MARINE ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED PEDESTRIAN PATH TO CONNECT THE TWO PARTS OF THE HERMANUS CLIFF PATH VIA POOLE'S BAY, SOUTH AFRICA

Anchor Environmental Consulting Report No, 1928/2

MARINE ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED PEDESTRIAN PATH TO CONNECT THE TWO PARTS OF THE HERMANUS CLIFF PATH VIA POOLE'S BAY, SOUTH AFRICA

October 2021

Report Prepared by:
Anchor Environmental Consultants Pty (Ltd)
8 Steenberg House, Silverwood Close, Tokai 7945, South Africa
www.anchorenvironmental.co.za

Report Prepared for:
Ecosense Environmental Consultants
58 The Glades, Wedderwill, Sir Lowry's Pass, 7133, South Africa
www.ecosense.co.za

Authors: Cheruscha Swart, Barry M. Clark and Safiyya Sedick

Citation: Swart C, Clark BM & Sedick S 2021. Marine Environmental Impact Assessment for the Proposed Pedestrian Path to Connect the Two Parts of the Hermanus Cliff Path Via Poole's Bay, South Africa. Report prepared by Anchor Environmental Consultants (Pty) Ltd for Ecosense Environmental Consultants (Pty) Ltd. 55 pp.

Cover Photo: Anchor 2021

EXECUTIVE SUMMARY

Project description

The Hermanus Cliff Path extends through a part of the Fernkloof Nature Reserve in Hermanus and is a major tourist attraction in the area. It runs along 13 km of coastline but takes an approximate 1 km detour along the R43 (Main Road) in the middle of the path at Poole's Bay. This is due to there being no formalised pathway in the Poole's Bay area because of property boundaries extending down to the high-water mark. The Cliff Path Action Group (CPAG) is wanting to connect the two parts of the current Hermanus Cliff Path through the construction of a walkway along the coastline at Poole's Bay, thereby creating a continuous path. CPAG are of the opinion that a continuous walkway would provide tourists the opportunity to enjoy an extended scenic route and possibly encourage more tourists to visit the area. It could also allow safer access along sections that are rocky and perceived to be unsafe. A formal path will also provide people with the option of diverting away from the Main Road if they wish to do so. As the route currently followed is informal and not clearly marked, many people unknowingly trespass on private property. The construction of a formal cliff path would thus also encourage people to stay on the path and limit unnecessary trespassing.

Two design alternatives have been proposed for the new section of the cliff path. The first alternative will comprise linking walkways made of different materials constructed only in sections where it is necessary to facilitate walking. In sections with steep cliffs, a solid concrete walkway will be mounted against the cliff walls and supported by buttresses. The second alternative proposes a formal, continuous walkway along the entire length of the path, even across areas that are easily accessible. In sections with steep cliffs, the path will be mounted on pillars, which will be anchored to the base of the cliffs, to form a bridge.

Many people perceive the area in the vicinity of the footpath as environmentally sensitive due to its proximity to the Fernkloof Nature Reserve, the marine intertidal environment, a Critical Biodiversity Area (as identified by the National Web-Based Environmental Screening Tool and indicated as 'degraded' on the Western Cape Biodiversity Spatial Plan 2017) and the Walker Bay Marine Protected Area. For this reason, there is concern that the construction of a pathway in this area could have potential negative impacts on the environment and have requested that a Marine Specialist Study be conducted before commencement of construction. Furthermore, the Environmental Impact Assessment Regulations (2014) require that Environmental Authorisation be obtained prior to commencement of an activity such as this. To this end, the Cliff Path Action Group appointed Ecosense as the independent Environmental Assessment Practitioner to apply for Environmental Authorisation for this development through conducting a Basic Assessment Process. Ecosense, in turn, appointed Anchor Environmental Consultants (Pty) Ltd to conduct a Specialist Marine Environmental Impact Assessment as part of the Basic Assessment Process. This specialist study provides a baseline description of the affected marine and nearshore coastal environment, the flora and fauna associated with this environment, and an assessment of the potential impacts of the construction and presence of the path on these features, for two design alternatives.

Receiving environment

Hermanus is situated in Walker Bay along the south coast of South Africa. It is renowned for its beauty, museums, beaches, whale sanctuary and biodiversity, making it a very popular tourist destination. One of the prominent features is the Fernkloof Nature Reserve which includes sections of the Hermanus coastal area. The marine organisms occurring in this region reflect the prevailing physical conditions and are found to be generally distributed as such.

The rocky shoreline provides a resting place for seabirds that frequent the coast, but most of these are widely distributed throughout South Africa. This also includes some seabirds that are of national importance such as the Swift tern (*Thalasseus bergii*), Kelp gull (*Larus dominicanus*), Hartlaub's gull (*Larus hartlaubii*) and the Cape Cormorant (*Phalacrocorax capensis*). Whales can frequently be seen from the shores in Hermanus from July to December. Large numbers of whales breed and calve in Walker Bay, and the bay has therefore been declared a seasonal Marine Protected Area to serve as a sanctuary for these animals. Hermanus is further situated in the Cape Floristic Region (CFR), one of the three Biodiversity Hotspots of South Africa and one of 36 in the World. Fynbos and flowering plants can be found in abundance within the Fernkloof Nature Reserve with more than 1000 species collected and retained within the Orchard Herbarium. Approximately 12% of the plants occurring within the reserve have a threatened status. The reserve further supports several terrestrial animal species that are classified as Red List threatened species.

Potential impacts

Ten potential negative impacts were identified for the two project alternatives, five of which would occur during the construction and five during the operational phase. The first alternative is expected to have eight impacts of low and two impacts of medium significance. The impact assessment conducted for the second alternative rendered similar results. Only one impact, i.e., the displacement of species on the western side of the path, was considered to have a lower impact and was therefore rated as being of very low significance. The implementation of mitigation measures is expected to reduce the identified impacts to low or very low in addition to having two positive impacts which are related to improving the integrity of the area. No negative impacts of high significance were identified for either alternative, neither are any decommissioning or cumulative marine impacts anticipated for this development. It is envisioned that the estimated life of the cliff path will be permanent, although routine maintenance and upgrades will be required over the course of the design life of the path.

Some of the most significant impacts associated with the construction of a path include:

- temporary alteration, fragmentation or destruction of habitat and vegetation;
- water quality impacts associated with physical disturbance of the area;
- disturbance and/ or displacement of small mammals, avifauna and intertidal macrofauna due to construction activities, noise and vibration;
- generation of waste and pollution; and
- temporary restriction of public access to the coastline in the study area.

Potential environmental impacts that will arise during the operational phase (i.e., the physical presence of the footpath) include:

- disturbance due more people frequenting the area;
- habitat fragmentation and a barrier to the movement of species;
- permanent displacement of species due to the presence of the footpath;
- generation of waste and pollution; and
- decrease of environmental integrity due to degradation of the path.

A summary of the most important mitigation measures that have been identified for this study include:

- Strategically placing signs and litter bins to discourage people from littering;
- Implementing beach clean-ups as part of the Environmental Management Programme (EMPr);
- Keeping the path simple, avoiding elevations that could cause a barrier to movement and materials that would prevent recolonisation of species;
- Encouraging locals, tourists and workers to respect the environment, to not disturb animals and to limit noise;
- Educating locals, tourists and workers about the sensitivity of the marine and terrestrial environment;
- Restoring the environment to its natural state as far as possible;
- Disposing of waste and debris properly and avoiding spillage and pollution;
- Limiting construction times so they occur outside of bird and whale breeding seasons;
- Limiting construction and movement within the area and staying within the buffer zones;
- Moving any macrofaunal species to a safe area within the intertidal zone, but outside of the construction area;
- Using the construction as an opportunity to clean-up litter and remove rubble;
- Restoring the elevated areas below the properties to prevent further erosion and pollution;
- Doing routine inspections and maintenance as needed to reduce potential impacts;
- Designing the path to be as natural and unobtrusive as possible; and
- Using natural materials such as rock, wood and/ or an eco-friendly alternative, such as green concrete.

The study area (defined as the footpath itself, a 5 – 10 m study area on either side of the path, and the Island) was not found to be ecologically sensitive or of high conservation concern. The study area is situated outside of the Fernkloof Nature Reserve and any Protected or Critical Biodiversity Area, except for The Island which lies in the seasonal Marine Protected Area. The study area was found to be frequented by many people, degraded or physically transformed along much of its length, and to be largely devoid of natural vegetation alongside the path. Only five species of conservation concern were recorded within the study area, although none are expected to be severely impacted. These include two coastal bird species, i.e., the “Near Threatened” African Black oystercatcher and the “endangered” Cape cormorant; two coastal plant species, i.e., the “Near Threatened” Christmas Berry and the protected coastal White Milkwood; and the “Near Threatened” Cape Clawless otter.

Neither of the proposed design alternatives are likely to significantly alter, fragment or destroy the integrity of the surrounding environment, the Fernkloof Nature Reserve or the biodiversity contained therein or create a barrier to the movement of species, provided that the mitigation measures proposed are implemented and that development is restricted to the defined buffer zone area. It is thus recommended that the proposed development be permitted to proceed with the implementation of strict environmentally responsible practices as outlined in the mitigation measures, with the second design alternative as the preferred alternative.

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background

The Hermanus Cliff Path extends through a part of the Fernkloof Nature Reserve in Hermanus and is a major tourist attraction in the area. The path stretches along nearly 13 km of coastline, from New Harbour all the way to Grotto Beach, passing popular tourist spots and whale watching points in Fick's Pool, Gearings Point and Kraaiwater, the famous Old Harbour Open-Air Museum and numerous pebble beaches (Figure 1).

Figure 1 A section of the current Hermanus Cliff Path near the proposed site (Anchor 2021).

This path is, however, interrupted halfway where it takes an approximate 1 km detour along the R43 (Main Road; Figure 2). The section of the path that extends along the Main Road is located between the Western Entry Promontory in the west and Mickey in the east. The Cliff Path Action Group, a private and voluntary community group, is wanting to connect the two parts of the current Hermanus Cliff Path by the construction of a walkway via the coastline in Poole's Bay.

The rationale behind extending the pedestrian pathway throughout this area is discussed below. Firstly, establishing a continuous walkway could provide safer access during low tide along sections that are rocky and perceived to be unsafe walking terrain. Secondly, a formal path will provide people with the option of diverting away from the Main Road if they wish to do so. The Main Road detour would, however, still need to be followed should it be safer to do so during high tide. Thirdly, a continuous walkway would provide tourists the opportunity to enjoy an extended scenic route and could possibly encourage more tourists to visit the Hermanus Cliff Path. Furthermore, as the informal route between the two Hermanus Cliff Paths borders on residential property, tourists tend to unknowingly trespass on private property. Constructing a formal cliff path could divert tourists away from private property, thereby limiting unnecessary trespassing and associated legal implications.

Figure 2 **The position of the Hermanus Cliff Path (red), current detour (yellow) and the proposed path (blue).**

The proposed pathway is located close to the Fernkloof Nature Reserve and within a region that has been identified by the National Web Based Environmental Screening Tool as environmentally sensitive due to the presence of a Critical Biodiversity Area (CBA) directly north of the proposed path (albeit degraded) and a Marine Protected Area (a seasonal whale sanctuary in the bay) in this region. In light of this, many people are concerned that the construction of a pathway in this area could have potential negative ecological impacts. Moreover, the Environmental Impact Assessment Regulations (2014) promulgated in terms of the National Environmental Management Act (NEMA) (Act No 107 of 1998, as amended) requires Environmental Authorisation from the relevant Competent Authority prior to the commencement of such an activity. The Cliff Path Action Group is therefore required to apply for Environmental Authorisation. To this end, they have appointed Ecosense Environmental Consultants (Ecosense) as an independent Environmental Assessment Practitioner (EAP) to apply for Environmental Authorisation through a Basic Assessment Process. Furthermore, as the area has been identified as sensitive by the National Screening Tool, the regulations warrant that specialist studies, including a Marine Ecological Specialist Study, be included in the Basic Assessment Report (BAR). In addition to this, CapeNature and nearby residents expressed their concern regarding the proposed impacts that this path could have on the biodiversity and integrity of the area and requested that a Marine Specialist Study be conducted.

Ecosense subsequently appointed Anchor Environmental Consultants (Pty) Ltd (Anchor) to conduct a Specialist Marine Environmental Impact Assessment in the intertidal zone of Poole's Bay as part of the Basic Assessment Process. This specialist study provides a baseline description of the affected intertidal marine and nearshore coastal environment and includes a description of all flora and fauna associated with the environment surrounding the proposed cliff path in Hermanus. This study also assesses the potential impacts of the proposed project on this environment.

1.2 Description of the proposed activity

A detailed description of the proposed development is provided in the Draft Basic Assessment Report of this project (Ecosense 2021), a summary of which is provided here. The proposed path will form a connection between the two sections of the current Hermanus Cliff Path and is anticipated to be approximately 850 m in length (Figure 2). The path will be constructed via Poole's Bay between the areas known as Western Entry Promontory in the west and Mickey in the east, and will run immediately below the high-water mark (HWM). It should be noted that the HWM within this area was revised in October 2021, although this is not expected to change the outcome of the Marine Impact Assessment. The revised position of the HWM is indicated in blue in Figure 3 below. There will be a 5 m construction buffer zone on the seaward side of the path to account for slight deviations due to the irregular terrain and to allow for movement of workers during construction. The area above the HWM will be a no-go area as this is located on private property. .

Two alternative designs have been proposed for the pathway and are described below (Figure 4 – Figure 6). The first alternative proposes that the path only be constructed in sections where access is limited or challenging. In easily accessible areas such as the pebble beaches, the path will be demarcated using sugar gum bollards. The pathway will comprise of a series of linking walkways that will be constructed using different types of materials for sections of varying habitat and substratum types. A schematic illustration of the various materials that will be utilised in sections characterised by different substratum types and elevations, are included in Figure 4. These materials include reinforced concrete and steel, sugar gum wood and stainless-steel fixtures. The largest sections of the pathway will comprise battered concrete with steps and sugar gum beam crossings as can be seen from Figure 5 (note that this figure depicts the HWM as recorded prior to its revision in October 2021). The steps will allow easier crossing over elevated sections, while the gum beams will allow easier crossing over gullies and streams while simultaneously allowing the water to flow freely. Some materials will be pre-assembled to limit construction time and possible impacts, whereas others will have to be assembled on site. Materials will have to be transported by foot or wheelbarrow as there is no access for vehicles. A large section on the western side of the path is characterised by steep cliffs. Here, the path extends over very rocky terrain or runs narrowly between the cliff and shoreline within the intertidal zone. For this section, a solid concrete walkway will be built and supported by buttresses that will be mounted against the cliff walls. In sections elevated more than 500 mm, battered balustrade walls with a steel grip rail will form part of the walkway. The connection point of walkway on the western side will extend through the gully.

Figure 3 The current position of the high-water mark (in blue) as revised in October 2021 within the Poole's Bay area where the proposed pathway will be located.

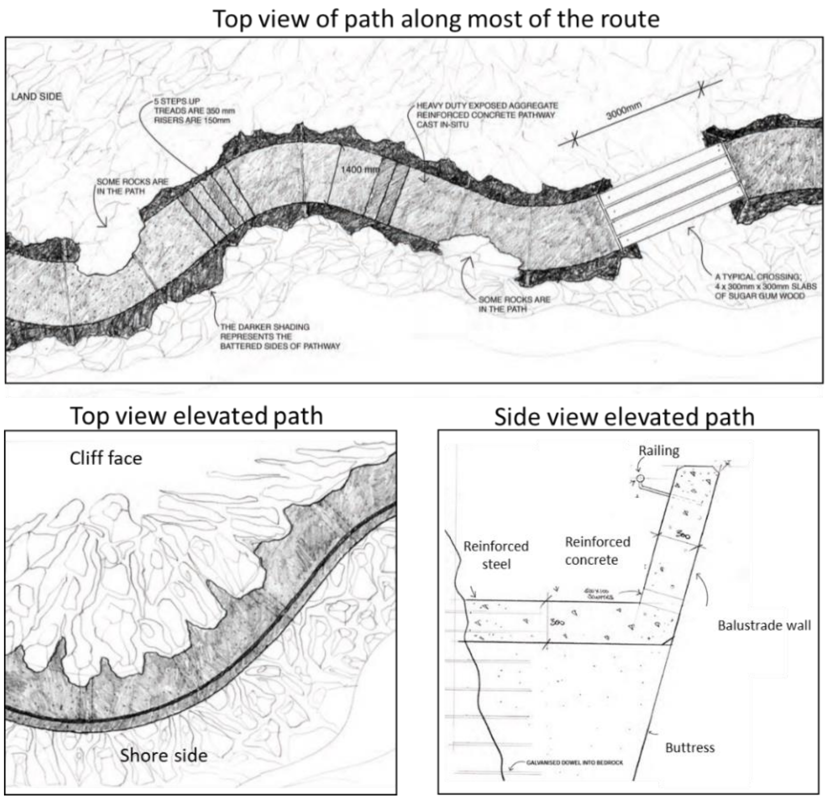

Figure 4 **Schematic illustration of the various designs of Alternative one in sections characterised by different substratum types and elevations. These illustrations have been extracted and modified from the Pre-Application Draft Basic Assessment Report (2020) and its Appendices.**

Figure 5 **The western most section of the proposed walkway (blue and purple) relative to the high-water mark (indicated in red) for Alternative one. Note that the map illustrates the HWM as it was recorded prior to its revision in October 2021. The map was extracted from the Pre-Application Draft Basic Assessment Report (Ecosense 2020).**

The second alternative proposes a formal, continuous walkway along the entire length of the path, even across easily accessible areas such as the pebble beaches. The walkway will be constructed of similar materials along the length of the path and include steps and bridges. This design will provide continuity and a refined appearance. The section on the western side of the path will, instead of being mounted against the wall using buttresses, be mounted on pillars to form a bridge. The pillars will be anchored to the base of the cliffs and be tall enough to ensure that the walkway will not be submerged during high tide. This will allow safer crossing during high tide and ensure that the path is always accessible. In areas where the walkway is elevated more than 500 mm, railings will be installed. The entry point on the western side will not extend through the gully, but rather through an alternative connection point that is more easily accessible.

Construction times will be dependent upon low tide, daylight and will need to occur outside of bird (November to January) and whale breeding seasons (July to December). As such, construction would only be possible during selected months and will thus extend over a period of 18 months.

Figure 6 **The proposed walkway (green, maroon, yellow and orange) within the Poole's Bay area relative to the position of the revised high-water mark (blue) for the second Alternative.**

2 TERMS OF REFERENCE

The objective of this study is to identify, assess and evaluate the potential marine ecological impacts associated with the construction, operation and decommissioning of the proposed development, for the two design alternatives.

The Terms of Reference for this Marine Impact Assessment study were as follows:

- Provide a description of the baseline environment and biota;
- Provide a description of the sensitivity of the environment and biota;
- Assess the two alternative cliff path designs and identify, assess and evaluate the potential marine ecology impacts associated with the construction, development, operation and decommissioning of the proposed walkways in the intertidal zone;
- Identify any areas to be avoided, including buffers;
- Provide recommendations, including those that may inform reasonable and feasible alternative options;
- Identify any practicable mitigation measures to reduce negative impacts and enhance positive impacts on marine ecological resources;
- Comment on the EAP's sensitivity verification for themes of plant and animal species, aquatic and terrestrial biodiversity in the context of the proposed path;
- Provide an assessment of other themes (animal species, aquatic biodiversity, plant species and terrestrial biodiversity), that have relevance to the marine environment, and might be affected;
- Provide a statement on the effects of climate change on the proposed pathway and its lifespan, for both alternatives;
- List any assumptions made and any uncertainties or gaps in knowledge;
- Provide a reasoned opinion as to whether the proposed activity or portions thereof should be authorised; and
- Recommend which design will be the preferred alternative.

3 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are applicable to the Marine Impact Assessment:

1. This study and its results and conclusions are based on all available information provided by Ecosense, reports, peer reviewed literature, the field survey and on the specialist's expertise. It cannot account for any information that has not been made public either in person, in the literature or in a report.
2. The Marine Impact Assessment is based on the two alternative path designs that have been provided. Should another alternative option be considered, an additional Marine Impact Assessment will be required for that alternative.
3. The disadvantage of a single site visit is that some mobile organisms may be overlooked. As many intertidal species are sessile in nature, the specialist is confident that the site visit was sufficient in recording the most common and important marine and coastal species in the area.

4 METHODOLOGY

This assessment was based on findings from a site visit and information collated during a desktop assessment of peer reviewed articles, published books and reports. The site survey was conducted on 27 February 2021, during spring low tide. The proposed path was followed starting at the site known as Mickey in the east, through to the Western Entry Promontory in the west. The blue symbols demarcating the proposed path and a detailed map as per the Site Development Plan (in the Ecosense 2021 BAR) compiled by the architects and engineers appointed to design the path, was used as a guide. It should be noted that the HWM within this area was revised in October 2021, although this is not expected to change the outcome of the Marine Impact Assessment.

As per the Site Development Plan, the footpath is anticipated to be 1.2 m in width. Furthermore, there will be a 5 m construction buffer zone on the seaward side of the path. The potential impacts associated with the proposed development are not anticipated to extend more than a couple of meters beyond the footpath on either side. The Marine Specialist Study therefore focussed on the intertidal marine and terrestrial coastal environment in the immediate vicinity of the path, and included the path itself, a 5 – 10 m study area on either side of the path and The Island. This area is referred to as "the study area" from here on. All marine fauna and flora, marine and shore birds, terrestrial animals, and any coastal flora occurring in the study area was recorded and photographed. Rock pools in the area were also inspected. Species were identified to the lowest taxonomic group using field guides and expert knowledge. Where a positive identification could not be made, the species was assigned only to a genus, family or phylum. The Marine Ecological Impact Assessment study and report is based on information sourced from the documents provided by Ecosense, available reports, peer reviewed literature, the field survey and on the specialists' knowledge and expertise. A Marine Impact Assessment was conducted for each alternative and assessed using methods prescribed in the Environmental Impact Assessment regulations and by Ecosense in the "Impact Rating Methodology" for the study (APPENDIX 1).

5 DESCRIPTION OF THE RECEIVING ENVIRONEMNT

5.1 Abiotic Environment

The south coast of South Africa is a warm temperate region influenced by the cold Benguela and the warm Agulhas current. It is roughly defined as the region between Cape Point (to the west) and Port Elizabeth (to the east) and is classified as the Agulhas Ecoregion in the most recent National Biodiversity Assessment for the marine and coastal environment in South Africa. More specifically, the Agulhas Ecoregion extends from Cape Point in the Western Cape north-eastwards to the Mbashe river in the Eastern Cape (Figure 7). This classification is based on the major differences in temperature, nutrients and productivity along the coast; each of the identified ecoregions being characterised by having distinct species assemblages (Sink *et al.*2011).

Hermanus is situated in Walker Bay (on the western Agulhas Bank) along the south coast of South Africa approximately 120 km southeast of Cape Town. This region is dominated by the cool waters of the Benguela Current and occasionally impacted by filaments of warm Agulhas Current waters creating a complex overlap of water masses (Hutchings 1994; Probyn *et al.* 1994). The south coast receives an annual wind stress that is made up of easterly and westerly winds in almost equal parts, but experiences a dominant easterly wind during summer and prevailing westerly wind during winter (Hutchings 1994). In the summer months, sections of the south coast periodically receive localised wind-driven upwelling, especially where the continental shelf widens to form the Agulhas Bank (Schumann *et al.* 1995; Griffiths *et al.* 2010). This upwelling is much less intense than that experienced off the South African west coast. It creates a level of stratification within the water column, resulting in comparatively warmer surface waters (> 18°C) (Hutchings 1994; Robyn *et al.*1994). In Hermanus, upwelling typically occurs between November and April with the strongest upwelling events and thus lowest sea surface temperatures, occurring in the period February – March, although this may persist into April (Largier *et al.* 1992). While temperatures in the nearshore upwelling region around the South African coastline tend to range from 10 – 18 °C, the mean annual sea surface temperature for Hermanus is 14.6°C (Stephenson 1937; Griffiths *et al.* 2010).

Hermanus is renowned for its beauty, museums, beaches, whale sanctuary and biodiversity, making it a very popular tourist destination. One of the prominent features is the Fernkloof Nature Reserve which includes sections of the Hermanus coastal area. The reserve is located in the Klein River mountains spanning approximately 18 square kilometres from sea level to an altitude of 824 m. In this region, the existing climate reflects that of a Mediterranean climate zone experiencing cold wet winters and hot dry summers. A well-known feature of the nature reserve is the Hermanus Cliff Path that cuts through the town and meanders for nearly 13 km and ends at the mouth of the Klein River toward the east of the town.

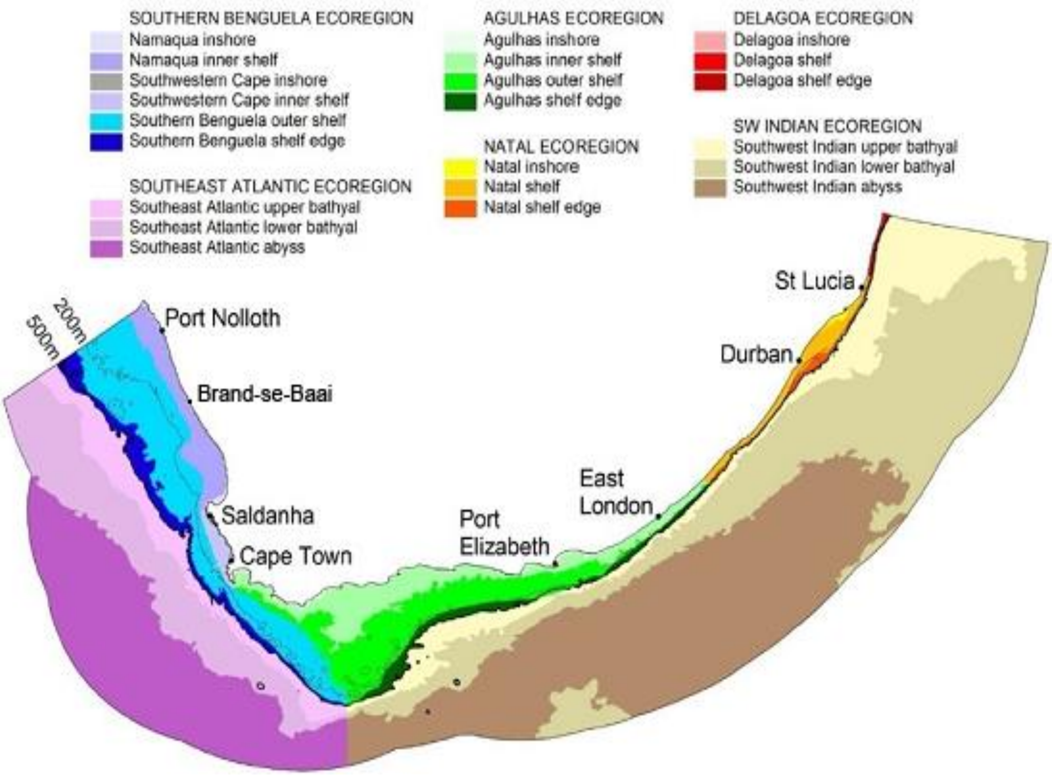

Figure 7 **The six marine ecoregions with 22 ecozones incorporating biogeographic and depth divisions in the South African marine environment as defined by Sink *et al.* (2012).**

5.2 Biotic Environment

The warm temperate South African south coast environment is influenced by the cold Benguela region and the warm Agulhas currents, and can be considered a hybrid of the conditions experienced on the west and east coast. Reflecting the seasonal upwelling within the region, overall primary production on the south coast is generally low resulting in only a few commercial fisheries. It is, however, known to have high human population densities which in turn place pressure on the coastal environment (Griffiths *et al.* 2010). The organisms found in this region are typically a reflection of the prevailing physical conditions and are generally distributed as such. For benthic organisms, species richness and endemism are highest along the south coast and lowest towards the east and western boundaries of the country (Awad *et al*. 2002). The nearshore coastal environment can broadly be classified into different zones namely the subtidal, intertidal, splash and the coastal zone (Figure 8). The subtidal zone is always submerged, whereas the intertidal zone is periodically submerged depending on the tides. This zone can further be classified as the lower-, mid- and high (upper) intertidal zones, with the lower intertidal being exposed during low tide and the upper intertidal being submerged during high tide. Rock pools are common in the intertidal and provide an "artificial" subtidal environment for various species in the intertidal zone. The splash zone, as its name suggests, experiences occasional splashes from waves during high tide and supports a small number of marine species such as periwinkles and algae that are tolerant to desiccation. The coastal zone is a mainly terrestrial environment characterised by coastal plants tolerant of saline condition. The high-water mark (HWM) usually occurs well above the splash zone and is the upper boundary to which water can extend during high tide in extreme cases such as storms. The nearshore coastal environment can also be classified according to the species they support. The five common zones along the southern coast are the Infratidal, Cochlear/ Argenvillei, Upper and Lower Balanoid and Littorina zones and extend from just below the lower intertidal (Infratidal) to just above the splash zone (Littorina).

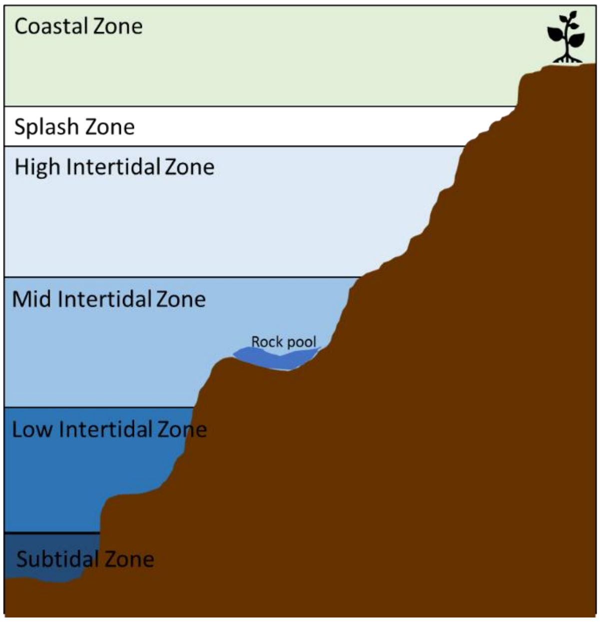

Figure 8 **Zonation of a typical nearshore coastal environment. The subtidal zone is permanently submerged, while the intertidal zones are periodically submerged depending on the tides. The splash zone only experiences occasional splashes from waves. The coastal zone is characterised by coastal plants tolerant to a saline environment and terrestrial animals.**

The southern periwinkle *Affrolittorina knysnaensis* and the alga *Porphyra capensis* colonise the Littorina zone; the barnacles *Tetraclita serrata, Chthamalus dentatus* and *Octomeris angulosa* densely populate the upper reaches of the Balanoid zone which also support the granular limpet *Cymbula granatina*; the lower parts of this zone are characterised by the limpet *Cymbula oculus,* the gastropod *Oxystele variegate*, the Mediterranean invasive mussel *Mytilus galloprovincialis*, ribbed mussel *Aulacomya ater* and the brown mussel *Perna perna* (Stephenson *et al.* 1937; Robinson *et al.* 2007; Branch & Branch 2018). The Cochlear/ Argenvillei zone is typically low down on the shore and, as its name suggests, support the limpets *Scutellastra cochlear* and *S. argenvillei*. The lowest part of the shore (infratidal), only exposed at spring low tide, is characterised by several species of algae including red algae such as the corallines, *Hypnea spicifera*, *Plocamium* and *Laurencia* and brown algae such as *Brassicophycus*, *Bifurcariopsis*, *Zonaria* and *Ecklonia radiata.* Red bait *Pyura stolonifera* and the Cape urchin *Parechinus angulosus* are also common sightings in this zone (Branch & Branch 2018).

The rocky shoreline in Hermanus provides a resting place for seabirds that frequent the coast, but most of these are widely distributed throughout South Africa. This also includes many seabirds that are of national importance such as the Swift tern (*Thalasseus bergii*), Kelp gull (*Larus dominicanus*), Hartlaub's gull (*Larus hartlaubii*) and the Cape Cormorant (*Phalacrocorax capensis*). Hartlaub's Gull is endemic to southern African and is found from Swakopmund to Cape Agulhas and, is one of approximately 50 of the world's rarest gull species. It breeds mainly on protected islands but has also been found to breed in sheltered inland waters. Hartlaub's Gulls are relatively nomadic and can alter breeding localities from one year to the next (Crawford *et al.* 2003). The Swift Tern is a widespread species and as a common resident in southern Africa. Swift Terns breed synchronously in colonies, usually on protected islands, and often in association with Hartlaub's Gulls. Sensitive to human disturbance, their nests easily fall prey to Kelp Gulls, Hartlaub's Gulls and Sacred Ibis (Le Roux 2002). Cape Cormorants are endemic to southern Africa, where they are abundant on the west coast, but less common on the east coast, occurring as far east as Seal Island in Algoa Bay. They breed between Ilha dos Tigres, Angola, and Seal Island in Algoa Bay, South Africa.

The reserve also supports several species of mammals, reptiles, amphibians, terrestrial birds and insects, many of which are also Red List threatened species (De Villiers and Zweig 2020; ewt.org.za). Within the Walker Bay area, mammals such as the Southern Right Whale (*Eubalaena australis*) and the common rock Hyrax (*Procavia capensis*) occur frequently. The southern right whale distribution in South Africa seems to be found in areas that are protected by open ocean swell and prevailing wind conditions, aligning with general notions that physical environmental conditions determine their distributions (Elwyn and Best 2004). Along our coastline they are concentrated in two main areas on either side of Cape Agulhas during the months of July to December, i.e., nursery areas (De Hoop and St Sebastian Bay) and breeding areas (Walker Bay) (Elwyn and Best 2004). These whales can thus frequently be seen from the shores in Hermanus. As they breed and calve in the bay, Walker Bay has been declared a seasonal Marine Protected Area to serve as a whale sanctuary by the Marine Living Resources Act (Act No. 18 of 1998) as published in Government Notice No. 417 (Gazette No.20877). The proposed declaration applies from 1 July to 15 December each year during which time no vessel may be used or operated within this area, except for legally permitted whale watching vessels. The rock Hyrax or 'klip dassie' as it is referred to locally, are found throughout Africa and the Middle East but tend to favour areas where rocky outcrops are dominant with favourable amounts of food. They are listed as "least concern" on the IUCN Red list given that they are abundantly distributed within marine protected areas.

Fynbos and flowering plants can be found in abundance within the Fernkloof Nature Reserve with more than 1000 species collected and retained within the Orchard Herbarium. Approximately 12% of the plants occurring within the reserve have a threatened status, but many common species are also distributed here. *Sideroxylon inerme* (white milkwood) is usually distributed in coastal dune thickets and forests, *Sarcocornia capensis* (glasswort) typically coastal sands and *Searsia glauca* (blue kunibush) is commonly distributed along the coast of South Africa, but is also found further inland amongst the Fynbos vegetation. It is found mostly on coastal dunes from southern Transkei up until Velddrif in the Southwestern Cape.

5.3 Field survey and observations

Marine fauna and flora present in the nearshore environment around Poole's Bay was found to be typical of the region and exhibited a zonation pattern similar to that seen elsewhere and described in Section 5.2 (Figure 9). Anemones, urchins, gastropods and algae were a common sight in the subtidal and rock pools (A) and the lower intertidal (A and B).

The mid intertidal zone was dominated by the alien Mediterranean mussel, *M. galloprovincialis* (C). This mussel is the most widespread and ecologically important invasive alien species along the South African coast, occupying over 2000 km of coastline (Robinson *et al.* 2005). Its presence in this area does therefore not come as a surprise.

The high intertidal zone in most areas were occupied by several species of barnacles and limpets (D), while the splash zone was characterised by large numbers of the southern periwinkle, *Affrolittorina knysnaensis*. As this gastropod is highly tolerant to desiccation, it is commonly found above the intertidal zone (E). As no other marine species were recorded to occur within or above this zone along the length of the path, the presence of this species along the shoreline was used as a proxy for the upper boundary of the splash zone. Coastal plants were characteristic of the coastal zone (F), along with the occasional hyrax.

These pictures also visibly illustrate the five coastal zones, i.e., the Infratidal (A), Cochlear/ Argenvillei (B), Lower Balanoid (C), Upper Balanoid (D) and Littorina zone (E). The proposed path (blue dashed line and bollards) relative to the upper boundary of the HWM (red dashed line), splash zone (between white dotted lines) and upper intertidal zone (below the splash zone) is illustrated in Figure 10. The proposed foot path will be situated just below the HWM along the length of the path. High tide very seldomly extends to the HWM and was observed to be far lower during the field survey for most of the length of the path. The "normal" splash zone (i.e., outside of extreme storm events, positioned between the white dotted lines) was located approximately 5 m below the proposed pathway for most of the length of the path.

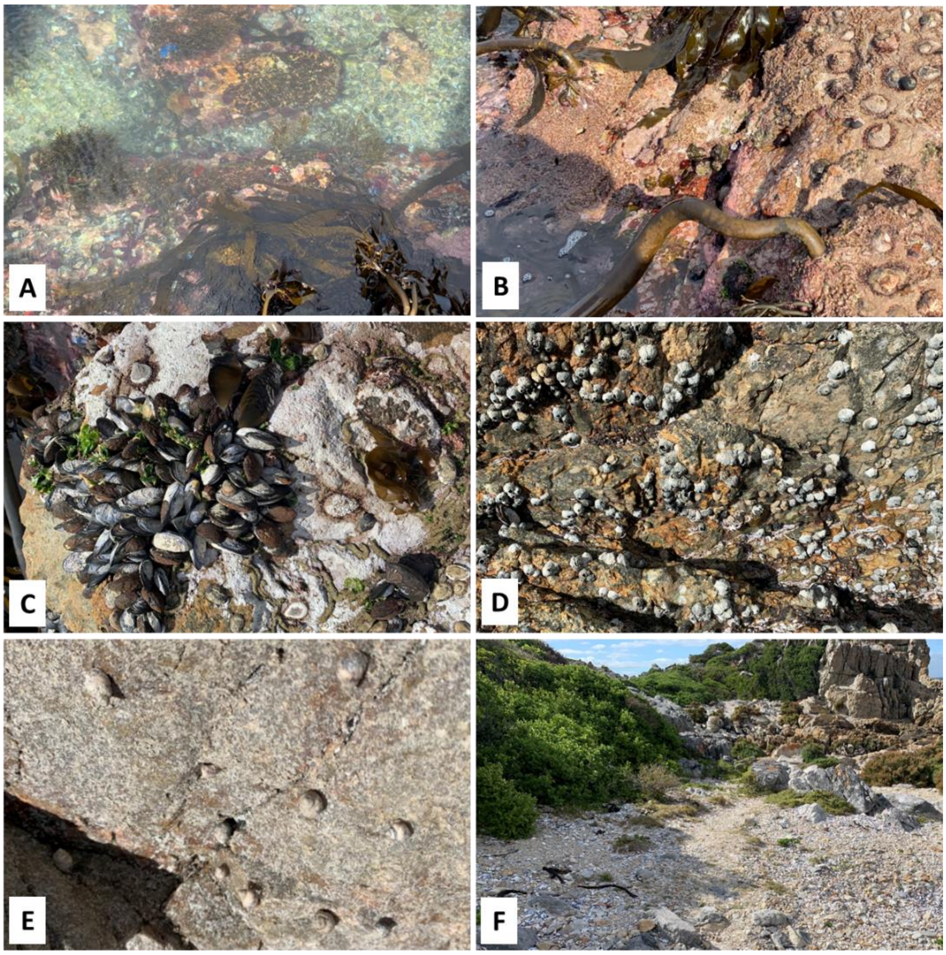

Figure 9. **Illustration of a typical subtidal (A), low (B), mid (C) and high intertidal zone (D), splash zone (E) and coastal zone (F) in the study area in Hermanus (Anchor 2021).**

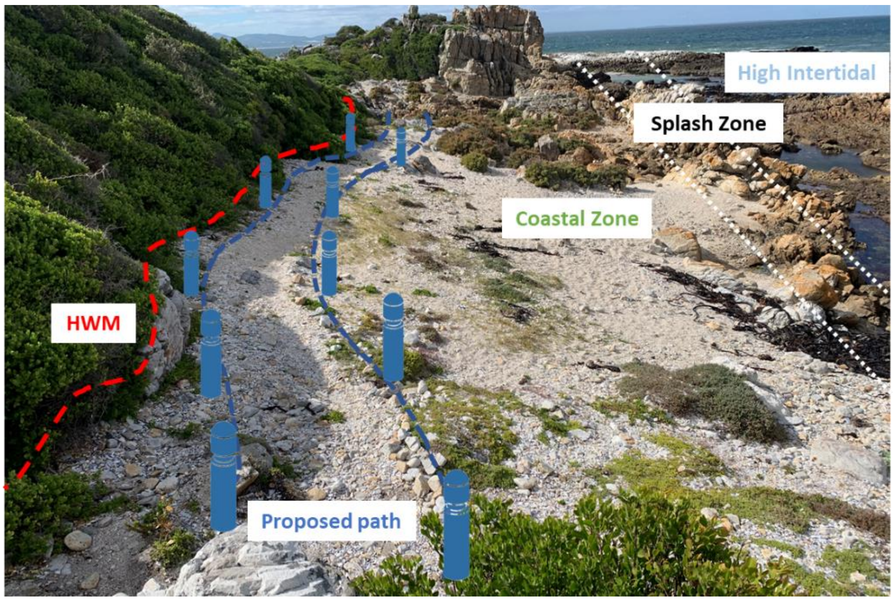

Figure 10. **Observed zonation pattern for most of the coastline along the route of the proposed path. The splash zone (between the white dotted lines) under "typical" wave energy conditions was recorded approximately 5 m below the proposed pathway (blue dashed line with bollards) for most of the length of the path. The path is located below the high-water mark (red dashed line).**

The proposed route extends over various substratum types (Figure 11), from gravel and sand (A), boulders (B), rocky outcrops (C, D) and pebble beaches (E) to old sewer and storm water pipes (F). The proposed foot path is designed to provide an easier means of crossing these obstacles. Some sections of coastline along this route are also bordered by cliffs (Figure 11 C, D). These cliffs create a barrier between the terrestrial (mostly private) residential areas and that of the marine environment.

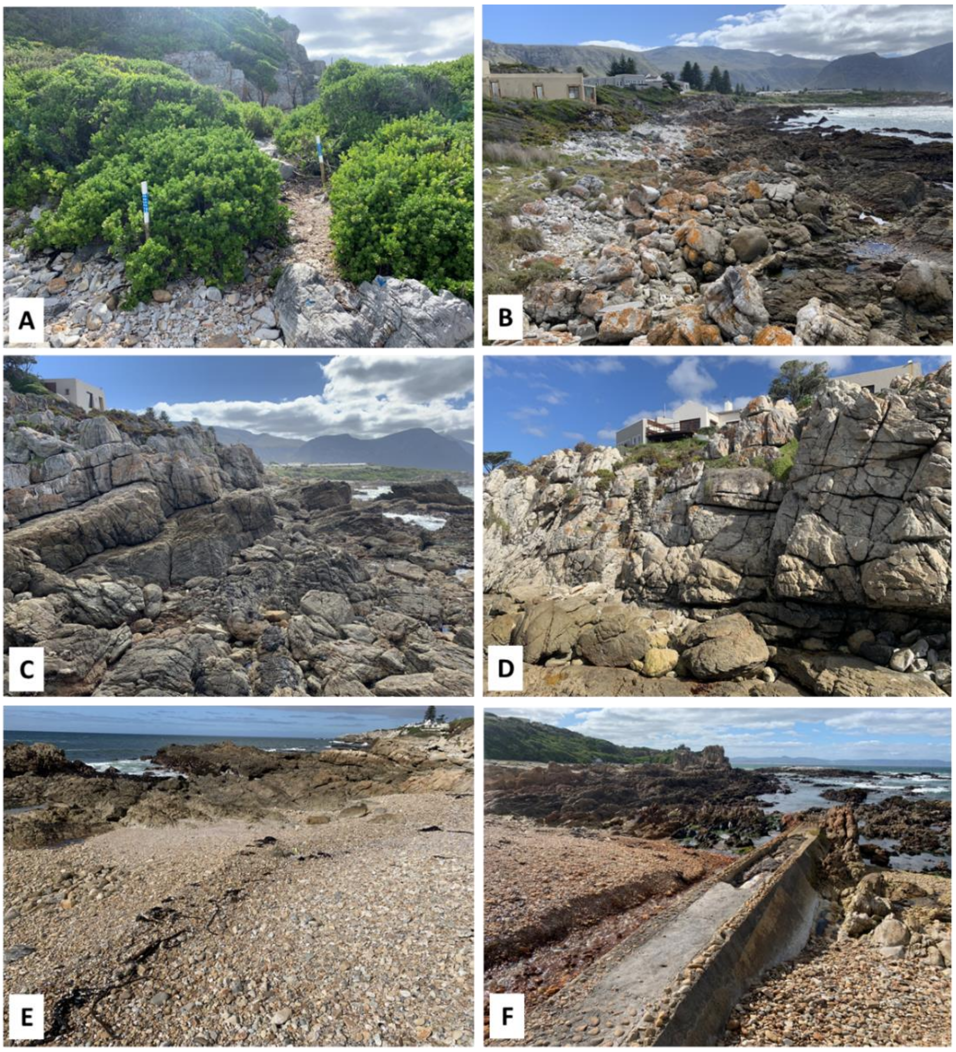

Figure 11 **Photos taken along the route of the proposed path. The path extends over various substratum types including gravel and sand (A), boulders (B), rocky outcrops (C, D), pebble beaches (E) and old sewer and storm water pipes (F).**

As the cliffs extend into the intertidal zone, the proposed path runs narrowly between the cliff and shoreline over very rocky terrain within the upper intertidal zone. In these sections, the path will be elevated and either mounted against the cliff wall or on pillars to allow safer crossing and to avoid the path being submerged during high tide (Figure 12). In some sections, the cliffs and therefore the proposed path, extend into the intertidal zone. For this reason, the proposed path will be raised and mounted either against the cliff wall or on pillars as illustrated in the figures above. These elevated sections include the (1) Bayview landing; (2) Bayview pool; (3&4) Baleen cliffs; and (5) Western Entry Promontory.

Figure 12 **In some sections, the cliffs and therefore the proposed path, extend into the intertidal zone. For this reason, the proposed path will be raised and mounted either against the cliff wall or on pillars. These elevated sections will occur at the (1) Bayview landing; (2) Bayview pool; (3&4) Baleen cliffs; and (5) Western Entry Promontory.**

A total of 71 marine and coastal faunal and floral species, typical of those found along the South Coast and coastline of Hermanus, were recorded within the study area during the field survey (Figure 13–Figure 17). Most species (n = 35) comprised intertidal macrofaunal invertebrates (Figure 13) from various taxonomic groups, including Porifera (sponges), polychaetes (bristle worms), gastropods (sea-snails and limpets), bivalves (mussels), polyplacophorans (chitons), echinoderms (starfish and urchins), crustaceans (barnacles and crabs), actiniaria (anemones) and ascidians (sea squirts). An additional 16 seaweed species were recorded in the intertidal area (Figure 14), while eight seabird species and one whale species, the Southern Right whale, were recorded offshore (the whale was spotted approximately 200 m offshore) (Figure 15). Although whales usually frequent the region between the months of July and December, a sighting this early in the year is not unheard of. Within the coastal zone, nine species of coastal plants (Figure 17), one passerine bird species and one hyrax was recorded (Figure 15).

Table 1 **Species of macrofaunal invertebrates, seaweed (kelp), birds, mammals and terrestrial flowering plants recorded in the vicinity of the proposed foot path in Hermanus. Counts are indicated in brackets and only provided for birds and mammal species. Letters in the last column refer to images of species in the respective figures.**

Species	Common Name	Phylum	Class	Order	Figure
Marine invertebrates					Figure 13
Porifera spp.	Sponge	Porifera			
Hymeniacidon perlevis	Crumb of bread sponge	Porifera	Demospongiae	Suberitida	
Gunnarea gaimardi	Cape reef worm	Annelida	Polychaeta		C
Spirorbis spp.	Spiral fanworm	Annelida	Polychaeta	Sabellidae	
Affrolittorina knysnaensis	Southern periwinkle	Molluscs	Gastropoda	Littorinimorpha	
Burnupena sp.	Whelk	Molluscs	Gastropoda	Neogastropoda	G
Cymbula oculus	Goats eye limpet	Molluscs	Gastropoda		
Fissurella mutabilis	Cape Keyhole limpet	Molluscs	Gastropoda	Lepetellidae	
Haliotis midae	Abalone	Molluscs	Gastropoda	Lepetellidae	
Helcion pectunculus	Prickly limpet	Molluscs	Gastropoda		D
Oxystele antoni	Variegated topshell	Molluscs	Gastropoda	Trochida	D
Oxystele tigrina	Tiger topshell	Molluscs	Gastropoda	Trochida	D
Scutellastra argenvillei	Argenvilles limpet	Molluscs	Gastropoda		B
Scutellastra cochlear	Pear limpet	Molluscs	Gastropoda		B
Scutellastra granularis	Granular limpet	Molluscs	Gastropoda		D
Scutellastra longicosta	Ducks foot limpet	Molluscs	Gastropoda		F
Siphonaria capensis	Cape false limpet	Molluscs	Gastropoda	Siphonariidae	
Siphonaria serrata	Serrate false limpet	Molluscs	Gastropoda	Siphonariidae	
Polyplacophora sp.	Chiton	Molluscs	Polyplacophora		
Aulacomya atra	Ribbed mussel	Molluscs	Bivalvia	Mytilidae	

Species	Common Name	Phylum	Class	Order	Figure
Mytilus galloprovincialis	Mediterranean mussel	Molluscs	Bivalvia	Mytilidae	
Parechinus angulosus	Cape urchin	Echinodermata	Echinoidea	Camarodonta	A
Henricia ornata	Reticulated starfish	Echinodermata	Asteroidea	Spinulosida	A
Marthasterias glacialis	Spiny starfish	Echinodermata	Asteroidea	Forcipulatida	
Parvulastra exigua	Dwarf cushion star	Echinodermata	Asteroidea	Valvatida	H
Octomeris angulosa	Eight-shell barnacle	Crustacea	Hexanauplia	Sessilia	
Tetraclita serrata	Volcano barnacle	Crustacea	Hexanauplia	Sessilia	
Plagusia chabrus	Cape rock crab	Crustacea	Malacostraca	Decapoda	I
Actinia equina	Beadlet anemone	Cnidaria	Anthozoa	Actiniaria	
Anthopleura michaelseni	Crevice anemone	Cnidaria	Anthozoa	Actiniaria	A
Anthostella sp.	Dwarf spotted anemone	Cnidaria	Anthozoa	Actiniaria	A
Bunodactis reynaudi	Sandy anemone	Cnidaria	Anthozoa	Actiniaria	E
Bunodosoma capense	Knobbly anemone	Cnidaria	Anthozoa	Actiniaria	
Pseudactinia flagellifera	False plum anemone	Cnidaria	Anthozoa	Actiniaria	
Pyura stolonifera	Red bait	Urochordata	Ascidiacea	Stolidobranchia	B
Seaweed					Figure 14
Algal turf					E
Codium fragile fragile	Fragile upright codium	Chlorophyta	Ulvophyceae	Bryopsidales	A
Ulva spp.	Sea lettuce	Chlorophyta	Ulvophyceae	Ulvales	
Brassicophycus brassicaeformis	Hanging wrack	Ochrophyta	Phaeophyceae	Fucales	A
Ecklonia maxima	Sea bamboo	Ochrophyta	Phaeophyceae	Laminariales	B
Laminaria pallida	Split-fan kelp	Ochrophyta	Phaeophyceae	Laminariales	B
Ralfsia verrucosa	Ralfsia	Ochrophyta	Phaeophyceae	Ralfsiales	
Splachnidium rugosum	Dead man's fingers	Ochrophyta	Phaeophyceae	Scytothamnales	
Athrocardia sp.	Hinged corallines	Rhodophyta	Florideophyceae	Corallinales	
Gigartina polycarpa	Tongue weed	Rhodophyta	Florideophyceae	Gigartinales	D
Gymnogongrus sp.		Rhodophyta	Florideophyceae	Gigartinales	A
Hildenbrandia lacanellieri	Tar crust	Rhodophyta	Florideophyceae	Hildenbrandiales	
Nothogenia erinacea	Hedgehog seaweed	Rhodophyta	Florideophyceae	Nemaliales	D
Pachymenia orbitosa	Slippery orbits	Rhodophyta	Florideophyceae	Halymeniales	A
Plocamium sp.		Rhodophyta	Florideophyceae	Plocamiales	
Porphyra capensis	Purple laver	Rhodophyta	Bangiophyceae	Bangiales	
Birds					Figure 15
Larus dominicanus	Kelp Gull (30)	Chordata	Aves	Charadriiformes	E

Species	Common Name	Phylum	Class	Order	Figure
Larus hartlaubii	Hartlaub's Gull (10)	Chordata	Aves	Charadriiformes	D
Sterna bergii	Swift tern (25 & 750 at sea)	Chordata	Aves	Charadriiformes	F
Sterna hirundo	Common tern (6 & > 500 at sea)	Chordata	Aves	Charadriiformes	G
Sterna sandvicensis	Sandwich tern (5 & > 500 at sea)	Chordata	Aves	Charadriiformes	
Ardea cinerea	Grey Heron (1)	Chordata	Aves	Ciconiiformes	
Threskiornis aethiopicus	African Sacred Ibis (1)	Chordata	Aves	Ciconiiformes	
Phalacrocorax capensis	Cape cormorant (100)	Chordata	Aves	Pelecaniformes	C
Sturnus vulgaris	European Starling (22 – terrestrial)	Chordata	Aves	Passeriformes	
Mammals					Figure 15
Eubalaena australis	Southern Right Whale (1; approximately 200 m offshore)	Chordata	Mammalia	Cetartiodactyla	A
Procavia capensis	Rock Hyrax (1)	Chordata	Mammalia	Hyracoidea	B
Terrestrial flowering Plants					Figure 17
Ipomoea cairica	Morning glory	Spermatophyta	Dicotyledonae	Solonales	A
Sideroxylon inerme	White milkwood	Spermatophyta	Dicotyledonae	Ericales	G
Aloe ferox	Cape Aloe	Spermatophyta	Magnoliopsida	Asparagales	F
Brachylaena sp.	Cape Silver oak	Tracheophyta	Magnoliopsida	Asterales	E
Mesembryanthemum canaliculatum	Dew plant	Spermatophyta	Magnoliopsida	Caryophyllales	B
Sarcocornia tegetaria	Glasswort Samphire	Spermatophyta	Magnoliopsida	Caryophyllales	D
Maytenus sp.	Cape Maytenus	Tracheophyta	Magnoliopsida	Celastrales	H
Passerina ericoides	Christmas berry	Spermatophyta	Magnoliopsida	Euphorbiales	I
Searsia glauca.	Blue Kuni-bush	Spermatophyta	Magnoliopsida	Sapindales	C

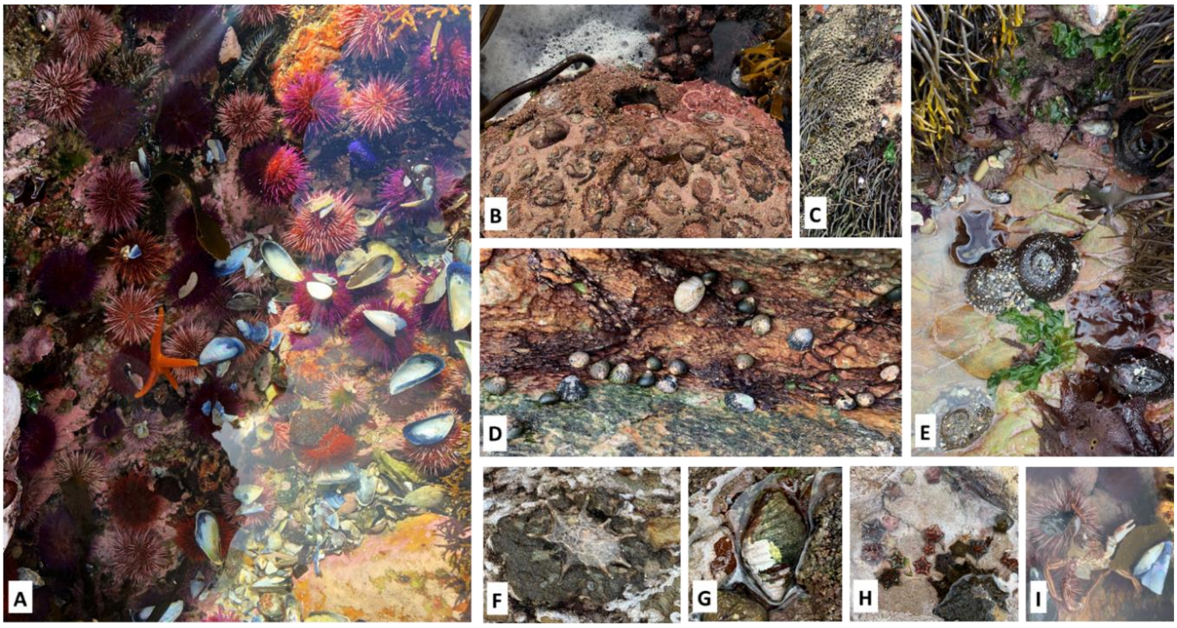

Figure 13 **Examples of various intertidal macrofaunal species recorded in the study area during the site survey. Names of species in each image (A–I) are listed in Table 1 (Photo credits: Anchor 2021).**

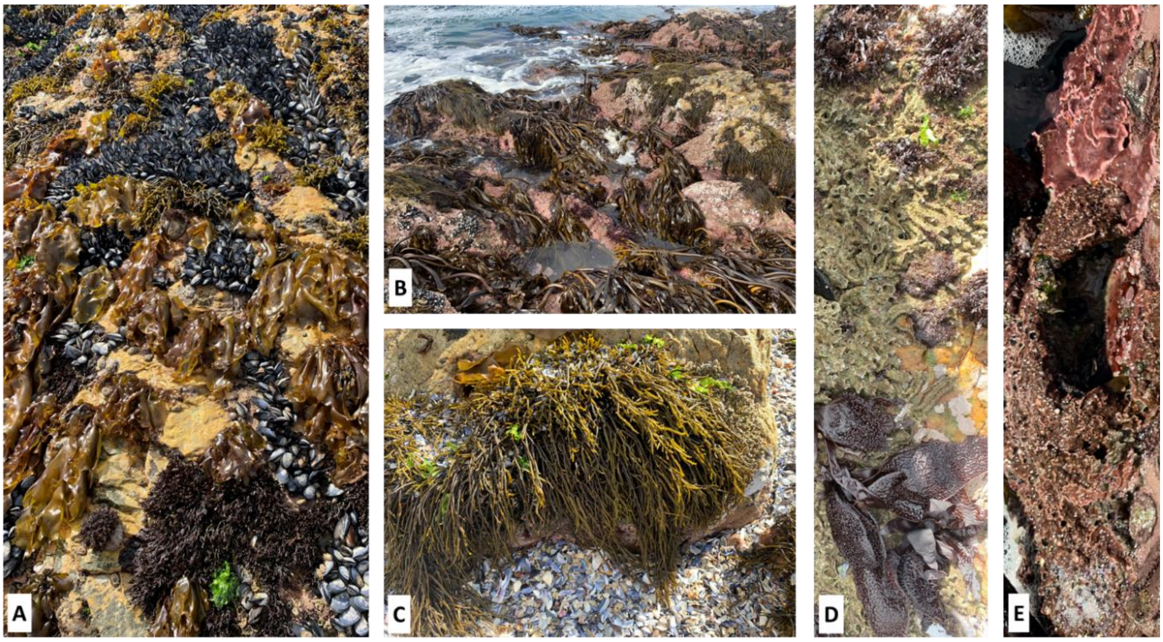

Figure 14 **Examples of several intertidal seaweed species recorded in the study area during the site survey. Names of seaweed species in each image (A–E) are listed in Table 1 (Photo credits: Anchor 2021).**

Just under 2 000 seabirds from eight different species were recorded during site visit, with terns being the most frequently observed. Seabird species recorded include the Cape cormorant (*Phalacrocorax capensis*: C), White-breasted cormorants (*Phalacrocorax lucidus*), Hartlaub's gull (*Larus hartlaubii*: D), Kelp gull (*Larus dominicanus*: E), Swift tern (*Sterna bergii*: F), Common tern (*Sterna hirundo*: G), Sandwich tern (*Sterna sandvicensis*: H), African Sacred ibis (*Threskiornis aethiopicus:* I) and the Grey Heron (*Ardea cinerea*: J) (Figure 15). The thick layer of guano on The Island, noticeable even from the shore, suggest that The Island serves as an important roosting site for many seabirds, especially the cormorants and terns (Figure 16). This island is isolated from the mainland even during spring low tide thereby offering roosting birds protection from terrestrial predators and other forms of disturbance, including that from people. A couple of European starlings, *Sturnus vulgaris*, were recorded in the vicinity but no shore birds were observed on the beach. Interestingly, no crowned cormorants (*Phalacrocorax africanus*), or the Near Threatened African black oystercatcher (*Haematopus moquini*) were recorded during the field survey. The latter species is, however, known to occur in the area and were recorded during the avian survey in March 2020.

Figure 15. Examples of some of the mammals and birds that were recorded in the area during the survey. Names of species in each image (A–F) are listed in Table 1 (Photo credits – Photo A, C, D, E and F: Anchor 2021; Photo B: Fernkloof.org.za)

Figure 16 Photo of The Island just south of Mickey in Hermanus. This island is an important roosting site for various species of marine birds of conservation importance (Photo credits: Anchor 2021).

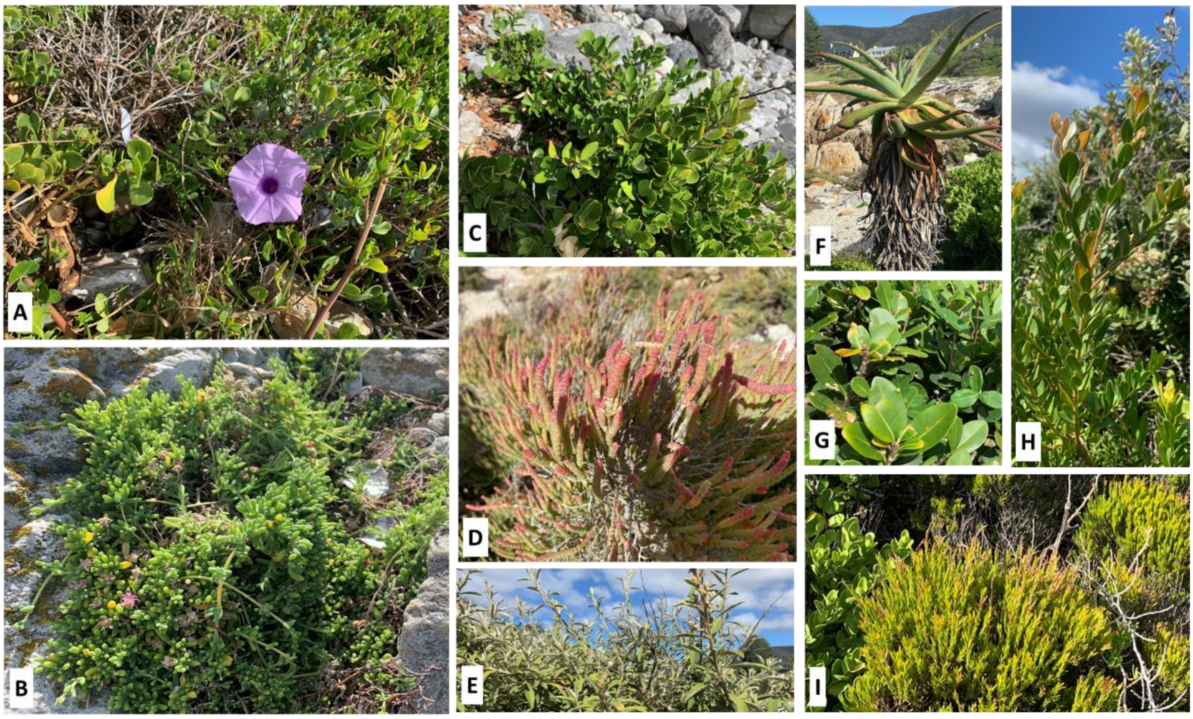

Figure 17 Examples of the terrestrial flowering plants recorded along the proposed path during the survey. Names of species in each image (A–I) are listed in Table 1 (Photo credits: Anchor 2021).

5.4 Sensitivity and significance of the system

Hermanus is situated in the Cape Floristic Region (CFR), one of the three Biodiversity Hotspots of South Africa and one of 36 such sites in the World. It is deemed a "hotspot" due to the high diversity and endemism of plants and the associated faunal and bird species supported by the various ecosystems within this region. Several nature reserves have been established in this region with the aim to protect the rich biodiversity, one of these being the Fernkloof Nature Reserve in Hermanus. The ecosystem threat status of the region was assessed using spatial data from the National Biodiversity Assessment or NBA (Sink *et al.* 2012). Ecosystem types are categorised as 'critically endangered', 'endangered', 'vulnerable' or 'least threatened', based on the proportion of each ecosystem type that remains in good ecological condition relative to a series of thresholds" (Driver *et al.* 2012). Approximately 78% of the reserve comprises of Critically Endangered Sandstone Fynbos, 7.4% Vulnerable Agulhas Limestone Fynbos and a small percentage of Endangered Hangklip Sand Fynbos. The reserve also supports several species of mammals, reptiles, amphibians, birds and insects, many of which are also Red List threatened species (De Villiers and Zweig 2020; ewt.org.za). A large section of the reserve forms part of a region that has been classified as a "critically endangered" ecosystem and Protected Area, while some sections of the reserve and surrounding areas are also considered Critical Biodiversity Areas (CBA). A CBA is an area that support species of high biodiversity value such as those considered rare, endemic or endangered and which must be protected in their natural state to ensure the persistence of biodiversity and ecosystems in that area. In addition to the conservation significance of the terrestrial realm, the marine realm, specifically Walker Bay, is also considered important, having been declared a seasonal Marine Protected Area (MPA) from 1 July to 15 December each year to serve as a whale sanctuary for breeding and nursing whales.

Many people perceive the area in the vicinity of the footpath as environmentally sensitive due to its proximity to the conservation areas and are concerned that the construction of a pathway could have potential negative ecological impacts. Any potential impacts associated with the proposed development are, however, not anticipated to extend more than a couple of meters beyond the footpath on either side. The survey was conducted in the intertidal marine and coastal environment and included the footpath itself, a 5 – 10 m study area on either side of the path and The Island. This area is referred to as "the study area". Any conclusions drawn about the sensitivity and significance of the system is based only on the assessment of the biota observed in the study area during the site survey and that are known to occur in the region based on historic literature. It is important to note that the ecosystem threat status of an area is dependent upon available information. In the absence of such information, a threat status can be assigned using what is known from adjacent locations, or what is known about species distributions based on the climate or habitat of an area. It is thus possible that some heavily degraded or transformed areas can incorrectly be classified as CBA's. Ground-truthing of an area is therefore crucial in assessing the sensitivity of an environment. Although the Hermanus cliff path extends through a section of the Fernkloof Nature Reserve, the site survey in addition to several National Web Databases (refer to the links in the reference list) revealed that the study area falls outside of the Fernkloof Nature Reserve and is situated just below the boundary of the CBA (which has been severely degraded / transformed due to landscaping of private properties in some areas right down to the HWM) and, as it is land-based, falls outside of the Walker Bay Marine Protected Area (Figure 18). Observations suggest that the study area is not as ecologically sensitive or of high conservation concern as anticipated. The study area is already frequented by numerous locals and tourists in addition to being greatly modified and disturbed. This was evident from the discovery of structures either built directly below, or bordering the HWM (Figure 19) in addition to the presence of waste, rubble and old sewer and storm water pipes (Figure 21).

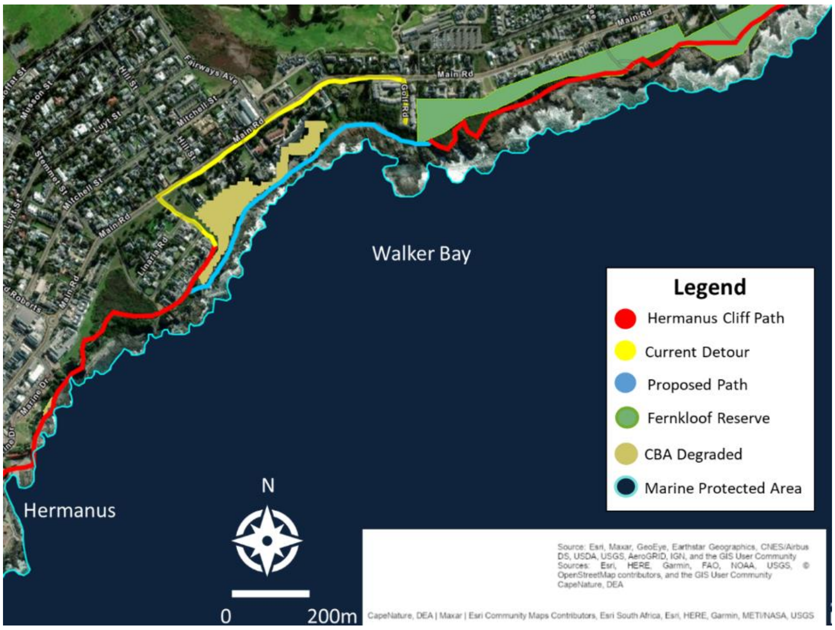

Figure 18 The position of the Hermanus Cliff Path, current detour and the proposed path relative to the Fernkloof Nature Reserve, Walker Bay Marine Protected Area and Degraded Critical Biodiversity Area (CBA). Map extracted from the Western Cape Government Department of Agriculture Enterprise GIS Portal and based on the Biodiversity Spatial Plan 2017. (https://gis.elsenburg.com/portal/home/webmap/viewer.html).

Figure 19 **Photos taken along the route of the study area showing how the study area is already disturbed and transformed due to the presence of various structures either below or bordering the high-water mark (HWM — indicated in red).**

An area located just east of Mickey on the eastern side of the proposed footpath, is a popular and important fishing site. Unfortunately, this site has become a dumping ground for the fisherman as evident by litter (Figure 21 A – C) and scattered empty white mussel shells (*Donax serra*) that are used as bait (D). A derelict house was also noted near to the western side of the path close to the Western Entry Promontory (E). The area just above the HWM is heavily transformed and has undergone extensive residential development. Many residents have elevated the land in front of their property just above the HWM using rubble, some of which is now spilling down onto the rocks and the marine environment below (F). It is suggested that the construction of the pathway be used as an opportunity to remove some of the rubble and reinforce these elevated areas to prevent further erosion and pollution. These interventions are necessary regardless of whether the path is construction or not, as in its present state, they pose a safety risk and are causing pollution. The patches of natural vegetation surrounding the path and bordering the residential properties was noted to be severely fragmented and degraded. Impacts associated with the loss of natural vegetation due to the construction of the path is therefore anticipated to be of low significance.

Only five species of fauna and flora of conservation concern are known to occur in the study area, three of which were recorded during the survey. These include two coastal bird species, the "Near Threatened" African Black oystercatcher and the "endangered" Cape cormorant, two coastal plant species, the "Near Threatened" Christmas Berry *Passerina ericoides* and the protected coastal White Milkwood tree *Sideroxylon inerme* and one mammal species, the "Near Threatened" Cape Clawless otter *Aonyx capensis*. Although the Black oystercatcher and Cape Clawless otter were not recorded during the site survey, they are known to occur within the area. The White Milkwood tree was recorded below the HWM on a rocky outcrop on the pebble beaches at Mickey, on the eastern side of the path (Figure 20). Regardless, it is not expected to be impacted at this area during construction due to it being present on top of a rocky outcrop. Christmas Berry was recorded in two places on the shoreward side of the path, outside of the defined study area, and is also not expected to be at risk from the proposed development.

Hartlaub's gull (*Larus hartlaubii*) is one of approximately 50 of the world's rarest gull species, although it is not classified as being of conservation concern. The White Milkwood tree is widespread throughout the region and was a common sight along the proposed path. Although it is not classified as being threatened, this tree is protected in terms of the National Forest Act of 1998 and may not be damaged, destroyed or moved. No marine species of conservation concern were recorded or are known to occur within the study area. Interestingly, however, one juvenile abalone, *Haliotis midae*, a species endemic to South Africa, was recorded in one of the rock pools. Although it was listed as a protected species in terms of the Threatened or Protected Species Regulations (promulgated in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004)) and its harvesting banned, it was subsequently removed from these lists due to the pressure from the fishing industries (Raemaekers *et al.* 2011).

Figure 20 **The White Milkwood tree was recorded below the HWM on a rocky outcrop on the pebble beaches at Mickey.**

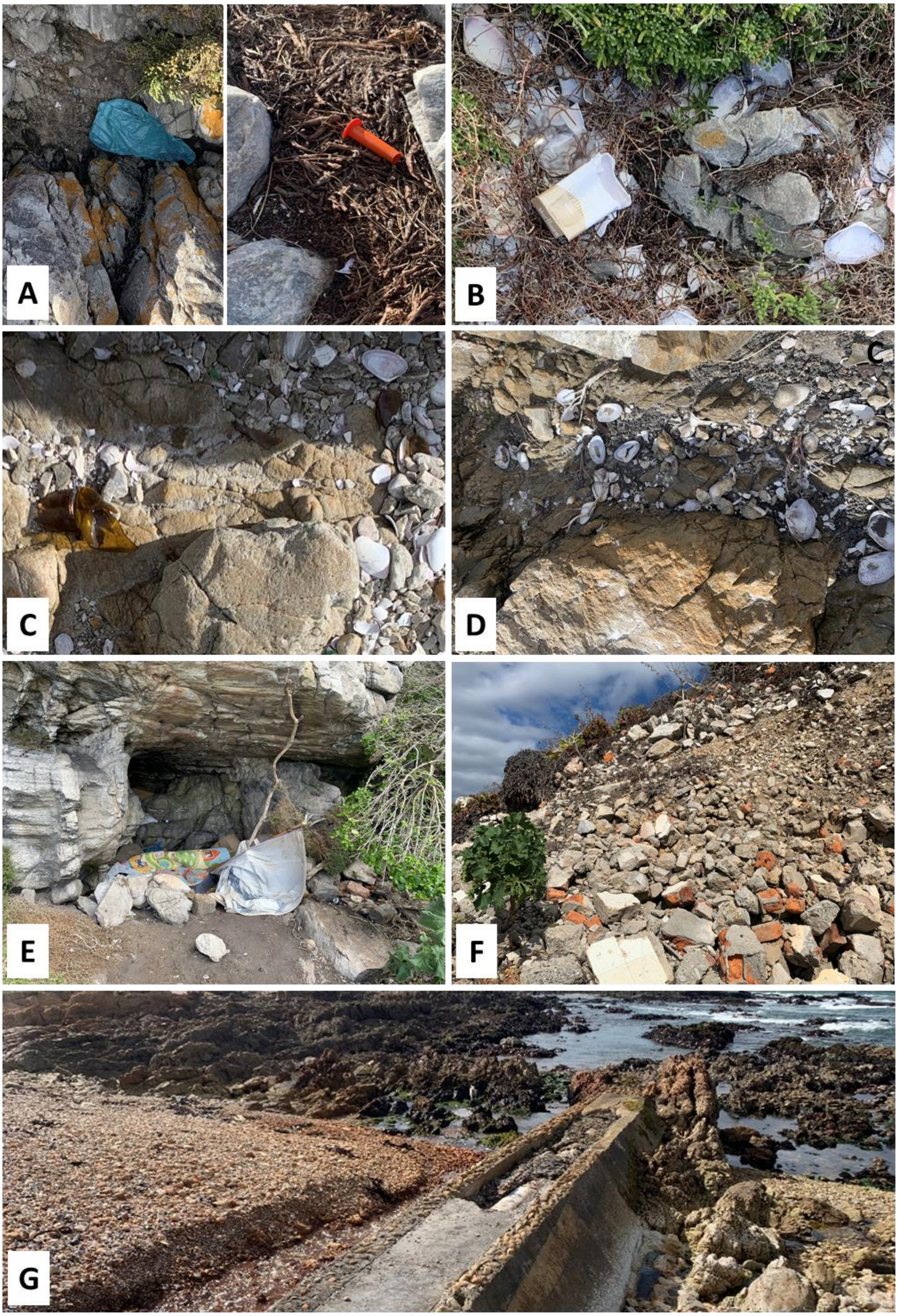

Figure 21 **Photos taken along the route of the study area. This area is already subject to disturbance and pollution as evident by the presence of waste (A –C), discarded white mussel shells from local fisherman (D), shelter used by vagrants (E), rubble from adjacent properties (F) and old sewer and storm water pipes (G).**

6 ASSESSMENT OF IMPACTS AND RECOMMENDED MITIGATION MEASURES

The objective of this section was to identify, assess and evaluate the potential marine ecological impacts associated with the construction, presence and maintenance of the footpath, for both design alternatives. Consideration is given to the fact that this area is already frequented by people, subject to disturbance, and to some extent already altered and transformed. Potential impacts on the marine and coastal environment were assessed during the site survey using methods prescribed in the Environmental Impact Assessment regulations and by Ecosense in the "Impact Rating Methodology" for the study (APPENDIX 1). Due to the difficulty involved in attaching values to potential impacts, the risks of the potential impacts are typically determined according to certain criteria for determining risk ratings, namely Extent (spatial scale), Duration and Intensity to determine Significance, as well as the Probability and Consequence of the impacts on an affected party or the environment.

To reduce negative impacts, precautions referred to as 'mitigation measures' are set and attainable mitigation actions are recommended. The 'construction footprint' is defined as the total area of new infrastructure as determined by design engineers. The development is likely to be site specific and restricted to the immediate vicinity of the path regardless of the design alternatives or materials used. Based on information collected, the potential impacts of the proposed development on the marine and coastal environment for both alternatives are related to, but not limited to, trampling, noise, pollution, disturbance, habitat destruction and fragmentation and displacement of species due to construction activities and the physical presence of the footpath. Each alternative was assessed separately for each impact. Results of each assessment are presented in Table 2 to Table 21 and summarised in Table 22 – Table 25.

6.1 Construction phase

Potential impacts that may arise from the construction of the new cliff path are discussed below. All pre-construction and preparation activities have also been included under this section. Note that any impacts associated with the upgrade and/ or maintenance of the path due to degradation, water damage, weather conditions, etc. is anticipated to be the same as for the initial construction phase.

- temporary alteration, fragmentation or destruction of habitat and vegetation;
- water quality impacts associated with physical disturbance;
- disturbance and or displacement of small mammals, avifauna and intertidal macrofauna due to construction activities, noise and vibration;
- generation of waste and pollution; and
- temporary restriction of public access to the coastline in the study area.

6.1.1 Impact 1: Temporary alteration, fragmentation or destruction of habitat and vegetation

Pre-construction activities would include pruning of vegetation where necessary, clearing the path of any obstructions and some degree of earth removal. These activities might lead to destruction of habitat and biota. The planned development of the cliff path requires the construction of an approximately 850 m long and 1.2 m wide walkway with a 5 m construction zone buffer on the seaward side. No site camp will be required in proximity to the construction area. The building materials will be stored offsite at an appropriate site and brought in daily on the days that construction will actively take place. Some materials will be pre-assembled off-site to limit construction time and possible impacts, while others will have to be assembled on-site. Materials will be transported by foot or wheelbarrow as there is no access for vehicles. Construction will occur over an extended period of 18 months as it will be dependent upon low tide, daylight and must occur outside of bird (November to January) and whale breeding seasons (July to December). More specifically, construction should not occur during whale breeding season for the entire length of the path, while construction would be possible on the western side of the path (as this is far from The Island where birds breed) during the last month of bird breeding season, i.e. January. Due to construction being limited to certain months, the number of times the area will be accessed over the course of the construction phase will be greatly increased. This may lead to an increased degree of disturbance of and trampling in the area.

The coastal Milkwood tree is common in the area, but protected in terms of the National Forest Act, while the Christmas Berry is classified as "Near Threatened". These plants may thus not be damaged, destroyed or moved both before and during construction. All areas supporting these plants should be identified and clearly marked as "no-go" areas. Should pruning be absolutely necessary, a permit will first have to be obtained from the relevant authority. The habitat surrounding the path is, however, already degraded and natural vegetation sparse. The White Milkwood tree is not expected to be impacted at this area during construction due to it being present on top of a rocky outcrop. Christmas Berry was recorded in two places on the shoreward side of the path, outside of the defined study area, and is also not expected to be at risk. Loss of natural habitat and vegetation and fragmentation due to construction and trampling is therefore not anticipated or anticipated to be low.

The impacts are site specific, short-term and likely to be of low intensity. If construction is kept below the HWM and within the 5m construction buffer zone of the path and habitat outside this area is not disturbed, the significance of this impact is expected to be low for both alternatives (Table 2 and Table 3). It is suggested that the construction of the pathway be used as an opportunity to remove the rubble, and upgrade and reinforce the elevated areas below the properties to prevent further erosion and pollution. Another impact rating was added to indicate the positive outcome that could be achieved.

Table 2 Alternative one: Ecological effects due to the temporary alteration or destruction of habitat and vegetation.

<table>
<tr><th></th><th>Extent</th><th>Duration</th><th>Intensity</th><th>Significance</th><th>Status</th><th>Probability</th><th>Consequence</th></tr>
<tr><td>Without mitigation</td><td>Site specific</td><td>Short-term</td><td>Low</td><td>LOW</td><td>-ve</td><td>Probable</td><td>Moderate</td></tr>
<tr><td colspan="8"><u>Mitigation measures:</u>
• Care should be taken to not damage, destroy or move the coastal Milkwood tree or Christmas Berry both pre-construction and during construction. All areas supporting these plants should be identified and clearly marked as "no-go" areas. Should pruning be absolutely necessary, a permit will first have to be obtained from the relevant authority.
• Ensure that construction materials, infrastructure and workers stay within the demarcated buffer zones.
• Adherence to an environmental monitoring programme that works to restore affected habitat/vegetation.
• Use the construction of the pathway as an opportunity to remove rubble, and upgrade and reinforce the elevated areas below the properties to prevent further erosion and pollution</td></tr>
<tr><td>With mitigation</td><td>Site specific</td><td>Short-term</td><td>Low</td><td>VERY LOW</td><td>-ve</td><td></td><td></td></tr>
<tr><td>With mitigation</td><td>Site specific</td><td>Permanent</td><td>Low</td><td>HIGH</td><td>+ve</td><td></td><td></td></tr>
</table>

Table 3 Alternative two: Ecological effects due to the temporary alteration or destruction of habitat and vegetation.

<table>
<tr><th></th><th>Extent</th><th>Duration</th><th>Intensity</th><th>Significance</th><th>Status</th><th>Probability</th><th>Consequence</th></tr>
<tr><td>Without mitigation</td><td>Site specific</td><td>Short-term</td><td>Low</td><td>LOW</td><td>-ve</td><td>Probable</td><td>Moderate</td></tr>
<tr><td colspan="8"><u>Mitigation measures:</u>
• Care should be taken to not damage, destroy or move the coastal Milkwood tree or Christmas Berry both pre-construction and during construction. All areas supporting these plants should be identified and clearly marked as "no-go" areas. Should pruning be absolutely necessary, a permit will first have to be obtained from the relevant authority.
• Ensure that construction materials, infrastructure and workers stay within the demarcated buffer zones.
• Adherence to an environmental monitoring programme that works to restore affected habitat/vegetation.
• Use the construction of the pathway as an opportunity to remove rubble, and upgrade and reinforce the elevated areas below the properties to prevent further erosion and pollution</td></tr>
<tr><td>With mitigation</td><td>Site specific</td><td>Short-term</td><td>Low</td><td>VERY LOW</td><td>-ve</td><td></td><td></td></tr>
<tr><td>With mitigation</td><td>Site specific</td><td>Permanent</td><td>Low</td><td>HIGH</td><td>+ve</td><td></td><td></td></tr>
</table>

6.1.2 Impact 2: Water quality impacts associated with physical disturbance

Earth removal and removal of vegetation before and during construction may cause sedimentation, particularly within the intertidal region. Further to this, cement and other inorganic materials may wash into the ocean and the intertidal region. Marine organisms have a limited ability to cope with sediments containing anthropogenic contaminants which can prove toxic (Roberts 2012). Intentional disposal of any substance into the marine environment is strictly prohibited, while accidental spillage must be prevented, contained and reported immediately. Increased turbidity can also negatively impact biota in the intertidal region. The impacts are, however, largely depend on the extent of the turbidity plume created. These impacts are anticipated to be highly localized, short-term and of low intensity. Water quality impacts associated with construction activities were thus assessed to be of low significance for both alternatives (Table 4 and Table 5).

Table 4 Alternative one: Water quality impacts associated with physical disturbance.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Moderate
<u>Mitigation measures:</u> • Limit the removal of vegetation • Limit access of construction materials to either end of the footpath. • Secure materials brought into the construction site and immediately clear the debris. • Emergency management and spill contingency planning must be put into place. • Ensure that construction materials, infrastructure and workers stay within the demarcated buffer zones. • Adherence to an environmental monitoring programme that works to restore affected habitat/vegetation.							
With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

Table 5 Alternative two: Water quality impacts associated with physical disturbance.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Moderate
<u>Mitigation measures:</u> • Limit the removal of vegetation • Limit access of construction materials to either end of the footpath. • Secure materials brought into the construction site and immediately clear the debris. • Emergency management and spill contingency planning must be put into place. • Ensure that construction materials, infrastructure and workers stay within the demarcated buffer zones. • Adherence to an environmental monitoring programme that works to restore affected habitat/vegetation.							
With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

6.1.3 Impact 3: Disturbance and/or displacement of small mammals, avifauna and macrofaunal invertebrates

Construction activities (physical presence and movement) and associated construction noise (e.g. from machinery, generators, chopping, drilling, grinding, etc.) of the proposed cliff path may result in the temporary disturbance and/ or displacement of small mammals such as the rock hyrax, coastal birds such as terns and cormorants and macrofaunal invertebrates within the intertidal zone. Marine invertebrates have, however, been shown to be relatively insensitive to low frequency sound (Keevin & Hempen 1997), while the highly mobile organisms will be able to move to adjacent habitat or avoid the construction zone and noise and return to the region once the construction has ended. Due to the existence of similar habitats within the area, it is not expected that the animals will be excluded from feeding on a particular food source.

Birds recorded during the survey, were observed to feed and roost offshore or on The Island, away from the coastal region. They are not anticipated to be disturbed as they did not seem to be disturbed by the numerous people frequenting the area during the survey. The southern periwinkle, characteristic of the splash zone, is the only macrofaunal species anticipated to be killed or displaced during construction, but only in sections where the pathway extends into the splash zone and, as in the case with alternative one, where it needs to be raised and mounted against the cliff wall. Alternative two is not expected to have such an adverse effect on this species, mainly due to the fact that the walkway will be mounted on pillars as opposed to against the cliff wall where this species commonly occurs. These sections that will be impacted only comprise a small part of the path.

Although waves may reduce the noise to some degree, it is recommended that noise levels be kept to a minimum, especially close to The Island to avoid disturbance of the birds. Materials should be preassembled off-site and hand-tools rather than power-tools be used as far as possible. As a precautionary measure, equipment should be subject to noise tests which are measured against manufacturer specifications to confirm compliance before deployment on site. Noise emissions from mobile and fixed equipment should be subject to periodic checks as part of regular maintenance programmes to allow for detection of any unacceptable increases in noise.

Impacts are considered site specific, of short duration and of low intensity. The significance of the impact is thus rated as low for both alternatives, although the probability of it occurring is probable for alternative one and unlikely for alternative two. The consequence of alternative one would be substantial due to the loss of individuals, while that of alternative two would be moderate due to the loss of individuals being less (Table 6 and Table 7).

Table 6 **Alternative one: Ecological effects due to the disturbance and or displacement of avifauna, small mammals and macrofaunal invertebrates.**

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Probable	Substantial
Mitigation measures: • Limit construction times so they occur outside of bird and whale breeding seasons. • Limit movement within the area and stay within the buffer zones. • Where possible, try not to disturb any animal in the region unnecessarily. • Where possible, move any macrofaunal species (such as the southern periwinkle) to a safe area within the intertidal, but outside of the construction zone. • Subject equipment to noise tests at commencement and periodically throughout the construction phase. • Noise should be kept to a minimum by preassembling materials off-site and using hand tools instead of power tools as far as possible.							
With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

Table 7 **Alternative two: Ecological effects due to the disturbance and or displacement of avifauna, small mammals and macrofaunal invertebrates.**

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Moderate
Mitigation measures: • Limit construction times so they occur outside of bird and whale breeding seasons. • Limit movement within the area and stay within the buffer zones. • Where possible, try not to disturb any animal in the region unnecessarily. • Where possible, move any macrofaunal species (such as the southern periwinkle) to a safe area within the intertidal, but outside of the construction zone. • Subject equipment to noise tests at commencement and periodically throughout the construction phase. • Noise should be kept to a minimum by preassembling materials off-site and using hand tools instead of power tools as far as possible.							
With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

6.1.4 Impact 4: Generation of waste and pollution

South Africa has laws against littering, both on land and in the coastal zone, but unfortunately these laws are seldom rigorously enforced. Objects which are particularly detrimental to marine fauna include plastic bags and bottles, pieces of rope and small plastic particles. Large numbers of marine organisms are killed or injured daily by becoming entangled in debris or as a result of the ingestion of small plastic particles (Wallace 1985, Gregory 2009, Wright *et al.* 2013). If allowed to enter the ocean, solid waste may be transported by currents for long distances out to sea and around the coast. Thus, unlike fuel or sewage contamination, the extent of the damage caused by solid waste is potentially large. The impact of floating or submerged solid materials on marine life (especially seabirds, cetaceans and fish) can be lethal and can affect rare and endangered species.

The problem of litter entering the marine environment has escalated dramatically in recent decades, with an ever-increasing proportion of litter consisting of non-biodegradable plastic materials. Although to a lesser extent, litter in the terrestrial environment is also of concern and harmful and detrimental to many animals in the region. To reduce littering, all waste generated must be disposed of responsibly. All reasonable measures must be implemented to ensure there is no littering and that construction waste is adequately managed. Staff must regularly be reminded about the detrimental impacts of pollution on the marine and terrestrial environment and suitable handling and disposal protocols must be clearly explained and sign boarded. The "reduce, reuse, recycle " policy must be implemented. The construction of the path can be used as an opportunity to clean-up any litter already present in the area. For both alternatives, this impact is rated as medium without mitigation and is reduced to low by implementing the actions outlined in Table 8 and Table 9. Another impact rating was added to indicate the positive outcome that can be achieved.

Table 8 Alternative one: Generation of waste during construction.

<table>
<tr><th></th><th>Extent</th><th>Duration</th><th>Intensity</th><th>Significance</th><th>Status</th><th>Probability</th><th>Consequence</th></tr>
<tr><td>Without mitigation</td><td>Regional</td><td>Medium-term</td><td>Medium</td><td>MEDIUM</td><td>-ve</td><td>Very likely</td><td>Severe</td></tr>
<tr><td colspan="8"><u>Mitigation measures:</u>
• Inform all staff about the sensitivity of marine and terrestrial species and the suitable disposal of waste.
• Suitable handling and disposal protocols must be clearly explained and sign boarded.
• Reduce, reuse, recycle.
• Litter bins should be strategically placed in the construction zone.
• The construction phase should be used as an opportunity to clean-up any litter already present in the area.</td></tr>
<tr><td>With mitigation</td><td>Site specific</td><td>Short-term</td><td>Low</td><td>LOW</td><td>-ve</td><td></td><td></td></tr>
<tr><td>With Mitigation</td><td>Regional</td><td>Short-term</td><td>Low</td><td>LOW</td><td>+ve</td><td></td><td></td></tr>
</table>

Table 9 Alternative two: Generation of waste during construction.

<table>
<tr><th></th><th>Extent</th><th>Duration</th><th>Intensity</th><th>Significance</th><th>Status</th><th>Probability</th><th>Consequence</th></tr>
<tr><td>Without mitigation</td><td>Regional</td><td>Medium-term</td><td>Medium</td><td>MEDIUM</td><td>-ve</td><td>Very likely</td><td>Severe</td></tr>
<tr><td colspan="8"><u>Mitigation measures:</u>
• Inform all staff about the sensitivity of marine and terrestrial species and the suitable disposal of waste.
• Suitable handling and disposal protocols must be clearly explained and sign boarded.
• Reduce, reuse, recycle.
• Litter bins should be strategically placed in the construction zone.
• The construction phase should be used as an opportunity to clean-up any litter already present in the area.</td></tr>
<tr><td>With mitigation</td><td>Site specific</td><td>Short-term</td><td>Low</td><td>LOW</td><td>-ve</td><td></td><td></td></tr>
<tr><td>With Mitigation</td><td>Regional</td><td>Short-term</td><td>Low</td><td>LOW</td><td>+ve</td><td></td><td></td></tr>
</table>

6.1.5 Impact 5: Temporary restriction of access to the study area

Once construction commences, the connecting sides of the cliff path will not be accessible to the general public. To ensure the safety of the public, the site must be closed off during construction times. The Main Road detour should then be used instead. This impact will, however, occur only during specific times of the day, on certain days and in selected months, i.e. outside of bird (November to January) and whale breeding seasons (July to December). No mitigation measures are deemed necessary at this stage. The impact of temporary restriction of access to the general public is considered low for both alternatives (Table 10 and Table 11).

Table 10 Alternative one: Temporary restriction of access to the coastline.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Slight
Mitigation measures: • No mitigation measures deemed necessary							

Table 11 Alternative two: Temporary restriction of access to the coastline.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Slight
Mitigation measures: • No mitigation measures deemed necessary							

6.2 Operational phase

Possible environmental impacts associated with the operational phase (i.e. the physical presence of the footpath) is discussed below:

- disturbance due to more people frequenting the area;
- habitat fragmentation and barrier to movement;
- permanent displacement of species due to the presence of the footpath;
- generation of waste and pollution due to the public; and
- a decrease of environmental integrity due to degradation of the path.

6.2.1 Impact 6: Disturbance of biota due more people frequenting the area

Once the footpath is completed, it is anticipated that more people will visit the area. This may result in the disturbance of animals and birds in this region. An increase in people are not expected to cause significant disturbance to avifauna as they mostly feed and forage offshore or on The Island and did not seem to be disturbed by the numerous people already frequenting the area during the survey. Birds and mammals are also expected to avoid the source of disturbance. Impacts are likely to be site specific, of short duration and low intensity. The significance of the impact is thus rated as low, the probability of it occurring is unlikely and the consequence slight for both alternatives (Table 12 and Table 13).

Table 12 Alternative one: Ecological effects of disturbance on animals due to more people frequenting the area.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Slight
Mitigation measures: • People should be informed to respect the environment and not disturb animals.							
With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

Table 13 Alternative two: Ecological effects of disturbance on animals due to more people frequenting the area.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Slight
Mitigation measures: • People should be informed to respect the environment and not disturb animals.							
With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

6.2.2 Impact 7: Habitat fragmentation and barrier to movement of species

The footpath may create a barrier to the movement of certain marine and terrestrial species and fragment the habitat. Due to the differences in the design of the two alternative walkways, this impact was assessed separately for each. The first design alternative proposes a walkway only in sections where it is needed to facilitate walking. As such, the impact for alternative one will be restricted to specific sections and is not expected to be extensive. Even in areas where the walkway will be constructed, the path is not expected to severely impede the ability of species to move around in the area. There are sections on the western side of the path that extend into the intertidal zone and over rocky terrain. To facilitate crossing in these areas, alternative one proposes a solid concrete walkway supported by buttresses, elevated and mounted against the cliff walls. As these cliffs are occupied by the southern periwinkle *Affrolittorina knysnaensis*, the walkway could create a temporary barrier to the movement of this and other species in this area. The periwinkle is, however, expected to eventually occupy the balustrade wall, while other species such as the hyrax will move around these obstacles. It should be noted that the steep boulders and houses in the area is already a barrier to the movement of many marine and terrestrial fauna, while the habitat surrounding the path is degraded and fragmented.

In light of these observations, alternative one is not expected to create a barrier to the movement of animals or fragment the habitat. The impact is considered to be site specific, short-term, of low intensity and low significance (Table 14). The probability of this impact occurring is unlikely. No mitigation measures are required for this impact.

Table 14 **Alternative one: Impacts due to the path possibly fragmenting habitat and creating a barrier to the movement of species.**

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Slight

Mitigation measures:

- No mitigation measures deemed necessary

The second alternative proposes a formal, continuous walkway along the entire length of the path and will include steps and bridges. For this reason, the impact for alternative two could be expected to extend along the entire path. Flat areas of the walkway are, however, not expected to limit the movement of species and the impact in these areas are therefore expected to be low. On the western side, the walkway will be mounted on pillars to form a bridge, as opposed to being mounted against the cliff walls and occupying and fragmenting large sections of habitat. Moreover, the movement of species is not expected to be limited as they will be able to travel across under the bridge. The periwinkle is also expected to eventually occupy the pillars and bridge. For these reasons, alternative two is not expected to create a barrier to the movement of animals or fragment the habitat. The impact is considered to be site specific, short-term, of low intensity and low significance (Table 15). The probability of this impact occurring is highly improbable. No mitigation measures are required for this impact.

Table 15 **Alternative two: Impacts due to the path possibly fragmenting habitat and creating a barrier to the movement of species.**

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Highly improbable	Slight

Mitigation measures:

- No mitigation measures deemed necessary

6.2.3 Impact 8: Permanent displacement of species due to the presence of the footpath

The presence of the footpath is not anticipated to greatly displace any floral or faunal species as the area where it will be constructed is largely devoid of any biota. The sections of the path that extend into the intertidal and specifically the splash zone are the only sections that might present a problem. Here, alternative one will temporarily displace the periwinkle in areas where the balustrade wall will be mounted against the cliff wall. This species is, however, expected to eventually occupy the balustrade wall. As these sections only comprise a small part of the path, and with the periwinkle not being of conservation concern, impacts are considered site specific, of short duration and of low intensity. The significance of the impact is thus rated as low, although the probability of it occurring is very likely and the consequence severe due to the loss of individuals (Table 16). Mitigation measures would include using materials that will ensure the recolonisation of the area. This will reduce the impact to very low.

Table 16 Alternative one: Ecological effects due to the disturbance and/ or displacement of biota.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Very likely	Severe
Mitigation measures: • Use material that would allow periwinkles to recolonise the area.							
With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

Alternative two, on the other hand, will not occupy space against the cliff wall and very limited space at the base of the cliffs. This alternative is not expected to displace the periwinkle and the impact therefore considered site specific, of short duration and of low intensity. The significance is rated as very low, with the probability of it occurring being highly improbable and the consequence slight (Table 17). No mitigation measures are deemed necessary.

Table 17 Alternative two: Ecological effects due to the disturbance and/ or displacement of biota.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve	Highly improbable	Slight
Mitigation measures: • No mitigation measures deemed necessary							

6.2.4 Impact 9: Generation and disposal of solid waste

Litter can be detrimental to the marine and terrestrial environment alike, being responsible for injuring or killing numerous animals daily due to ingestion or entanglement (Wallace 1985, Gregory 2009, Wright *et al.* 2013). All reasonable measures must be implemented to ensure that there is no littering from the path users. This includes placing litter bins and signs in designated areas to encourage people to dispose of litter properly and clean up litter already present or washed up on the beach. Bins should preferably be placed at the entrances of the path to make them accessible to the municipality for servicing, and preferably above the high shore to ensure they are not washed away. Beach clean-ups are recommended and should be implemented in the EMPr. This impact is rated as medium without mitigation for both alternatives and is reduced to low by implementing the actions outlined in Table 18 and Table 19.

Table 18 Alternative one: Generation and disposal of waste.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Regional	Medium-term	Medium	**MEDIUM**	-ve	Very likely	Severe
Mitigation measures: • Place litter bins and signs in designated areas to encourage people to dispose of litter properly and clean up litter already present or washed up on the beach • Beach clean-ups should be implemented in the EMPr.							
With mitigation	Site specific	Short-term	Low	**LOW**	-ve		

Table 19 Alternative two: Generation and disposal of waste.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Regional	Medium-term	Medium	**MEDIUM**	-ve	Very likely	Severe
Mitigation measures: • Place litter bins and signs in designated areas to encourage people to dispose of litter properly and clean up litter already present or washed up on the beach • Beach clean-ups should be implemented in the EMPr.							
With mitigation	Site specific	Short-term	Low	**LOW**	-ve		

6.2.5 Impact 10: Pollution and decrease in environmental integrity due to degradation of the path

Weathering and degradation of the path is natural and should be expected. Severe weather conditions and sea level rises due to climate change are anticipated to further damage and decrease the lifespan of the path, perhaps even at an accelerated rate. The most recent studies estimate that the sea level could potentially rise by 15 – 35 cm by 2050 (IPCC 2014), with either severe droughts or storms being expected in many regions (DEA 2013). Waste, rubble and sedimentation from the damaged path could lead to pollution and by extension decreased environmental integrity. Sea level rises and severe weather conditions could also affect pedestrian safety on the path. As such, it is recommended that routine inspections and maintenance be done on the path as needed to reduce potential impacts. Note that any impacts associated with the upgrade and/ or maintenance of the path is anticipated to be the same as for the initial construction phase and that these impacts are discussed in Section 6.1. As degradation is expected to happen slowly over time, this impact is rated as being of low significance for both alternatives, although it is very likely to occur and the consequence can be substantial (Table 20). The impact can be reduced to very low if routine maintenance is done. The impact associated with the safety of pedestrians due to degradation of the path and severe weather conditions associated with climate change cannot be commented on as this is outside of the expertise of the Specialist. It is, however, recommended that routine inspections be conducted and the path upgraded immediately as needed to reduce potential impacts. In addition, the path should preferably be closed during times when pedestrian safety will be jeopardised due to extreme weather conditions or high tide.

Table 20 Alternative one: Pollution and decrease of environmental integrity due to degradation of the path.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Very likely	Substantial
<u>Mitigation measures:</u> • It is recommended that routine inspections and maintenance be done on the path as needed to reduce potential impacts							
With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

Table 21 Alternative two: Pollution and decrease of environmental integrity due to degradation of the path.

	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Without mitigation	Site specific	Short-term	Low	**LOW**	-ve	Very likely	Substantial
<u>Mitigation measures:</u> • It is recommended that routine inspections and maintenance be done on the path as needed to reduce potential impacts							
With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

6.3 Decommissioning phase

It is envisioned that the estimated life of the cliff path will be permanent, although routine maintenance and upgrades will be required over the course of the design life of the path. As such, no decommissioning impacts are anticipated for either alternative.

6.4 Cumulative marine environmental impacts

No cumulative marine impacts are anticipated for this development for either alternative.

Table 22 **Summary of potential impacts resulting from the construction of the proposed footpath as assessed for alternative one.**

Phase	Impact identified	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Construction	**Impact 1:** Temporary alteration, fragmentation or destruction of habitat and vegetation.	Site specific	Short-term	Low	**LOW**	-ve	Probable	Moderate
	With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		
	With mitigation	Site specific	Permanent	Low	**HIGH**	+ve		
	Impact 2: Water quality impacts associated with physical disturbance.	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Moderate
	With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		
	Impact 3: Disturbance and/or displacement of small mammals, avifauna and macrofaunal invertebrates.	Site specific	Short-term	Low	**LOW**	-ve	Probable	Substantial
	With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		
	Impact 4: Generation of waste and pollution	Regional	Medium-term	Medium	**MEDIUM**	-ve	Very likely	Severe
	With mitigation	Site specific	Short-term	Low	**LOW**	-ve		
	With mitigation	Regional	Short-term	Low	**LOW**	+ve		
	Impact 5: Temporary restriction of access to the coastline in the study area.	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Slight
	No mitigation							

Table 23 **Summary of potential impacts resulting from the presence of the proposed footpath as assessed for alternative one.**

Phase	Impact identified	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Operation	**Impact 6:** Disturbance of biota due to more people frequenting the area	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Slight
	With mitigation	Site specific	Short-term	Low	**VERY LOW**			
	Impact 7: Habitat fragmentation and barrier to movement of species	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Slight
	No mitigation							
	Impact 8: Permanent displacement of species due to the presence of the footpath.	Site specific	Short-term	Low	**LOW**	-ve	Very likely	Severe
	With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		
	Impact 9: Generation of solid waste and pollution.	Regional	Medium-term	Medium	**MEDIUM**	-ve	Very likely	Severe
	With mitigation	Site specific	Short-term	Low	**LOW**	-ve		
	Impact 10: Pollution and decrease of environmental integrity due to degradation of the path.	Site specific	Short-term	Low	**LOW**	-ve	Very likely	Substantial
	With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

Table 24 Summary of potential impacts resulting from the construction of the proposed footpath as assessed for alternative two.

Phase	Impact identified	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Construction	**Impact 1:** Temporary alteration, fragmentation or destruction of habitat and vegetation.	Site specific	Short-term	Low	**LOW**	-ve	Probable	Moderate
	With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		
	With mitigation	Site specific	Permanent	Low	**HIGH**	+ve		
	Impact 2: Water quality impacts associated with physical disturbance.	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Moderate
	With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		
	Impact 3: Disturbance and/or displacement of small mammals, avifauna and macrofaunal invertebrates.	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Moderate
	With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		
	Impact 4: Generation of waste and pollution	Regional	Medium-term	Medium	**MEDIUM**	-ve	Very likely	Severe
	With mitigation	Site specific	Short-term	Low	**LOW**	-ve		
	With mitigation	Regional	Short-term	Low	**LOW**	+ve		
	Impact 5: Temporary restriction of access to the coastline in the study area.	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Slight
	No mitigation							

Table 25 **Summary of potential impacts resulting from the presence of the proposed footpath as assessed for alternative two.**

Phase	Impact identified	Extent	Duration	Intensity	Significance	Status	Probability	Consequence
Operation	**Impact 6:** Disturbance of biota due to more people frequenting the area	Site specific	Short-term	Low	**LOW**	-ve	Unlikely	Slight
	With mitigation	Site specific	Short-term	Low	**VERY LOW**			
	Impact 7: Habitat fragmentation and barrier to movement of species	Site specific	Short-term	Low	**LOW**	-ve	Highly improbable	Slight
	No mitigation							
	Impact 8: Permanent displacement of species due to the presence of the footpath.	Site specific	Short-term	Low	**VERY LOW**	-ve	Highly improbable	Slight
	No mitigation							
	Impact 9: Generation of solid waste and pollution.	Regional	Medium-term	Medium	**MEDIUM**	-ve	Very likely	Severe
	With mitigation	Site specific	Short-term	Low	**LOW**	-ve		
	Impact 10: Pollution and decrease of environmental integrity due to degradation of the path.	Site specific	Short-term	Low	**LOW**	-ve	Very likely	Substantial
	With mitigation	Site specific	Short-term	Low	**VERY LOW**	-ve		

7 CONCLUSIONS AND RECOMMENDATIONS

Hermanus is renowned for its beaches, museums, whale sanctuary, important biodiversity and Fernkloof Nature Reserve, making it a very popular tourist destination. This town and surrounding areas are thus of high economic, recreational and ecological importance. The Hermanus Cliff Path is located within the Fernkloof Nature Reserve and one of the main tourist attractions in the area. This path is, however, interrupted halfway, where it takes an approximate 1 km detour along the R43 Main Road. It is envisioned by the Proponent that the two parts of the current Hermanus Cliff Path be connected to provide a continuous cliff path for people to enjoy.

A marine specialist study was conducted to assess the potential impacts of the construction and presence of the path on the marine and coastal environment for two design alternatives. The first alternative proposes that a path be constructed only in sections where it is needed to facilitate walking. This alternative will comprise linking walkways of different types of materials in sections of varying habitat and substratum types. In the section on the western side of the path where steep cliffs are prominent, a solid concrete walkway will be mounted against the cliff walls and supported by buttresses. The second alternative, on the other hand, proposes a formal, continuous walkway along the entire length of the path, even across areas that are easily accessible. The section on the western side will be mounted on pillars, which will be anchored to the base of the cliffs, to form a bridge.

Ten potential negative impacts were identified for each alternative, five of which will occur during the construction (Table 22 and Table 24) and five during the operational phase (Table 23 and Table 25). Some of the most significant impacts associated with the construction of a path include alteration, fragmentation or destruction of habitat; creating a barrier to the movement of species; disturbance and/or displacement of biota due to noise and frequent movement through the area; the generation of waste and pollution; a decrease in water quality and the restriction of public access to the coastline in the entire study area. These impacts are not anticipated to extend beyond the construction buffer zone of the footpath.

In assessing the impacts for the first design alternative, eight impacts that will be of low and two that will be of medium significance were identified. Impacts associated with the second design alternative were found to be the same with similar significance ratings to that of the first alternative. Only one impact, i.e., the displacement of species on the western side of the path, was considered to have a lower impact and was therefore rated as being of very low significance. The implementation of mitigation measures is expected to reduce the identified impacts to low or very low in addition to having two positive impacts which are related to improving the integrity of the area. No negative impacts of high significance were identified for either alternative.

The study area was not found to be ecologically sensitive or of high conservation concern. The area is already frequented by many people, degraded, physically transformed and devoid of natural vegetation directly alongside the path. No species are anticipated to be disturbed, threatened or displaced, except for the southern periwinkle, but only to a limited extent and in small sections and only for design alternative one. Only five species of conservation concern are known to occur in the study area, although none are expected to be severely impacted. No marine species of conservation concern were recorded or are known to occur within the study area. Neither of the proposed design alternatives are likely to significantly alter, fragment or destroy any natural habitat or vegetation or create a barrier to the movement of species, given that the proposed development will occur within the construction buffer zone and mitigation measures implemented.

A summary of the most important mitigation measures that have been identified for this study include:

- Strategically placing signs and litter bins to discourage people from littering;
- Implementing beach clean-ups as part of the EMPr;
- Keeping the path simple, avoiding elevations that could cause a barrier to movement and materials that would prevent recolonisation of species;
- Encouraging locals, tourists and workers to respect the environment, to not disturb animals and to limit noise;
- Educating locals, tourists and workers about the sensitivity of the marine and terrestrial environment;
- Restoring the environment to its natural state as far as possible;
- Disposing of waste and debris properly and avoiding spillage and pollution;
- Limiting construction times so they occur outside of bird and whale breeding seasons;
- Limiting construction and movement within the area and staying within the buffer zones;
- Moving any macrofaunal species to a safe area within the intertidal zone, but outside of the construction area;
- Using the construction as an opportunity to clean-up litter and remove rubble, and restoring the elevated areas below the properties to prevent further erosion and pollution;
- Doing routine inspections and maintenance on the path as needed to reduce potential impacts.

The path should be designed to be as natural and unobtrusive as possible. It is suggested that natural materials such as rock, wood and/ or an eco-friendly alternative to concrete be used. Green concrete is considered eco-friendly and manufactured using waste materials. It requires less energy to produce and produces less carbon dioxide when compared to traditional concrete. It is also a cheaper and more durable option. Examples include ashcrete, blast furnace slag, micro silica and timbercrete. The path should further be kept simple, avoiding large steps and elevations that could create barriers to the movement of species. Signs should be placed at the entrances of the path to encourage people to stay on the path and so mitigate potential impacts such as trampling.

It is the specialist's reasoned opinion that the construction of the proposed path will not greatly impact the integrity of the surrounding environment, the Fernkloof Nature Reserve or the biodiversity contained therein, but is, instead, expected to add value to the area. It is therefore recommended that the proposed development be permitted to proceed with the implementation of strict environmentally responsible practices as outlined in the mitigation measures, with the second design alternative as the preferred alternative.

8 DECLARATION OF INDEPENDENCE

Anchor Environmental Consultants (Pty) Ltd is an independent consultant and has no business, financial, personal or other interest in the activity, application or appeal in respect of which the company was appointed other than fair renumeration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of this specialist performing such work.

9 BACKGROUND AND QUALIFICATION OF THE SPECIALIST CONSULTANTS

Dr Barry Clark

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

Cheruscha Swart

Cheruscha has MSc (Cum Laude) and BSc (Hons) degrees in the field of Biodiversity and Ecology from Stellenbosch University. Her work focused on producing and implementing novel approaches to understand the drivers governing successful invasions, their impacts and identifying species of concern. Her training and experience have made her highly competent within a variety of disciplines, including environmental monitoring and assessments, terrestrial and marine ecology, invasion biology, conservation biology and marine invertebrate taxonomy and biology. Her other interests also include environmental legislation and management, environmental impact assessments and sustainable development. This has prompted her to undertake and assist with projects within these disciplines. Cheruscha is the author of three peer reviewed scientific publications and has contributed to numerous scientific reports. Within Anchor Environmental Consultants, she works as an Environmental Consultant and Ecologist, marine invertebrate Taxonomist and assists the Environmental Assessment Practitioner with Environmental Impact Assessments. Cheruscha also has training in the ISO 14001:2015 standard applications. Her CV is presented as an Appendix.

Safiyya Sedick

Safiyya has degrees in Zoology, Biodiversity & Conservation Biology, Marine Biology and Ocean & Atmospheric Science. She has working experience as a biodiversity expert, conservation biologist and marine invertebrate taxonomist. She is particularly interested in deep sea mining and has worked with organisations such as the International Seabed Authority. Her other interests include conservation planning, climate change and biodiversity. Safiyya has undertaken a specialist role in invertebrate taxonomy for the De Beers Marine Namibia Environmental Monitoring Programme where she is charged with the description of new species and analysis of associated DNA barcodes. She also enjoys being actively involved in projects outside of her field of expertise and has assisted with Environmental Impact Assessments and Estuary Management Plans. Safiyya is an author on a number of peer reviewed and non-peer reviewed publications, with several other projects in preparation, and has also contributed to various consulting reports. Her CV is presented as an Appendix.

10 REFERENCES

Awad AA, Griffiths CL & Turpie JK. 2002. Distribution of South African marine benthic invertebrates applied to the selection of priority conservation areas. Diversity and Distributions 8(3): 129–145.

BirdLife International. 2018. *Phalacrocorax capensis*. The IUCN Red List of Threatened Species 2018: https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22696806A132594943.en. Downloaded on 17 March 2021.

Branch G and Branch M. 2018. *Living Shores: Interacting with Southern Africa's Marine Ecosystems*. Struik Nature. Cape Town. pp. 336.

Branch GM, Griffiths CL, Branch ML & Beckley LE. 2016. Two Oceans – A guide to the marine life of Southern Africa. 4th edition. Struik Nature: Cape Town.

DEA (Department of Environmental Affairs). 2013. Long-Term Adaptation Scenarios Flagship Research Programme (LTAS) for South Africa. Summary for Policy-Makers. Pretoria, South Africa.

De Villiers L & Zweig T. 2020. Fernkloof Nature Reserve protected area management plan 2020 – 2025. Overstrand Municipality, Environmental Management Services. pp 174.

Ecosense CC. 2020. Pedestrian Path to Connect the Hermanus Cliff Path via Poole's Bay in Hermanus (Pre-application Draft Basic Assessment Report).

Elwen SH & Best PB. 2004. Environmental factors influencing the distribution of southern right whales (*Eubalaena australis*) on the south coast of South Africa II: Within bay distribution. Marine Mammal Science 20(3): 583–601.

Fernkloof Nature Reserve. https://www.fernkloof.org.za/index.php/home/about. Accessed: 15 March 2020.

Griffiths CL, Robinson TB, Lange L & Mead A. 2010. Marine Biodiversity in South Africa: An Evaluation of Current States of Knowledge. PLoS ONE 5(8): e12008.

http://bgis.sanbi.org/Projects/Detail/194

https://gis.elsenburg.com/apps/cfm/

https://gis.elsenburg.com/portal/home/webmap/viewer.html

https://portal.environment.gov.za/portal/apps/webappviewer/index.html?id=54487a82babf4a7e9ab3a42aacabdf84

Hutchings L. 1994. The Agulhas Bank: a synthesis of available information and a brief comparison with other east-coast shelf regions. South African Journal of Science 90 (3): 179–185.

IPCC. 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

Largier JL, Chapman P, Peterson WT & Swart VP. 1992. The western Agulhas Bank: circulation, stratification and ecology, South African Journal of Marine Science 12(1): 319–339.

Jacques H, Reed-Smith J & Somers MJ. 2015. *Aonyx capensis*. The IUCN Red List of Threatened Species 2015: e.T1793A21938767. https://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T1793A21938767.en. Downloaded on 17 March 2021.

List of flowering plants and information - https://www.fernkloof.org.za/index.php/hermanus-botanical-society - Accessed 16 March 2021 .

Probyn TA, Mitchellinnes BA, Brown PC, Hutchings L & Carter RA. 1994. Review of primary production and related processes on the Agulhas-Bank. South African Journal of Science 90: 166–173.

Raemaekers S, Hauck M, Bürgener M, Mackenzie A, Maharaj G, Plagányi EE & Britz PJ. 2011. Review of the causes of the rise of the illegal South African abalone fishery and consequent closure of the rights-based fishery. Ocean and Coastal Management 54: 433–445.

Roberts DA. 2012. Causes and ecological effects of resuspended contaminated sediments (RCS) in marine environments. Environment international 40: 230–243.

Robinson TB, Branch GM, Griffiths CL, Govender A & Hockey PA. 2007. Changes in South African rocky intertidal invertebrate community structure associated with the invasion of the mussel *Mytilus galloprovincialis*. Marine Ecology Progress Series 340: 163–171.

Rocky Hyrax - https://www.sanbi.org/animal-of-the-week/dassie. - Accessed: 16 March 2021.

Searsia glauca - http://pza.sanbi.org/searsia-glauca - Accessed 16 March 2021.

Simmons R & Martins M. 2020. Avian Basic Assessment for the Proposed Cliff Path at Poole's Bay, Hermanus. Bird and Bats Unlimited Environmental Consultants.

Sink KJ, Holness S, Harris L, Majiedt PA, Atkinson L, Robinson T, Kirkman S, Hutchings L, Leslie R, Lamberth S, Kerwath S, von der Heyden S, Lombard AT, Attwood C, Branch G, Fairweather T, Taljaard S, Weerts S, Cowley P, Awad A, Halpern B, Grantham H & Wolf T. 2012. National Biodiversity Assessment 2011: Technical Report. Volume 4: Marine and Coastal Component. South African National Biodiversity Institute, Pretoria.

Skowno AL, Poole CJ, Raimondo DC, Sink KJ, Van Deventer H, Van Niekerk L, Harris LR, SmithAdao, LB, Tolley KA, Zengeya TA, Foden WB, Midgley GF & Driver A. 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria. pp. 1–214.

Stein AB, Athreya V, Gerngross P, Balme G, Henschel P, Karanth U, Miquelle D, Rostro-Garcia S, Kamler JF, Laguardia A, Khorozyan I & Ghoddousi A. 2020. *Panthera pardus* (amended version of 2019 assessment). The IUCN Red List of Threatened Species 2020: e.T15954A163991139. https://dx.doi.org/10.2305/IUCN.UK.2020-1.RLTS.T15954A163991139.en. Downloaded on 17 March 2021.

Stephenson TA, Stephenson A & Du Toit CA. 1937. The South African intertidal zone and its relation to ocean currents. Transactions of the Royal Society of South Africa 24(4): 341–382.

Taylor A, Cowell C & Drouilly M. 2017. *Pelea capreolus*. The IUCN Red List of Threatened Species 2017: e.T16484A50192715. https://dx.doi.org/10.2305/IUCN.UK.2017-2.RLTS.T16484A50192715.en. Downloaded on 17 March 2021.

The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa. 2016.

11 APPENDICES

APPENDIX 1: IMPACT RATING METHODOLOGY

Impact rating methodology followed (criteria provided by Ecosense)

The significance of all potential impacts that would result from the proposed project is determined to assist decision-makers. The **significance** of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The significance of each identified impact was thus rated according to the methodology set out below:

IMPACT ASSESSMENT CRITERIA: POOLE'S BAY CONNECTION PATH, HERMANUS

Due to the difficulty involved in attaching values to potential impacts, the risks of the potential impacts must be determined according to certain criteria for determining risk ratings, namely **Extent**, **Duration**, **Intensity** to determine Significance, as well as the **Probability** of the impacts to impact an affected party or the affected environment.

1. Extent scale

The Extent scale refers to the extent of the impact to be felt at the regional, local or site specific scale. The extent scale is explained in more detail in Table 1 below:

Table 1 : Description of the Spatial scale

Rating	Description
Low	The impact will affect only the specific site
Med	The impact will affect as far as a 1 - 2 km radius area (Local)
High	The impact will affect more than a 2 km radius area or Regional

2. Duration scale

This explains the duration and persistence of an impact on affected parties or the environment. The duration scale is rated according to criteria set out in Table 2 below:

Table 2: Description of the Duration scale

Rating	Description
Low	The impact will be limited to the construction phase (up to 18 months). / Short-term
Med	The impact will persist for up to 5 years / Medium term
High	The impact will be permanent.

3. Intensity scale

This explains the degree to which natural or social functions are altered, see Table 3 below:

Table 3:Description of the Intensity scale

Rating	Description
Low	Natural or social functions are negligibly altered or even unaltered.

Medium	Natural or social functions are slightly altered.
High	Natural or social functions are severable or notably altered.

4. Significance Assessment

Based on a synthesis of the information contained above, the assessment of the significance of potential impacts can be done with assistance from the following table. The significance of impacts shall be assessed both with and without prescribed mitigation actions.

Table 4: Significance calculation Significance: (Duration X Extent X Intensity)

Intensity = L				
Duration	*H*			
	M			Medium
	L	Low		
Intensity = M				
Duration	*H*			High
	M		Medium	
	L	Low		
Intensity = H				
Duration	*H*			
	M			High
	L	Medium		
		L	M	H
		Extent		

Significance rating of the associated impacts embraces the notion of extent and magnitude. The means of arriving at a Significance Rating is explained in Table 5 below:

Table 5: Description of the Significance Rating scale

Significance	**Description**	**Effect on decision making**

Very low / Negligible	The impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit.	Will not have an influence on the decision to proceed with the proposed project, provided that the recommended mitigation measures to mitigate impacts are implemented.
Low	The impact is low where the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected. In the case of adverse impacts, mitigation and/or remedial activity is either easily achieved or little will be required. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper and more effective.	Will not have an influence on the decision to proceed with the proposed project, provided that the recommended mitigation measures to mitigate impacts are implemented.
Medium	Impact is real but not substantial in relation to other impacts. In the case of adverse impacts, mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.	Should influence the decision to proceed with the proposed project, provided that recommended measures to mitigate impacts are implemented.
High	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts, mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.	Would strongly influence the decision to proceed with the proposed project.
Very-high	The impact on natural, cultural or social functions and processes are altered to the extent that it will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.	Would strongly influence the decision to proceed with the proposed project.

6. Probability scale

This explains the likelihood of an impact occurring as described in Table 6 below:

Table 6: Description of the Probability scale

Rating	**Description**
Highly improbable	The consultant believes that it is not going to happen

Unlikely	Less than 40% chance
Probable	40% - 70% sure
Very likely	70% - 90% sure
Definite	More than 90% certain that it is going to happen

7. Consequence scale (risk)

This explains what the changes mean as described in Table 7 below:

Table 7: Description of the Consequence scale

Rating	Description
Slight	Change with no other consequence
Moderate	Nuisance / Convenience
Substantial	Material reduction / improvement in environmental quality (air, soil, water, habitat, heritage, amenity etc)
Severe	Loss of faunal populations, livelihoods, individual economic loss or gain
Extreme	Human health, morbidity, mortality, species loss

Ecosense

Consulting Environmentalists
Konsulterende Omgewingskundiges

ANCHOR
environmental