of increased turbidity on algal communities in the nearshore will be negligible.

Smothering of benthic biota by sediments may impact on feeding of suspension feeders, potentially influencing benthic community structure on reef or hard substrata more significantly than unconsolidated substrata, as soft sediment biota are generally mobile or able to withstand short periods of inundation. Areas of rock outcropping within the cable route occur in a highly dynamic section of the coastal zone, subject to movement of large volumes of sediment. It is therefore probable that the inshore benthic communities are able to withstand temporary inundation. The impacts of smothering on reef macro-benthic communities will be limited to the reef edge closest to where burial will commence, which accounts for limited habitat. Any impacts from sedimentation will be highly localised to the cable route and more specifically adjacent to areas where the plough and diver burial methods will be used. Cable installation in the nearshore will also be short duration (approximately one day) further limiting the severity of this potential impact. Based on these considerations the overall significance of this impact is considered LOW.

9.5.3.3 Accidental spills (installation)

The findings regarding accidental spills corroborate those of the Marine Ecology Assessment as summarised in section 9.4.3 above.

9.5.3.4 Presence of hard permanent structure in the nearshore (operation)

The installation of the cable will result in the presence of a hard permanent structure. This impact is only relevant in areas where cable burial is not undertaken. For the landing at Pollock Beach, this will occur over the rock outcropping areas in which hard substrata is already present. The cable in this habitat will be colonised and overgrown by naturally occurring marine benthic species in time. Introduction of the hard cable structure to areas of subcropping rock is not seen as a major issue, as these areas comprise a mix or hard and soft substrata in the natural state, and the new hard substrate will be colonised by naturally occurring species. The cable will be buried in the soft substrata in the nearshore and the introduction of hard substrata in areas of soft substrata will not occur at Pollock Beach landing site.

9.5.3.5 Introduction of electric fields, electromagnetic fields, sound and heat (operation)

The findings regarding cable emissions corroborate those of the Marine Ecology Assessment as summarised in section 9.4.3 above.

9.5.4 Conclusion

The report concludes that the impacts on macro benthic communities during installation and operation are of low significance, post mitigation. Macro benthic communities which are damaged during the construction phase will be able to recover to pre-impact conditions within a reasonable period and there will be no long-term impacts during operation. No follow on or long term monitoring is required.

This makes it an acceptable activity within the CBA1 area of Algoa Bay since it is compatible with the management objectives and sea-use activities. Based on the assessment of shallow water benthic communities, it is feasible to authorise the cable landing, installation and operation through the proposed route at Pollock Beach.

9.6 Heritage assessment

9.6.1 Introduction

The HIA report (Appendix B6) provides an assessment of the potential impacts of the 2AFRICA 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) on heritage resources.

The HIA deals with both the marine and terrestrial portions of the cable system. The marine portion of the cable route is located between the outer edge of the contiguous zone (i.e. 24 nautical miles offshore) and the high water mark, which is the extent of the jurisdiction of SAHRA. The terrestrial element of the cable route lies between the BMH and the CLS and falls under the jurisdiction of the ECPHRA.

9.6.2 Approach

The HIA aims to identify heritage resources which may be impacted during the construction, operation and decommissioning phases of the project, assess their significance and provide recommendations for mitigation. The report therefore includes the following:

- A desk-top level literature review to assess the potential for maritime archaeological sites, and submerged pre-colonial sites along the marine route of the cable system;
- A desk-top level literature review to assess the potential for archaeological and other heritage sites along the terrestrial route of the cable system;
- A desk-top palaeontologist assessment of the potential for impacts to palaeontological features (both on land and in the seabed) arising from the cable system; and
- A review of the offshore geophysical survey reports for the cable system for seabed anomalies that may represent heritage resources.

The results of the studies listed above are integrated in the HIA report along with an assessment of the sensitivity and significance of any heritage resources, an evaluation of the potential impacts of the project on these resources and recommendations for measures to mitigate any negative impacts.

9.6.3 Findings

Of the heritage resource types protected by the NHRA, the installation and operation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) has the potential to impact the following, which are defined in Section 2 of the NHRA:

- Submerged pre-colonial archaeological sites and materials older than 100 years;
- Maritime and underwater cultural heritage sites and material older than 60 years, which are principally historical shipwrecks;
- Palaeontological features and material, which are defined by the NHRA as the fossilised remains or fossil trace of animals or plants which lived in the geological past;
- Terrestrial archaeological sites and materials older than 100 years;
- Structures older than 60 years;
- Graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Public monuments and memorials.

These have been described in Section 6.6 of this EIA report and in more detail in the specialist report.

9.6.3.1 Submerged prehistoric archaeological material

The report finds that where submerged prehistoric archaeological material potential has survived post-glacial marine transgression, it will form part of the sedimentary make-up of the seabed and may be impacted by interventions on and in the seabed. The small footprint of the seabed intervention that will result from the installation of the cable system, however, makes the potential for direct impacts on submerged prehistoric archaeological material in the study area unlikely. The nature of the proposed seabed intervention, namely the burial of the cable in the seabed within the area covered by this assessment suggests that indirect impacts, which manifest themselves after and/or downstream of the activity are also unlikely.

No mitigation is proposed.

9.6.3.2 Paleontological features and fossil material

The sediments, both onshore and offshore, that may be affected by the proposed cable, are the relatively young Nanaga Formation aeolianites, which have a low potential to preserve significant fossils.

Where the cable rests on the seabed, direct impacts on potentially fossiliferous sediments below the seabed are expected to be negligible. Where burial is required with the seabed plough method, it is not possible to perform palaeontological mitigation, as seabed materials are not brought up to the vessel for inspection and sampling. However, direct palaeontological impacts from burial are considered to be negligible, due to the limited subsurface seabed disturbance entailed in burying the cable by seabed plough.

Where the cable crosses the shoreface and beach sands, the water jetting and trench digging may encounter the Nanaga Formation aeolianites. Given the nature of these sediments, direct impacts on palaeontological material is unlikely.

The nature of the proposed seabed intervention also suggests that indirect impacts, which manifest themselves after and/or downstream of the activity are likely to be negligible.

No mitigation is proposed.

9.6.3.3 Maritime archaeological resources

Three wrecks may occur within 1 km either side of the proposed cable alignment. The Inshore and Shallow Waters geophysical surveys undertaken by Fugro Germany Marine (Fugro, 2020) noted the presence along the route of two occurrences of possibly anthropogenic debris and magnetic anomalies, although none of these contacts could be more accurately described or positively identified. It is therefore not known whether any of these anomalies represent historical shipwrecks or related material. The small footprint of the seabed intervention and the potential for seabed debris to damage the cable plough, which means that these contacts are likely to be carefully avoided during cable installation, suggests that the potential for direct impacts on maritime archaeological sites or material in the study area is negligible. The nature of the proposed seabed intervention suggests that indirect impacts, which manifest themselves after and/or downstream of the activity and can take the form of, for example, seabed scour, are unlikely to affect any of the handful of known wrecks in vicinity of the cable system.

The specialist recommendations for mitigation of impacts on maritime heritage resources are listed in Section 10.6 of this report and incorporated into the EMPr (Appendix F), as relevant.

9.6.3.4 Terrestrial archaeology

Although archaeological assessments in the Summerstrand / Cape Recife area indicate the presence in places of, particularly, Later Stone Age sites and material, the urban development of the area that includes the BMH alternatives and terrestrial cable route alignment suggests that archaeological material is unlikely to be preserved in this area.

Measures for mitigation of chance finds of terrestrial archaeological resources are listed in Section 10.6 of this report and incorporated into the EMPr (Appendix F), as relevant.

9.6.4 Conclusion

The HIA concludes that the proposed installation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) raises no red flags, contains no fatal flaws and is unlikely to have any significant impact on heritage resources. It is, therefore, considered acceptable.

9.7 Avifauna assessment

9.7.1 Introduction

This report (Appendix B7) is a generic, desktop assessment of the potential impacts of the construction and operation of marine fibre optic cable systems on avifauna in South Africa, prepared by WildSkies (2021). This assessment was commissioned following comments raised by DFFE – O&C with regards to possible impacts on offshore avifauna. The findings can be applied to all submarine fibre-optic cable landings on the West, South and East coasts of South Africa.

9.7.2 Approach

The investigation utilised desk-top assessments and a review of available literature to investigate and identify factors associated with the installation and operation of subsea cables and their potential impacts on seabirds associated with South Africa's EEZ and coastline. In addition, the investigation identified mitigation and management measures that may be employed during and post installation.

9.7.3 Findings

South African waters boast a rich diversity of seabirds and shorebirds, many of which occur in the area affected by the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing). The 2018 'State of South Africa's Birds' (Taylor & Peacock, 2018) states that "seabirds have declined faster than any other group of birds and now account for a third of all threatened species". Reasons for the poor conservation status of seabirds include slow reproductive rates; dependence on islands for breeding (and consequent vulnerability to disturbance and introduced predators); direct mortality through interaction with fishery activities; and competition between seabirds and fisheries.

Three main impacts of subsea cable installations on birds were identified, along with general mitigation measures, as described below.

- **Offshore habitat destruction** during installation of the marine cable is an indirect impact most likely to affect seabird prey base and is likely to be of low significance given the limited development footprint and short construction period. The onshore and near-shore components of the cable system have a very small footprint and are generally located on sandy beaches (to facilitate cable burial) and not the more ecologically sensitive rocky shorelines. Although work within this zone is normally completed within a week, the site should be carefully managed to ensure that no unnecessary impacts occur. Particularly sensitive bird areas should be avoided when planning cable landing sites and include avoiding MPAs, IBAs, sensitive onshore areas and any islands.
- **Disturbance effects** will be limited, if breeding sites are not impacted on, as cable installation moves relatively quickly (up to 20 kilometres of cable laid per day). As described above, the onshore and near-shore activities will be extremely limited spatially and temporally, and any impacts on shore birds should be minor and short lived. Disturbance will therefore be a localised and temporary effect. Breeding areas for sea and shorebirds should be avoided, to minimise impacts.
- Since no food will be available to sea birds during cable installation or during the pre-lay grapnel run, **possible incidental mortality of seabirds striking the cable laying vessel** will be of low significance. Birds may approach the vessel to investigate but will not spend extended periods close to the ship or congregate in large numbers (since no food is available). Further, since no feeding behaviour will be induced, birds will not be distracted (which is thought to contribute to their collision and entanglement at fishing vessels) whilst in flight close to the ship. Lighting on board project vessels should be kept to a minimum in order to reduce the risk of attracting and disorientating seabirds.

Mitigation measures from this specialist report have been carried across to Section 10.3 of this report and incorporated into the EMPr (Appendix F), as relevant. Refer also to the recommendations above.

9.7.4 Conclusion

In general, the significance of anticipated impacts of submarine telecommunications cables projects on seabirds and shorebirds is low, provided the cable avoids particularly sensitive bird areas such as MPAs, IBAs, sensitive onshore areas and any islands

9.8 Marine mammal assessment

9.8.1 Introduction

This report is a generic, desktop assessment of the potential impacts of the construction and operation of marine fibre optic cable systems on marine mammals in Southern African waters, prepared by Sea Search (2021) (Appendix B8). This assessment was commissioned following comments raised by DFFE-O&C with regard to possible impacts of marine telecommunications cable projects on marine mammals. These findings can be applied to all of the 2AFRICA landings on the West and East coasts of South Africa.

9.8.2 Approach

The investigation utilised desk-top assessments and a review of available literature to investigate and identify factors associated with the installation and operation of telecommunications cable systems around South Africa which could potentially impact on marine mammals. In addition, the investigation identified mitigation and management measures that may be employed during and post installation.

9.8.3 Findings

Submarine telecommunications cables have been laid across the ocean floor since the mid-1800s, with over a million kilometres of cable now deployed worldwide. Given that the laying of the cable is relatively brief in comparison to other human activities floor such as mining and trawling and the fact that the footprint of the cable is narrow (up to 8 m for the actual cable but a few km for initial acoustic/benthic surveys), the impacts of benthic destruction and modification is not thought to impact marine mammals in any measurable way. The main impacts of the cable laying process which might affect marine mammals have been identified as follows:

- Avoidance of noise and masking of vocalisations by general ship noises and depth sounders.
- Potential startle responses of marine mammals to multi-beam echosounders, which could lead to mass stranding events.
- Entanglement of cetaceans in the cable is possible during deployment or once laid but has not been recorded in over 30 years. This is thought to be a result of modern materials and cable laying methods (including shallow water burial) and thus, entanglement is not regarded as a threat.

Given that most marine mammals occur in South Africa's water throughout the year, the timing of installation is not considered to be of great importance, however based on the data available, the months of June – October tend to be more important to vulnerable species such as Fin Whales, Blue Whales and Sei whales.

Mitigation options for these activities are limited but include ensuring use of well-maintained ships and equipment to minimize noise production from engines; switching off non-essential sonar systems, cautious use of multi-beam echosounders and avoidance of peak whale seasons.

It is recommended that the vessel appoint a suitably trained crew member with relevant experience in marine mammal identification as a Marine Mammal / Protected Species Observer (MMO/PSO), to ensure no mammals are within the potential impact zone of sonars, cables or noise pollution.

10 ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

The key issues identified during Scoping and carried through to the Impact Assessment are formulated as seven [28] key questions:

- What are the potential social and socio-economic impacts associated with the construction and operation of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)29?
- What impacts will the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on terrestrial vegetation, wetlands and fauna?
- What potential impacts will the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on the marine environment?
- What impacts will the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on the fishing industry, in particular the squid fishery?
- What impacts will the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) Submarine Cable System (Gqeberha landing) have on the beach and dune cordon at Pollock Beach?
- What impacts will the construction of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on cultural and heritage resources, including any paleontological resources?
- What cumulative impacts will result from the construction of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)?

Potentially significant impacts associated with each of the above issues are discussed and assessed in the sections below. Where relevant, significance ratings have been assigned to impacts, according to the assessment conventions (Section 7.5), and presented in Impact Assessment tables (Table 14 to Table 20). The tables assess the significance of expected impacts before mitigation, as well as after application of the recommended mitigation measures (in Chapter 10 and in the EMPr), as applicable.

Note that mitigation measures may be repeated, where they apply to multiple phases of the project.

10.1 What are the potential social and socio-economic impacts associated with the construction and operation of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)?

During the construction/installation phase, social and socio-economic impacts (both positive and negative) are of medium and low significance after management/mitigation. During operation, they are also of medium and low significance after management/mitigation (Table 14).

10.1.1 Boost to economic development (nationally and internationally)

The proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) will provide additional and affordable international bandwidth which will support the country's economic development initiatives locally and abroad.

[28] Note that some changes have been made to the questions as originally framed in the FSR, however they continue to address all key issues identified in the FSR.

[29] This was not in the Draft and Final Scoping Reports but has been added during the Impact Assessment as a key issue.

While expanding access to communication technology will be done primarily through broadband infrastructure roll-out, this requires a national backbone connected to the rest of the world. In this case, the proposed project supports SIP 15 via its international connectivity, capacity and speed.

10.1.2 Impacts on existing marine telecommunications cables and submarine pipelines

While the main trunk cable of the 2AFRICA/GERA (East) will cross other submarine cables circumnavigating the South African coast, the branch line to Gqeberha will not cross submarine telecommunication cables. Vodacom will abide by the guidelines and standards of the ICPC, which are in place to ensure safety of existing marine telecommunications systems. Therefore, it is not anticipated that the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) will negatively impact on existing marine telecommunications cables.

The proposed route crosses no pipelines.

10.1.3 Impacts on Oil and Gas exploration concession areas

The proposed Gceberha branch cable alignment passes through three O&G exploration blocks. There will be potential conflicts of interest between the Developer and O&G rights holders, should the cable and/or its exclusion zone pass directly through planned drilling areas or interfere with offshore subsea infrastructure development for O&G.

Impact Oil and Gas has stated their concerns regarding impacts of the 2AFRICA/GERA (East) Submarine Cable System on their activities (future and planned) on the East Coast of South Africa. They have requested *"early engagement on the drafting of a Co-operation Agreement to clearly outline the roles and responsibilities of both parties in terms of financial obligations, protection of subsea infrastructure, insurance, rights and obligations, and principles of co-operation so this is in place in good time prior to commencement of cable operations"*. This engagement is currently underway, and draft agreements have been submitted to O&G Rights Holders for review and acceptance. Early concerns raised by the O&G Rights Holders have been addressed and ongoing discussions are taking place to formalise the Cooperation Agreements.

O&G interests and future associated drilling activities pose a risk to the development of the proposed 2AFRICA/GERA (East) Cable System. It is thus of primary importance for ASN and Vodacom to engage and conclude Cooperation Agreements with all affected O&G Rights Holders, to limit the disruption of either Party's commercial activities.

10.1.4 Improved/increased opportunities for education and job creation (during operation)

In improving and facilitating communications and economic development in South Africa, the project is anticipated to contribute positively towards education and job creation in the country, thus assisting to improve livelihoods.

10.1.5 Increased employment opportunities and opportunities for local business and SMMEs (during installation)

Since the landing of the marine cable onto shore is a specialised activity, and limited land based infrastructure will need to be constructed, very few temporary jobs will be available during the installation phase. Local businesses and accommodation facilities may benefit from the project team temporarily staying in the area.

10.1.6 Impacts on surfing at Pipe, Pollock Beach

The local surfing community have expressed concern that the cable installation and the cable itself, may negatively affect surfing at Gqeberha' s most popular surf spot, known as Pipe, at Pollock Beach.

Surfing in the vicinity of the cable laying operations may be temporarily restricted during installation. However, the duration of the cable landing is very short. Trenching on the beach will be completed within a week. One day is required for the actual cable landing, and a further 1-2 days for the burial of the cable out to 150 metres. Additionally, installation is undertaken preferably under conditions that are not good for surfing. Thus, potential disruption to surfers will be very limited.

Once the cable is buried under water and on the beach, currents, wave and wind action will quickly restore the disturbed area to its natural topography. Where the cable is surface laid and/or anchored to the nearshore subtidal reef, it will have an insignificant effect on the profile of the seafloor due to its small dimensions. Double Armoured cable is 38 mm in diameter and the Articulate Pipe which is used to protect the cable in the near shore environment and to promote burial is the standard 55 type which is 165 mm at its widest point. The cable *in situ* is therefore not anticipated to have a negative impact on the surf break.

10.1.7 Impacts on water-based sports and recreation at Algoa Bay

Sailing activities and events at Algoa Bay could be affected by the temporary exclusion zone during the cable laying and landing. Some of these are organised well in advance of the event and could cause a conflict of interest. It will be important to engage the event's organisers timeously so that scheduling of cable laying leads to minimal disruptions.

Similarly, other water based events such as scuba diving events may potentially be affected by cable laying, unless the sectors are engaged ahead of time and the required co-ordination between role players takes place.

Provided there is sufficient, timeous communication between the relevant parties, the impact of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) on sporting events at Algoa Bay will be of low significance.

10.1.8 Community safety

The movement of vehicles and heavy machinery on the beach, as well as excavation and other installation activities, could pose a safety risk to beach goers if they are not kept away from the working area. Similarly, construction activities where the BMH and trenching are undertaken come with safety risks. However, with proper site management in accordance with existing construction safety regulations and specifications in the EMPr, no significant impacts with respect to community safety are anticipated.

10.1.9 Maritime safety

Safety of ships and personnel at sea, and safety of the environment from ships and shipping activities, is obviously of prime importance. It is, however, regulated and managed at many levels via existing legislation and management systems. Notification to mariners is sent out which notifies ships in the area of cable operations and a 500 m safety zone from the ship must be adhered to. Provided notifications are properly undertaken and mariners comply with the necessary regulations, increased safety risks at sea are not anticipated to be a significant negative impact of the project.

10.1.10 General disruption and nuisance impacts for residents and beach users

Construction of the BMH and trenching, as well as the shore end landing, will result in minor disruption and nuisance impacts to surrounding infrastructure, residents, and beach goers. These impacts may include increased noise and dust, temporary disruption of access, increased health, safety and security risks, and negative visual impacts. However, due to the very limited scale of the construction works and short duration, these impacts are anticipated to be of low significance.

During operation/maintenance of the cable, the impacts on beach infrastructure and beach and sea users will be negligible, as maintenance activities will be very infrequent and more likely to be required offshore.

Should decommissioning of the cable involve removal of the cable from the beach, similar (but less intense) impacts to cable installation, are anticipated.

10.1.11 Mitigation measures

10.1.11.1 During planning and design

- Vodacom to implement the guidelines and standards of the ICPC.
- Vodacom to engage directly with offshore concession holders and to draw up a Co-operation Agreement (if required) which outlines the rights, obligations and roles and responsibilities of both parties in terms of the installation and operation of subsea infrastructure.
- To eliminate interactions with future Oil and Gas activities on cable system infrastructure and operations, the landing partner must undertake the following:
    - Conclude agreements between the cable landing partner and the various offshore concession holders to ensure that the activities of both parties can co-exist without limiting each other's commercial operations.

- Map the marine cable system route and formally register the cable routing as a real right against the Deed and against the Oil and Gas Rights at the Mineral and Petroleum Titles Registration Office.

- ❑ Vodacom to communicate timeously[30] with sporting events organisers and hosting venues (e.g. yacht clubs, skiboat clubs, scuba diving clubs) at Algoa Bay for scheduling and co-ordination purposes.
- ❑ Installation should preferably be timed to occur outside of peak holiday seasons (December, January and April). However, this will need to be weighed up against several other factors such as major sporting events, peak whale seasons and other scheduling factors affecting the project.

10.1.11.2 During installation (on land)

- ❑ Targeted notification of the affected user groups (onshore and offshore) prior to cable landing, must be provided. This must include the Airports Company South Africa (ACSA).[31] Information regarding the expected types of construction activities must be supplied and signage/notices erected where appropriate.
- ❑ Where possible, make use of local labour/SMME's and use local goods and services.
- ❑ Cordon off work areas that pose a risk to the public and ensure that alternative access to the beach is provided.
- ❑ Construction vehicles must obey regulated speed limits, lights will be switched on at all times and no large vehicles will use the roads at dawn, dusk, at night or in heavy mist conditions to reduce the risk of accidents with other vehicles and pedestrians.
- ❑ Practice good housekeeping to limit negative visual impacts and leave the site clean and free of waste of any kind.
- ❑ Appropriate training of construction personnel must be undertaken so that they are aware of the restrictions, mitigation measures and the use of spill and containment kits.
- ❑ Any beach infrastructure that may be disturbed by the construction of facilities on land and by the installation of the cable, must be protected, or replaced at the cost of the applicant, should they get damaged due to implementation of the proposed project activities or negligence by the applicant.

10.1.11.3 During installation (marine)

- ❑ Number and size of vessels to be provided to SAMSA.

30 Big events, possibly including international events, are likely scheduled a year or more in advance.

31 At the time of writing this report, the contact people are: Patric Maxaxa, Senior Safety Compliance Officer, and Gcisa Salukazana, Safety Compliance Officer.

Table 14 Assessment of potential socio-economic and social impacts resulting from the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
Boost to economic development (operation)	Unmitigated	Positive	National/ Inter-national	Long-term	Low	Continuous	Low	Medium	Highly Probable	Medium	High
	Mitigated	Positive	National/ Inter-national	Long-term	Low	Continuous	Low	Medium	Highly Probable	Medium	High
Improved educational and job opportunities (operation)	Unmitigated	Positive	National/ Inter-national	Long-term	Low	Continuous	Low	Low	Highly Probable	Low	High
	Mitigated	Positive	National/ Inter-national	Long-term	Medium	Continuous	Low	Low	Low	Medium	High
Increased employment and business opportunities (installation)	Unmitigated	Positive	Regional	Short-term	Negligible	Once-off	Low	N/A	Probable	Low	High
	Mitigated	Positive	Regional	Short-term	Low	Once-off	Low	N/a	Probable	Low	High
Impacts on O&G concession areas (operation)	Unmitigated	Negative	Local	Permanent	Medium	Once-off	Low	Low	Probable	Medium	Medium
	Mitigated	Negative	Local	Permanent	Low	Once-off	Low	Moderate	Probable	Low	Medium
Impacts on existing tele-	Unmitigated	Negative	Site-specific	Short-term to permanent	Medium	Once-off	Low	Medium	Probable	Medium	Medium

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
communications cables and pipelines (installation)	Mitigated	Negative	Site-specific	Short-term to permanent	Negligible	Once-off	Low	High	Improbable	Low	Medium
Impacts on surfers and surf break	Unmitigated	Negative	Local	Short-term to permanent	Low	Once-off	Moderate	High	Probable	Low	High
	Mitigated	Negative	Local	Short-term to permanent	Negligible	Once-off	Moderate	High	Improbable	Low	High
Disruption of water sports events	Unmitigated	Negative	Local	Short-term	High	Once-off	N/A	N/A	Probable	Medium	High
	Mitigated	Negative	Local	Short-term	Negligible	Once-off	N/A	N/A	Improbable	Low	High
Community safety risks	Unmitigated	Negative	Local	Short-term	Low	Once-off	N/A	N/A	Probable	Low	High
	Mitigated	Negative	Local	Short-term	Low	Once-off	N/A	N/A	Probable	Low	High
Maritime safety risks	Unmitigated	Negative	Local	Short-term	Low	Once-off	N/A	N/A	Probable	Low	Medium
	Mitigated	Negative	Local	Short-term	Low	Once-off	N/A	N/A	Improbable	Low	Medium
General disruption and	Unmitigated	Negative	Local	Short-term	Low	Once-off	N/A	High	Highly Probable	Low	High

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
nuisance impacts (installation)	Mitigated	Negative	Local	Short-term	Negligible	Once-off	N/A	High	Highly Probable	Low	High

10.2 What impacts will the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on terrestrial vegetation, wetlands and fauna?

10.2.1 Loss of, or disturbance to terrestrial vegetation, freshwater ecosystems and non-marine fauna

The installation of the cable across the beach to the BMH and on to the CLS does not traverse threatened terrestrial ecosystems, CBAs or ESAs. The land based infrastructure affects a transformed area (tarred areas, grassed verges and planted vegetation) and will have no impact on wetland or other freshwater ecosystems. Consequently, the project will not negatively impact on natural habitat for terrestrial fauna (Table 15).

If HDD is utilised to install the cable due to substrate conditions the possibility does exist for pollution to take place through the spillage and escape of bentonite from the drilling hole. Although inert and nontoxic, bentonite has the consistency of mud which, if spilt, can smother surrounding plant life and organisms within the terrestrial environment. Through careful planning, and if a suitably qualified drilling contractor is appointed, the risks of bentonite spillages is considered to be of low significance. Mitigation measures to prevent the possible risk of bentonite spillages are also included in the EMPr should this construction method be utilised on site.

Table 15 What impacts will the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on the terrestrial vegetation, wetlands and fauna?

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
Loss/ disturbance of terrestrial vegetation	Unmitigated	Negative	Site-specific	Short-term	Negligible	Once-off	Low	High	Probable	Low	High
	Mitigated	Negative	Site-specific	Short-term	Negligible	Once-off	Low	High	Probable	Low	High
Loss/ disturbance of wetlands/ freshwater habitat	N/A (no impact)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Potential pollution of the terrestrial environment through bentonite spills (if HDD is utilised for cable installation	Unmitigated	Negative	Site-specific	Short-term	Medium	Once-off	Low	High	Probable	Medium	Medium
	Mitigated	Negative	Site-specific	Short-term	Low	Once-off	Low	High	Improbable	Low	High
Impacts on non-marine fauna	Unmitigated	Negative	Site-specific	Short-term	Negligible	Once-off	Low	High	Improbable	Low	High
	Mitigated	Negative	Site-specific	Short-term	Negligible	Once-off	Low	High	Improbable	Low	High

10.3 What impacts will the construction and operation of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on the marine environment?

The proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) will have impacts along its routing, on a number of marine ecosystems and biota associated with the seabed and the water body around it. The cable routing affects areas that are CBAs.

The potential negative impacts of the project on marine flora and fauna on shore, nearshore and offshore, are all of low significance before and after mitigation (noting the potential for mitigation is limited), with the exception of accidental pollution, which would be of medium significance before mitigation and low significance after mitigation. The cable will afford a section of the seabed long term protection due to the exclusion of anchoring and trawling 500 m either side of the cable, which is considered a positive impact of medium significance (Table 16).

10.3.1 Disturbance to shorebirds and seabirds

The beach and dunes at the landing site at Pollock Beach are highly transformed with no breeding habitat for shorebirds. Any shorebirds frequenting the area will temporarily move away from construction disturbance. Given the fast recovery of the sandy beach following excavation and laying of the cable (see the section below), the project is not expected to have any significant impact on the sandy beach biota which provide food sources for shorebirds. Therefore, impacts on shorebirds are anticipated to be of low significance.

Seabirds may approach the cable laying vessel to investigate but will not spend extended periods close to the ship or congregate in large numbers (since no food is available). Further, since no feeding behaviour will be induced, birds will not be distracted (which is thought to contribute to their collision and entanglement at fishing vessels) whilst in flight close to the ship. Lighting on board project vessels could, however, potentially attract and disorient seabirds. The possible incidental mortality of seabirds striking the cable laying vessel is anticipated to be of low significance.

10.3.2 Loss of, or disturbance to, sandy beach biota in the coastal zone

As detailed and assessed in the specialist findings (Section 9.4.3), disturbance and destruction of sandy beach biota will result during trench excavation and subsea cable installation across the surf zone and beach, but recovery will be rapid and the impact is considered to be of low significance.

10.3.3 Loss of, or disturbance to marine flora and fauna

10.3.3.1 Benthic organisms in sandy beach, littoral zone, nearshore and offshore habitats

The seashore, littoral zone and the seabed will be disturbed by pre-installation and installation activities along the route alignment of the marine cable, which will injure or crush benthic invertebrates in their path. Cable burial will disturb sediments and may affect benthic organisms by smothering or by turbidity plumes which alter light conditions and concentrations of suspended particles in the water column.

This disturbance will also occur on a small portion (0.2%) of the inshore reef complex between Bird Rock and Cape Recife point. As indicated in the specialist findings (Section 9.4.3) affected benthic communities (including the inshore reef) will recover over time and the impacts of the project on benthic organisms is deemed to be of low significance, without mitigation.

10.3.3.2 Disturbance/injury of marine fauna due to noise

Physiological injury or behavioural disturbance of marine fauna can be caused by noise. However, as detailed in the specialist findings (section 9.4.3), the nature of the noise resulting from the cable survey, cable installation and maintenance activities, as well as from the cable itself during operation, will result in impacts that are considered to be of very low significance, both without and with mitigation.

10.3.3.3 Effect of increased turbidity on marine biota

Pre-installation and installation activities along the route alignment of the marine cable will result in a localised and temporary increase in sediment concentration near the seabed and in the water column. Increased turbidity in the water can affect marine biota in various ways. As detailed in the specialist findings (Section 9.4.3), turbid water is a natural occurrence on this coastline and the biota are adapted accordingly. There is a risk that increased turbidity may adversely affect the spawning area for squid at Cape Recife. However, the elevated concentrations are deemed to be low intensity. The impact of increased turbidity on marine biota (deep and shallow waters), as a result of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) is considered to be of low significance. Mitigation potential is low.

10.3.3.4 Artificial reef effect due to presence of the cable

During operation, the physical presence of the cable on the seabed may have an “artificial reef” effect. As described in the specialist findings (Section 9.4.3), where not buried, the cable will provide a substrate for colonisation by sessile benthic organisms, thereby locally altering the composition of the benthic biota community. In the shallower waters of Algoa Bay, the cable will be surface laid on rock outcropping areas and will become colonised by naturally occurring species over time. The impacts on marine biodiversity through the physical presence of the subsea cable would be of medium intensity and highly localised along the cable itself. Although no direct mitigation measures are possible, the negative impact of the subsea cable presence on marine biota is considered to be of low significance. It is possible that the cable protection zones with suitable habitats may in fact act as marine sanctuaries, and as a result, have a positive effect on marine biodiversity and species abundance.

10.3.3.5 Pollution

Pollution by hydrocarbons and other litter is possible during the preinstallation and installation phases of the project and can have a variety of negative impacts on the health of marine organisms. Pollution is preventable, however, by good housekeeping and environmental management during preinstallation and installation. Once the cable is in place, there is no further risk of pollution other than if repairs to the cable are required. With mitigation, the effect of pollution on marine biota, as a result of cable installation, is anticipated to be of low significance.

If HDD is utilised to install the cable due to substrate conditions the possibility does exist for pollution to take place through the spillage and escape of bentonite from the drilling hole. Although inert and nontoxic, bentonite has the consistency of mud which, if spilt, can smother surrounding plant life and organisms within the marine environment. Through careful planning, and if a suitably qualified drilling contractor is appointed, the risks of bentonite spillages is considered to be of low significance. Mitigation measures to prevent the possible risk of bentonite spillages are also included in the EMPr should this construction method be utilised on site.

10.3.3.6 Collisions with and entanglement by marine fauna

As indicated in the findings of the marine specialist report, the likelihood of large marine mammals colliding with the survey or cable laying vessels or becoming entangled with the cable is low.

10.3.3.7 Effects of cable" emissions" on marine biota

As already discussed in this report, heat dissipation, electric fields and electromagnetic fields emanating from the cable are of such low magnitude that their potential impacts on marine life are considered negligible.

10.3.3.8 Long term protection due to exclusion zone

The long-term impacts of the marine telecommunications cable on the benthic environment (both fauna and flora) are expected to be positive due to the implementation of the legislated buffer zone, which protects this environment from disturbance due to bottom trawling activities and the anchoring of vessels.

10.3.4 Impact on marine protected areas and threatened marine ecosystems

The branch cable to Gqeberha traverses offshore habitats of varying conservation status, viz. Least Concern, Near Threatened and Vulnerable. It does not traverse any MPAs but does traverse the Algoa to Amathole EBSA and areas defined in the recent National Coastal & Marine Spatial Biodiversity Plan (Version 1) as CBA1, CBA2 and ESA. It also crosses the proposed Alexandria coastal belt/Algoa Bay Islands Nature Reserve Marine IBA.

However, as indicated in the specialist findings and in the sub-sections above, the identified impacts of cable installation and operation on the coastal zone, the marine benthic habitats and associated biota, fish, marine mammals, seabirds, and shorebirds are all considered to be of low significance. Furthermore, the specialist assessment of the nearshore ecology considers the cable to be compatible with CBA1 areas. The protection provided either side of the cable after installation, is considered to be positive. Accordingly, the significance of the impact of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) on marine areas of conservation significance will be low.

10.3.5 Mitigation measures

10.3.5.1 Timing

- ❑ Schedule construction associated with the cable shore crossing to avoid peak whale migration (June to November) periods where possible.

- ❑ As far as practicably possible, avoid cable installation at the shore crossing during the peak squid spawning period between September and December.

10.3.5.2 General

- ❑ Plan routing of proposed cable to as far as practicably possible avoid sensitive benthic habitats in the deepwater, coastal and nearshore zone.
- ❑ Ensure that constant monitoring for the presence of marine mammals and turtles is maintained by a ship's staff member designated as a Marine Mammal Observer (MMO). The observation post must keep a record of sightings, recording date, time, coordinates and approximate distance. This is particularly important should cable installation across the continental shelf be scheduled during the whale migration period (beginning of June to end of November).
- ❑ Should a cetacean become entangled in towed gear, contact the South African Whale Disentanglement Network formed under the auspices of DFFE to provide specialist assistance in releasing entangled animals.
- ❑ Vessels to be seaworthy.
- ❑ Vessels are to exchange ballast appropriately before coming into port or the coast.
- ❑ During operations, vessels are to comply with all local and international regulations including pollution prevention regulations.

10.3.5.3 During geophysical surveys

Although surveying of the cable alignment has been completed, should any further survey work be required along the cable alignment, the following mitigation measures must be implemented by the survey vessel:

- ❑ Onboard MMOs should conduct visual scans for the presence of cetaceans around the survey vessel prior to the initiation of any acoustic impulses.
- ❑ Pre-survey scans should be limited to 15 minutes prior to the start of survey equipment.
- ❑ “Soft starts” should be carried out for any equipment of 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 area.
- ❑ Terminate the survey if any marine mammals show affected behavior within 500 m of the survey vessel or equipment until the mammal has vacated the area.
- ❑ Avoid planning geophysical surveys during the movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (beginning of June to end of November) and ensure that migration paths are not blocked by sonar operations. As no seasonal patterns of abundance are known for odontocetes occupying the proposed exploration area, a precautionary approach to avoiding impacts throughout the year is recommended.
- ❑ Ensure that passive acoustic monitoring (PAM) is incorporated into any surveying taking place at night or between June and November.
- ❑ A dedicated MMO and PAM operator should be appointed to ensure compliance with mitigation measures during seismic geophysical surveying. The MMO can be either an independent MMO or a suitably trained crew member.

10.3.5.4 During cable installation (offshore)

- If cable installation across the continental shelf is scheduled during the whale migration period (beginning of June to end of November), consideration will be required from the cable-laying vessel to appoint a suitably trained crew member as a dedicated MMO with experience in seabird, turtle and marine mammal identification and observation techniques, to carry out daylight observations of the subsea cable route and record incidence of marine mammals, and their responses to vessel activities. Data collected should include position, distance from the vessel, swimming speed and direction, and obvious changes in behavior (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns). Both the identification and the behavior of the animals must be recorded accurately.
- Should a cetacean become entangled in towed gear, contact the South African Whale Disentanglement Network to provide specialist assistance in releasing entangled animals.
- The lighting on the cable laying vessels should be reduced to a minimum compatible with safe operations whenever and wherever possible. Light sources should, if possible and consistent with safe working practices, be positioned in places where emissions to the surrounding environment can be minimised.

10.3.5.5 During cable installation (nearshore)

- Follow the cable route plan as accurately as possible during landing of the cable at the Beach Manhole to prevent lateral drag across the seafloor.
- Divers to limit the working area to as narrow a corridor as possible during burial, attachment of articulated pipe and pinning of the cable.
- If cable requires re-alignment over the hard substrata by divers, the cable should be lifted to minimise damage to macro-benthic biota (gorgonians etc.).
- Bury cable in areas of soft sediment.
- Undertake the work on a calm sea day.
- Ensure cable protection in the nearshore by burial or armoured casing where possible.
- Pin cable to rock outcropping to prevent movement and limit abrasion (where practical/possible).
- Publicise the 2Africa servitude once declared.

10.3.5.6 During construction phase of the proposed cable shore-crossing

- Obtain a vehicle access permit from DFFE -OC prior driving in the coastal zone.
- While shore bird breeding is not anticipated to be an issue, due to the transformed nature of the dunes at the landing site, the ECO must check the affected area on the shoreline for nests of birds, prior to installation. If found, nests must be cordoned off and avoided as far as possible.
- Restrict disturbance of the intertidal and subtidal areas to the smallest area possible. Once the shore crossing is finalised and the associated construction site is determined, the area located outside of the site should be clearly demarcated and regarded as a 'no-go' area.
- All construction activities in the coastal zone must be managed according to a strictly enforced EMPr.
- Ensure that contracted construction personnel are aware of, and adhere to, the requirements of the EMPr.
- Keep heavy vehicle traffic associated with construction in the coastal zone to a minimum.

- ❑ Restrict vehicles to clearly demarcated access routes and construction areas only. These should be selected under guidance of the local municipality.
- ❑ Maintain vehicles and equipment to ensure that no oils, diesel, fuel or hydraulic fluids are spilled.
- ❑ For equipment maintained in the field, oils and lubricants must be contained and correctly disposed of off-site.
- ❑ Good housekeeping must form an integral part of any construction operations on the beach from start-up.
- ❑ Ensure regular collection and removal of refuse and litter from intertidal areas.
- ❑ There is to be no vehicle maintenance or refueling on the beach.
- ❑ Ensure that all accidental diesel and hydrocarbon spills are cleaned up accordingly.
- ❑ No mixing of concrete in the intertidal zone.
- ❑ Regularly clean up concrete spilled during construction.
- ❑ No dumping of construction materials, excess concrete or mortar in the intertidal and subtidal zones or on the seabed.
- ❑ After completion of construction activities remove all artificial constructions or created shore modifications from above and within the intertidal zone.
- ❑ No accumulations of excavated intertidal sediments should be left above the high-water mark, and any substantial sediment accumulations below the high-water mark should be levelled.

Table 16 Assessment of potential impacts of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) on the marine environment

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
Disturbance of avifauna (seabirds and shorebirds)	Unmitigated	Negative	Site specific	Short-term	Low	Once-off	Low	High	Probable	Low	High
	Mitigated	Negative	Site specific	Short-term	Low	Once-off	Low	High	Probable	Low	High
Loss/ disturbance of sandy beach biota	Unmitigated	Negative	Local	Short-term	Medium	Once-off	Low	High	Definite	Medium	High
	Mitigated	Negative	Local	Short-term	Medium	Once-off	Low	High	Definite	Low	High
Loss/ disturbance of marine benthic organisms	Unmitigated	Negative	Site-specific	Short to medium-term	Medium	Once-off	Low	High	Definite	Low	High
	Mitigated	Negative	Site-specific	Short to medium-term	Medium	Once-off	Low	High	Definite	Low	High
Disturbance/ injury of marine fauna due to noise	Unmitigated	Negative	Local	Short-term	Low	Once-off	Low	High	Probable	Low	High
	Mitigated	Negative	Local	Short-term	Low	Once-off	Low	High	Probable	Low	High

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
Impact of increased turbidity on marine biota	Unmitigated	Negative	Local	Short-term	Low	Intermittent	Low	High	Probable	Low	High
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Artificial reef effect on marine biota	Unmitigated	Neutral	Site-specific	Long-term to permanent	Medium	Once-off	Low	Moderate	Definite	Low	High
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pollution effects on marine biota	Unmitigated	Negative	Site-specific	Short to medium term	Medium	Intermittent	Medium	Moderate	Probable	Medium	High
	Mitigated	Negative	Site-specific	Short -term	Low	Once-off	Low	High	Improbable	Low	High
Injury of large marine fauna and seabirds due to collision or entanglement	Unmitigated	Negative	Site-specific	Short -term	Low	Once-off	Medium	Moderate	Improbable	Low	High
	Mitigated	Negative	Site-specific	Short -term	Low	Once-off	Low	High	Improbable	Low	High
Effect of cable “emissions” on marine biota	Unmitigated	Negative	Site-specific	Long-term	Negligible	Intermittent to continuous	Low	High	Improbable	Low	High
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact on marine areas of	Unmitigated	Negative	Site-specific	Medium to long-term	Medium	Once-off	Low	Low	Definite	Low	High

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
conservation value	Mitigated	Negative	Site-specific	Medium to long-term	Medium	Once-off	Low	High	Definite	Low	High
Potential pollution of the marine environment through bentonite spills (if HDD is utilised for cable installation	Unmitigated	Negative	Site-specific	Short-term	Medium	Once-off	Low	High	Probable	Medium	Medium
	Mitigated	Negative	Site-specific	Short-term	Low	Once-off	Low	High	Improbable	Low	High
Long term protection of marine flora and fauna due to exclusion zone	Unmitigated	Positive	Local	Long-term	High	Continuous	N/A	N/A	Highly Probable	Low-Medium	Medium
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

10.4 What impacts will the construction and operation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on the fishing industry, in particular, the squid fishery?

The proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) will potentially negatively impact the following fisheries which operate in the same area as the proposed marine cable alignment, to a greater or lesser extent:

- Demersal Trawl.
- Mid-Water Trawl.
- Small Pelagic Purse Seine.
- Large Pelagic Longline.
- Traditional Linefish.
- South Coast Rock Lobster.
- Squid Jig.
- Small Scale Fisheries.

The potential for mitigation of identified impacts of the project on fisheries (other than the no-go option) is not possible. However, the identified potential impacts on the above-mentioned fishing sectors, including the Squid Jig, are assessed as being of low significance. (Refer to Table 17).

10.4.1 Potential reduction in catch rates during geophysical survey as a result of noise

The elevated noise produced during the geophysical survey does not coincide with the hearing range of fish and crustaceans. As described in Section 9.2.3, due to the short-term duration and low intensity of the noise, the impact on catch rates for all fishing sectors, including the squid jig, is considered to be of low significance. No mitigation measures are possible.

10.4.2 Temporary exclusion from fishing ground during cable-laying operations (1,500 m from the vessel)

The temporary exclusion of fisheries from the safety zone will effectively reduce fishing grounds, which in turn could potentially result in a loss of catch and/or displacement of fishing effort for the demersal trawl, midwater trawl, small pelagic purse-seine, large pelagic longline, traditional linefish, south coast rock lobster, squid jig and small-scale fisheries sectors. However, the impact will be short term, localised and for all sectors overall, is of low intensity and low significance.

10.4.3 Long-term exclusion of anchoring and trawling around the cable (500 m on either side of the cable)

The long term 500 m exclusion zone on either side of the cable will affect the inshore demersal trawl and will require skippers to lift gear off the seabed when moving over the cable, to prevent risk of damage to both the cable and their own fishing gear. This reduces fishing time and excludes a limited area (0.3%) of the inshore fishing ground used. The overall significance of the impact is assessed as low.

There is low potential for mitigation of the above impacts.

Cumulative impacts are discussed in Section 10.7.

10.4.4 Effect on Algoa 1 Aquaculture Block

As discussed in Section 6.1.12, the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) traverses part of the area proposed for the Algoa Bay Sea-Based Aquaculture Development Zone. After discussion between DFFE and the cable route engineers, the cable alignment was modified to reduce the impact on the proposed aquaculture area. Where the cable will traverse the block, aquaculture activities will be restricted. However, once buried, the cable will affect a small area and the significance of the impact on the planned aquaculture development is considered to be low.

10.4.5 Effect on offshore fisheries research surveys

As discussed in Section 6.1.7, bottom trawls and acoustic surveys are undertaken twice per year to assess demersal and pelagic fish stocks, respectively. Should the surveys be undertaken in the vicinity of the survey vessel or the cable laying vessel, the concentration of fish in the area may be temporarily altered due to the disturbance caused by cable survey or cable burial activities, which could potentially skew research survey results. Skewed results in turn could affect DFFE's decisions regarding allocations to the fisheries. Additionally, the temporary safety zone will exclude the survey ship from the cable alignment at a specific point in time which may interfere with set out transects.

However, a notification to mariners is sent out which notifies ships in the area of cable operations. This allows nearby vessels to avoid the cable laying area and provides them with warning of cable laying activities. Under good conditions, the cable laying vessel can install up to 20 km of cable per day and cable laying operations are completed over a relatively short time period. It is therefore expected that disruption to fish stocks and/or planned research transects will be short lived and can easily be avoided. Provided sufficient advance notice is given by the cable developer to the fisheries survey team regarding their presence (timing and position) in the survey area, the survey team should be able to plan to avoid any disruption to their surveys. With mitigation, the significance of the impact is considered to be low.

10.4.6 Mitigation measures

10.4.6.1 Prior to installation

- Timing: many of the affected fisheries operate year-round, therefore the timing of the survey to avoid certain periods of peak fishing activity is not considered to be advantageous to any sectors except the squid jig fishery which is closed from April to June.
- The fishing industry and key stakeholders must be notified prior to the commencement of cable installation. These include DFFE, the SA Fishing Industry Association, the South African Navy Hydrographic Office (SAN Hydrographer), SAMSA and Ports Authorities.

10.4.6.2 During installation

- Request, in writing, the SAN Hydrographer to broadcast a navigational warning via Navigational Telex (NAVTEX) and Cape Town radio for the duration of the survey operation.
- For the duration of the installation phase of the operation, a navigational warning should be broadcast to all vessels via Navigational Telex (NAVTEX) and Cape Town radio.
- Once installed, the cable route must be accurately charted with the SAN Hydrographer.
- Manage the lighting on the survey vessel to ensure that it is sufficiently illuminated to be visible to fishing vessels and compatible with safe operations.
- Implement a grievance mechanism in case of disruption to fishing or navigation.

10.4.6.3 Post installation

- The cable servitude must be charted by the SAN Hydrographer
- Publicise the 2AFRICA servitude once declared.

Table 17 Assessment of potential impacts of construction and operation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) on the fishing industry

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
Reduction in catch rates due to noise emissions during geophysical survey	Unmitigated	Negative	Local	Short-term	Low	Once-off	Low	High	Probable	Low	High
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Temporary exclusion of fisheries from within 1,500 m of the cable laying vessel	Unmitigated	Negative	Local	Short-term	Low	Once-off	Low	High	Probable	Low	Medium
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Long term exclusion of anchoring and trawling around cable (500 m either side of the cable)	Unmitigated	Negative	Local	Long-term	Medium	Continuous	Low	High	Definite	Low	High
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Loss of area for Algoa 1 Aquaculture Block	Unmitigated	Negative	Site-specific	Long-term	Low	Once-off	Low	Moderate	Highly Probable	Medium	High
	Mitigated	Negative	Site-specific	Long-term	Low	Once-off	Low	High	Probable	Low	High

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
Potential disruption of fisheries research surveys	Unmitigated	Negative	Local	Short-term	Medium	Once-off	Low	High	Probable	Medium	High
	Mitigated	Negative	Local	Short-term	Negligible	Once-off	Low	High	Improbable	Low	High

10.5 What impact will the construction and operation of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) Submarine Cable System (Gqeberha landing) have on the beach and dune cordon at Pollock Beach?

The potential impacts of the proposed cable landing on the three eco-morphological drivers of coastal systems, namely wind and wave, sediment transport dynamics and the prevailing biotic or vegetated dune form, are anticipated to be of low significance, both before and after mitigation (Table 18).

10.5.1 Alteration of drivers of coastal process, (e.g. wind and wave)

The cable will align approximately shore perpendicular and lie at a point 0,5 – 1,0 below the surface, effectively having no impact on localised wind and wave regime. Some minor disruption of inter-tidal and supra-tidal wave regime may arise during laying of the cable. The once-off impact will be of negligible intensity, short duration and highly reversible and thus the significance of the impact is low, before and after mitigation.

10.5.2 Interruption of sediment transport regime

Some minor perturbation is expected during construction during excavation of the dune, beach and intertidal zone. Sediment mobilisation at the point of excavation through dune/stabilised dune may arise, exacerbating present trends towards engulfment. Following cable burial and establishment, the sediment transport regime should rapidly reach a state of equilibrium. The once-off impact is anticipated to be of negligible intensity, short duration and highly reversible and thus the significance of the impact is low, before and after mitigation.

10.5.3 Alteration of habitat/eco-morphology

Effectively, removal and replacement of geofabric defence structures will be required. Excavation through the primary dune and beach will be followed by reinstatement of materials and natural aeolian winnowing will sculpt the excavated area. Measures to stabilise and possibly replant habitat may be considered. The impact will be of negligible intensity and the significance is low, after mitigation.

10.5.4 Mitigation measures/recommendations

- The cable should be buried within the beach to a depth approximately 1 m below the deflated beach state and thereby probably lying within the shingle or beach aeolianite (beach rock) strata of the beach (the target depth for cable burial is 2 m). Machinery may be required to excavate a trench through the beach rock to the required depth, this being to a depth approximating 300 mm with a width of approximately 300 mm. Such excavation should be addressed through the use of an excavator with a cutting head or perhaps “jack hammer”, with displaced material being set aside. Once the cable has been set in place, excavated material should be set back into the trench using an epoxy/cement material (or similar material suitable to the receiving environment), to the original profile of the beach rock.
- Some monitoring of the excavated trench may be required from time to time, particularly following periods of beach scour or significant storm events to ensure that the reinstated trench and cover material remains intact and cable/conduit exposure has not arisen.

- If machinery is utilised, such as an excavator, stringent management measures must be implemented to prevent negative impacts on the coastal environment. Access to the beach may prove difficult where sizable plant machinery is utilised. The Environmental Control Officer should address and oversee such matters. Following establishment of the trench, the excavated material must be laid in a similar order to the previous state.
- Where disturbance of the vegetated dune arises, the affected area should be raked back to an angle of repose ~ 27°, stabilised using geofabric bags and suitably planted with appropriate vegetation (ideally the same dune species that are currently present on the dune cordon including *Tetragonia decumbens, Carpobrotus edulis* and *Gazania rigens*.
- An alternative pedestrian walkway should be established during the laying of the cable and restoration stage of the project. In addition, the dune cordon should be fenced off to prevent use by the public for beach access.

Table 18 Assessment of potential impacts of construction and operation of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) Submarine Cable System (Gqeberha landing) on the beach and dune cordon at Pollock Beach

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
Alteration of drivers of coastal process, (e.g. wind and wave)	Unmitigated	Negative	Local	Short-term	Negligible	Once-off	Low	High	Improbable	Low	High
	Mitigated	Negative	Local	Short-term	Negligible	Once-off	Low	High	Improbable	Low	High
Interruption of sediment transport regime	Unmitigated	Negative	Local	Short-term	Low	Once-off	Low	High	Highly Probable	Low	High
	Mitigated	Negative	Local	Short-term	Low	Once-off	Low	High	Highly Probable	Low	High
Alteration of habitat/eco-morphology	Unmitigated	Negative	Local	Short-term	Negligible	Once-off	Low	High	Improbable	Low	High
	Mitigated	Negative	Local	Short-term	Negligible	Once-off	Low	High	Improbable	Low	High

10.6 What effects will the construction of the proposed 2AFRICA 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) have on cultural and heritage resources, including any paleontological resources?

The potential for the project to negatively impact on submerged pre-historic archaeological resources, palaeontological resources and/or terrestrial heritage resources is negligible. While there are maritime archaeological resources (shipwrecks) within 1 km either side of the cable alignment, the likelihood of negatively impacting them is very low. The significance of potential impacts on heritage resources, should they occur, are assessed as medium (where there is no possible mitigation) and low (where mitigation is possible). Refer to Table 19.

10.6.1 Disturbance or destruction of submerged pre-historic archaeological resources

As discussed in the heritage specialist findings (Section 9.6.3) the potential for direct impacts on submerged prehistoric archaeological material in the study area is unlikely. No mitigation is proposed. Due to the irreplaceability of the resource and non-reversibility of the impact, the significance of the impact, should it occur, is assessed as medium.

10.6.2 Disturbance or destruction of palaeontological resources and fossil material

As discussed in the heritage specialist findings (Section 9.6.3), due to the nature of the sediments in the study area, the potential for impacts on fossils and palaeontological material is negligible. No mitigation is proposed. Due to the irreplaceability of the resource and non-reversibility of the impact, the significance of the impact, should it occur, is assessed as medium.

10.6.3 Disturbance or destruction of maritime archaeological resources

As discussed in the heritage specialist findings (Section 9.6.3), while there are wrecks within 1 km of the cable alignment, the potential for direct impacts on maritime archaeological sites or material in the study area is negligible. With mitigation, the significance of the impact is assessed as low.

10.6.4 Disturbance or destruction of terrestrial archaeological resources

As discussed in the heritage specialist findings (Section 9.6.3), the potential for impacting pre-colonial or historical archaeological sites or material is highly unlikely along the alignment of the terrestrial cable route. With mitigation, the significance of the impact is assessed as low.

10.6.5 Mitigation measures

- There is a very small chance that fossils may occur in the aeolianites so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found once trenching has commenced, then they should be rescued and a palaeontologist called to assess and collect a representative sample.

- Along the inshore waters and beach crossing, an alert for the occurrence of palaeontological material be included in the EMPr, specifically for the divers working in the shoreface and the operators excavating the trench in the beach and dune, particularly if rock trenching is required. Any fossil material noted during these activities must be collected immediately by the divers.
- Should any possible archaeological or palaeontological material be accidentally disturbed during these activities it must be immediately reported to the ECO and/or the monitoring archaeologist for further advice. Any finds accidently disturbed must be recorded, and their contextual information (a report) must be lodged with a SAHRA-approved institution.
- The three seabed anomalies (SSS contact E2-G-S527, and magnetic and sonar contacts E2-G-M001 and E2-G-S344) are avoided during cable installation.
- If any further geophysical data, particularly in the Inshore Waters portion of the cable route, is generated to support the installation of the cable system it be archaeologically reviewed for the presence of historical shipwrecks or related material. If possible, the project archaeologist should be consulted before data are collected to ensure that the survey specifications and data outputs are suitable for archaeological review.
- Any shipwreck-related material recovered from the seabed during the pre-lay grapnel runs must be retained, kept wet, and the maritime archaeologist must be notified of the find.
- Should the data identify wreck material at or near the location of any portion of the cable, micro-siting of the cable and/or the possible implementation of an exclusion zone around the archaeological feature should be sufficient to mitigate the risks to the site.
- Should any maritime archaeological sites or material be accidentally encountered during the course of laying the cable, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.
- Should any archaeological sites or material be encountered during the course of laying the cable on land, work must cease in that area until the project archaeologist and the ECPHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.
- Should any burials or human remains be encountered at any stage during the installation of the cables, work in the vicinity must cease immediately, the remains must be left in situ but made secure and the project archaeologist and ECPHRA must be notified immediately so that a decision can be made on how best to deal with the remains.

Table 19 Assessment of potential impacts of construction and operation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) on cultural and heritage resources, including any paleontological resources

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
Disturbance or destruction of submerged pre-historic archaeological resources	Unmitigated	Negative	Site-specific	Short-term	Low	Once-off	High	Non-reversible	Improbable	Medium	Low
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Disturbance or destruction of palaeontological resources	Unmitigated	Negative	Site-specific	Short-term	Low	Once-off	High	Non-reversible	Improbable	Medium	Low
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Disturbance or destruction of maritime archaeological resources	Unmitigated	Negative	Site-specific	Short-term	Low	Once-off	High	Non-reversible	Improbable	Medium	Low
	Mitigated	Negative	Site-specific	Short-term	Low	Once-off	High	Non-reversible	Improbable	Low	Low
Disturbance or destruction of terrestrial archaeological resources	Unmitigated	Negative	Site-specific	Short-term	Low	Once-off	High	Non-reversible	Improbable	Medium	Low
	Mitigated	Negative	Site-specific	Short-term	Low	Once-off	High	Non-reversible	Improbable	Low	Low

10.7 What cumulative impacts will result from the construction of 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)?

A cumulative impact is an incremental impact upon the environment that results from the impact of a proposed action when added to past, existing, and reasonably foreseeable future actions which can be both positive and negative in nature.

The proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) is a linear project (approximately 194 km in length), traversing various marine and terrestrial ecosystems and resulting also in indirect social/socio-economic impacts potentially throughout South Africa. As such, it is difficult to quantify the impacts. A qualitative assessment of cumulative impacts has been undertaken and considers the impacts of the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) together with impacts from the existing cables and planned fibre-optic marine cables off the coast of South Africa.

Both positive and negative cumulative impacts are anticipated. Overall, the significance of negative cumulative impacts is assessed to be low (Table 20).

10.7.1 Cumulative social and socio-economic impacts

The positive socio-economic impacts associated with the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) will cumulatively add to the positive impacts of other fibre optic cable landings in South Africa, through additional bandwidth and internet connectivity availability to the country. This has the potential to unlock investment and advance socio-economic development and education.

There are several existing cables circumnavigating South Africa and the installation of the 2AFRICA/GERA (East) Submarine Cable System will increase the incidence of cable crossings and thus increase the risk of damage to existing cables. However, with implementation of ICPC guidelines and standards, the contribution of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) to cumulative risks is considered to be of low significance.

The increasing number of cables crossing O&G Concession areas will cumulatively exclude increased areas of the seabed from potential future mining. Given the relatively small surface area taken up by the cables in contrast to the large areas of the exploration blocks, the contribution of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) to this cumulative impact, is considered to be of low significance. However, it must be noted that conflicts of interest are likely to increase with the accumulation of cables crossing O&G rights areas, unless agreements are concluded between the cable landing partner and the offshore concession holders, to ensure that the activities of both parties can co-exist without limiting each other's commercial operations.

In terms of construction impacts, given the brief installation period and small footprint on land, the potential for this project to add cumulatively to disruption and nuisance impacts on the beach and inland of the landing site is not significant.

10.7.2 Cumulative impacts on terrestrial ecosystems

Given that the affected site is completely transformed by urban development and artificial dune stabilisation interventions, and there are no affected wetlands/freshwater habitat, the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) will not cumulatively impact on terrestrial ecosystems.

10.7.3 Cumulative impacts on marine ecosystems

As discussed in the marine ecology specialist report (Appendix B4), the cumulative impact of increased background anthropogenic noise levels in the marine environment is an ongoing and widespread issue of concern. However, given that disturbance and injury to marine biota due to construction noise or noise generated by the vessel and cable plough is of low magnitude within the immediate vicinity of the construction site/subsea cable route, with impacts persisting over the short-term only, the contribution of the project to cumulative noise impacts in the marine environment is considered to be of low significance.

While the cable itself will remain in place over the long term, most of the negative impacts of the cable installation and operation on benthic organisms and other marine biota (as shown in Table 17) are once-off, and short term. With the exception of possible pollution events, all these impacts are of low significance before mitigation. In this light, the contribution of this project towards cumulative (negative) impacts on marine ecosystems crossed by the cable on the Southeast Coast, is considered low.

10.7.4 Cumulative impacts on the fishing industry

A cumulative impact associated with the installation of an increasing number of subsea fibre-optic cables around the South African coastline, is the cumulative loss of fishing grounds to the demersal trawling and long lining industry, due to the exclusion zones.

Existing exclusion zones follow the routings of the SAT3/WACS, SAFE, SAT-2 and ACE cables which land at Melkbosstrand and the WACS cable which lands at Yzerfontein. The SAT-2 cable became operational in the early 1990s and has been out of service since 2013 (whereas the exclusion zone is still applicable). The SAT3/WACS and SAFE cable were completed at the end of 2001 and the WACS cable was completed in April 2011.

The proposed routing of the 2AFRICA/GERA (West) cable landing in Yzerfontein will result in an additional loss of 60 km^2 of fishing ground and a cumulative exclusion area of 368 km^2 from all existing and proposed telecommunications cables in the area.

The proposed routing of the 2AFRICA/GERA (East) cable landing at Duynefontein would result in a loss of 45 km^2 of the trawl footprint and an additional 56 km^2 of fishing ground due to the Gqeberha landing. However, the impact of the proposed branch unit to Gqeberha would affect the inshore trawl sector rather than the offshore trawl sector, which are managed as separate fisheries sectors.

The cumulative exclusion area from all telecommunications cables mentioned above amounts to of 424 km^2 and covers 0.6% of the total offshore trawl footprint and 0.3% of the total inshore trawl footprint. The addition of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) to the cumulative impact on the fishing industry is considered to be of low significance.

10.7.5 Cumulative impacts on the beach and coastal dunes at Pollock Beach

Given the historical and current state of transformation of the beach and dunes at the landing site, any additional disturbance as a result of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) is considered to be a cumulative impact of low significance.

10.7.6 Cumulative impacts on heritage (marine)

Based on the improbability of impacting any submerged or terrestrial heritage resources, the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) is not anticipated to contribute in any significant way to negative cumulative impacts. However, it is considered that the accumulated information that subsea cable surveys add to the existing knowledge base of maritime archaeological resources, is a positive impact for South African heritage.

10.7.7 Cumulative impacts associated with climate change

On a global scale, the cumulative provision of improved and affordable bandwidth between countries can potentially have a positive impact with respect to climate change. The International Cable Protection Committee (ICPC) represents 97% of the world's subsea telecom cables (https://www.iscpc.org/). A report prepared by the environmental advisor of the ICPC, Dr Mike Claire entitled: "Submarine Cable Protection and the Environment: A Bi-Annual Update" (30 September 2020) addresses the role of submarine cables in a post-Covid world, where submarine telecommunications cables are an enabler for changing people's behaviour away from hydrocarbons and climate impacting sources. Lessons learned from the lockdown will inform how businesses operate in future— leading to an increase in virtual, online meetings compared to those requiring long haul flights, and increased home-working— all of which will help in lowering greenhouse gas emissions. The ICPC estimates that internet traffic increased between 25% and 50% between November 2019 and the early stages of lockdown in April 2020, and this will likely continue as we adapt to the "new-normal" virtual world. Communications revenue for the quarter ending July 31, 2020, saw a 355% increase compared to the previous year. This is just one indication of the increased video conferencing occurring as a result of widespread remote work, remote education, and remote personal video communication.

The cumulative impact of cables with respect to the production of greenhouse gases is not considered significant. A life cycle analysis study suggests that over a typical operational lifetime of 25 years (manufacture-to-decommissioning)[32] the main sources of carbon emissions from cables are due to a) power consumption at the terminal station (chiefly related to air conditioning and powering of the terminal equipment); and b) vessel transits for cable maintenance (ACER, 2021).

[32] Donavan, 2009. "Twenty thousand leagues under the sea: A life cycle assessment of fibre optic submarine cable systems".

Table 20 Assessment of potential cumulative impacts of the proposed2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
Cumulative social and socio-economic impacts (positive)	Unmitigated	Positive	National/ Inter-national	Long-term	Low	Continuous	Low	Low	Highly Probable	Medium	Medium
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative social and socio-economic impacts (negative)	Unmitigated	Negative	Site specific to local	Short-term to permanent	Medium to low	Once-off	Low	Moderate to High	Probable	Medium to Low	Medium
	Mitigated	Negative	Site specific to local	Short-term to permanent	Low to Negligible	Once-off	Low	Moderate to High	Probable	Low	Medium
Cumulative ecological impacts (terrestrial environment)	N/A (no impact)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative ecological impacts (marine environment)	Unmitigated	Negative	Site specific to international	Short-to long term	Low	-	-	-	Highly Probable	Low	Medium
	Mitigated	Negative	Site specific to international	Short-to long term	Low	-	-	-	Highly Probable	Low	Medium

Description and Nature of Impact	**Mitigation**	**Nature** (Positive, Negative, Neutral)	**Spatial Extent** (Site Specific, Local, Regional, National/ International)	**Duration** (Short-term, Medium-term, Long-term, Permanent)	**Intensity** (Negligible, Low, Medium, High)	**Frequency** (Once off, Intermittent, Periodic, Continuous)	**Irreplace-able loss of resources** (Low, Moderate, High)	**Revers-ability of impacts** (Non-reversible, Low, Moderate, High)	**Probability** (Improbable, Probable, Highly Probable, Definite)	**Significance** (Low, Medium, High)	**Confidence** (Low, Medium, High)
Long term protection of marine biota within cable exclusion zones (cumulative)	Unmitigated	Positive	Regional	Long-term	Low	Continuous	N/A	High	Highly Probable	Low	Medium
	Mitigated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cumulative impacts on demersal fishing	Unmitigated	Negative	Regional	Long-term	Medium	Continuous	Low	Moderate	Definite	Low	Medium
	Mitigated	Negative	Regional	Long-term	Low	Continuous	Low	Moderate	Definite	Low	Medium
Cumulative impacts on beach and coastal dunes	Unmitigated	Negative	Site-specific	Short-term	Low	-	Low	High	Probable	Low	Low
	Mitigated	Negative	Site-specific	Short-term	Low	-	Low	High	Probable	Low	Low
Cumulative impacts on heritage (marine)	Unmitigated	Negative	Site-specific	Short to medium-term	Medium	-	High	Non-reversable	Improbable	Low	Low
	Mitigated	Negative	Site-specific	Short to medium-term	Medium	-	High	Non-reversable	Improbable	Low	Low

11 ENVIRONMENTAL IMPACT STATEMENT

Taking the key issues and the assessment of associated potential impacts into account, a summary of the environmental impacts of the proposed activity, and their significance (after mitigation, where applicable) is provided below.

Social and socio-economic impacts

Overall, the project is expected to contribute positively to the goal of improving livelihoods for South Africans through the education and economic opportunities opened up as a result of access to improved telecommunications networks. While expanding access to communication technology will be done primarily through broadband infrastructure roll-out, this requires a national backbone connected to the rest of the world. In this case, the proposed 2AFRICA/GERA (East) Cable System supports SIP 15 via is international connectivity, capacity and speed. The significance of this positive impact is assessed as medium.

Operation of the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) will render a limited area of the seabed permanently unavailable to some concession holders in the Oil and Gas sector. To eliminate interactions with future Oil and Gas activities on cable system infrastructure and operations, the landing partner must undertake the following:[33]:

- Obtain consent letters from existing Oil & Gas Rights Holders as required by the MPRDA.
- Conclude agreements between the cable landing partner and the various offshore concession holders to ensure that the activities of both parties can co-exist without limiting each other's commercial operations.
- Map the marine cable system route and formally register the cable routing as a real right against the Deed and against the Oil and Gas Rights at the Mineral and Petroleum Titles Registration Office.

The cable overlaps with a limited area of seabed planned for the Algoa1 Aquaculture development; however, the alignment has been shifted to the outer edge of the development zone to minimise impacts. The cable *in situ* is not expected to have any impact on the surf break for surfers, but during installation, the cable landing may potentially disrupt water based recreational and sporting events (including international yachting events) at Algoa Bay unless timeous communication and co-ordination with affected parties is undertaken. Other minor, short term disruption and nuisance impacts may arise during construction activities on the beach and inland. However, provided these negative social and socio-economic impacts are suitably managed, they will be of low significance.

Impacts on terrestrial ecosystems, vegetation and fauna

The implementation of the project on land affects an area which is totally transformed by urban development and will not negatively impact on any CBAs or terrestrial ecosystems of conservation value. No wetlands or freshwater habitat is present on site. Consequently, there will be negligible impact on terrestrial (non-marine) fauna.

[33] In terms of Section 53 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) (MPRDA), any person who intends to use the surface of any land in a manner which may be contrary to the objectives of the MPRDA or is likely to impede such objectives, must obtain consent from the rights holder and apply to the Minister for approval in the prescribed manner. Proof is required that no prospecting or mining right holders have objected to the proposed development based on its incompatibility with their interests.

Impacts on marine ecosystems, flora, fauna and avifauna

The branch cable to Gqeberha traverses offshore habitats of varying conservation status, viz. Least Concern, Near Threatened and Vulnerable. It does not traverse any MPAs but does traverse the Algoa to Amathole EBSA and areas defined as CBA1, CBA2 and ESA. It will traverse inshore rocky reef between Bird Rock and Cape Recife point, affecting only 0.2% of this inshore reef complex. However, as confirmed by marine specialist studies, the residual impacts of the cable on the benthic environment (deep water and shallow water) will be of low significance. The potential negative impacts of the project on marine flora and fauna (small and large) on shore, nearshore and offshore, are all of low significance (after applying mitigation where feasible). Similarly, the impacts on seabirds and shorebirds will be of low significance.

The cable, once in place, will afford a section of the seabed long term protection due to the exclusion of anchoring and trawling 500 m either side of the cable, which is considered a positive impact of low to medium significance.

Impacts on fisheries

The cable alignment intersects with areas used by several fishing sectors, which may potentially be negatively affected by the project. A potential decline in catch rates due to temporary noise disturbance is assessed as being of low significance. The potential effect on fishing activities and decline in catch rates due to the temporary exclusion zones (to a maximum of 1,500 m) around survey and cable laying vessels is assessed as being of low significance. The long term effect on operational activities due to the 500 m exclusion zone either side of the cable will negatively impact the inshore demersal trawl sector as gear will have to be lifted when crossing the exclusion zone. The loss of inshore trawling ground is estimated to be 0.3% of the inshore trawl fishing grounds. Overall, the significance of the impact on fisheries is assessed as low. The potential for mitigation of identified impacts is very low.

The cable alignment also intersects with transects covered by DFFE bi-annual research survey vessels. Provided there is sufficient co-ordination between the proponent and DFFE with regards to timing of their respective activities in the affected area, no significant impact on survey activities and results is anticipated.

Impacts on the beach and coastal dunes

The project will have little impact on the beach and coastal dunes. The significance of potential negative impacts on drivers of coastal processes, sediment transport and habitat/eco-morphology of the beach and dunes will be low, both before and after mitigation.

Impacts on cultural heritage

The likelihood of the project impacting on submerged pre-historic archaeological resources, palaeontological or fossil material is negligible. As the impacts would be non-reversable if they should occur, and the potential for mitigation is low, the significance of impacts on these cultural heritage resources is assessed as medium. While there are recorded shipwrecks within 1 km of the cable alignment, the likelihood of these being negatively impacted is low and, with mitigation, the significance of the impact is low.

Cumulative impacts

To date, there is only one known subsea fibre-optic cable traversing Algoa Bay and landing at Gqeberha. In general, the positive and negative impacts resulting from the proposed 2AFRICA/GERA (East) Submarine Cable System, along with those of other existing or future cables around the coast of South Africa, will have cumulative effects on the social and biophysical environment. Conflicts of interest may increase over time between the subsea fibre optic cable developers and the trawling industry, as increasing areas become excluded due to cables crossing trawling grounds. Similarly, conflicts of interest may increasingly arise between

the subsea fibre optic cable developers and the O&G industry, particularly as offshore exploration activities ramp up and drilling plans materialise. Direct and early engagement between role-players will be required to ameliorate cumulative impacts. As the cable installation is once-off and of short duration, with a relatively quick recovery of the disturbed benthic habitat, no negative cumulative impacts are anticipated.

The No Development Alternative

The No-Development Alternative would avoid potential negative impacts on the natural environment and competing seabed users. However, it would preclude the positive impacts which improved telecommunications would have on the country's socio-economic environment and would fail to support the country's development goals. It is anticipated that, with required mitigation of negative impacts, the advantages of the project will outweigh the disadvantages. For this reason, the No-Development Alternative is not preferred.

12 CONCLUDING STATEMENT/RECOMMENDATION OF THE EAP

Based on the findings of the specialists and the assessment of key issues and associated impacts undertaken in this report, it is the professional opinion of the EAP that there are no fatal flaws associated with the proposed project and that the negative impacts resulting from the proposed 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing) can be mitigated to acceptable levels. Therefore, the project should be granted environmental authorisation by DFFE, conditional on compliance with the mitigation measures as recommended in this report and contained within the EMPr.

The project components to be authorised are the installation and operation of the marine cable, along the alignment as proposed, with the shore landing at Pollock Beach to link up to a new BMH at Summerstrand and on to the Telkom Exchange building via new underground ducting. The type of System Earth must be implemented as dictated by substrate conditions and the excavation method selected. The location and alignment of the proposed infrastructure is indicated in the table below and in relevant Figures in this report.

GPS Co-ordinates (approximate) of the proposed infrastructure for the 2AFRICA/GERA (East) Submarine Cable System (Gqeberha landing)		
Location	**Latitude (S)**	**Longitude (E)**
Start of marine branch cable (at trunkline)	34°22.695′	27°35.789′
Mid-point of marine branch cable	34°10.976′	26°41.172′
Approximate length of marine branch cable	194 km	
Width of the offshore cable corridor to be authorised	0.5 km	
Width of the beach crossing corridor to be authorised	0,1 km	
Sea Earth Plate	33° 59.195’	25° 40.693’
Land based System Earth (if sea earth not used)	33° 59.252’	25° 40.688'
BMH at Pollock Beach (Alternative 1- preferred)	33 59.244 S	25°40.350′
Telkom exchange building housing the CLS	33°59.348′	25°39.980′
Mid-point of trench line for ducting from BMH to CLS.	33°59.109′	25°40.085′
Approximate length of trench line for ducting to CLS	Approximately 1,2 km	
Width of the land cable corridor to be authorised	0.01 km	

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APPENDIX A: EAP *CURRICULUM VITAE*

APPENDIX B: SPECIALIST REPORTS, *CURRICULUM VITAE* AND DECLARATIONS

APPENDIX C: PROPERTY DETAILS

APPENDIX D: PUBLIC PARTICIPATION DOCUMENTATION

APPENDIX E: COMMENTS AND RESPONSES REPORTS

APPENDIX F: ENVIRONMENTAL MANAGEMENT PROGRAMME

APPENDIX G: SUPPORTING MAPS