APPENDIX E: TERRESTRIAL BIODIVERSITY SPECIALIST STUDY

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Proposed Upgrade of Bayhead and Langeberg Roads in the Port of Durban, eThekwini Municipality, KwaZulu-Natal

TERRESTRIAL BIODIVERSITY COMPLIANCE STATEMENT

08 July 2026

Prepared for: **LA Consulting Engineers**

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Project Name	Proposed Upgrade of Bayhead and Langeberg Roads in the Port of Durban, eThekwini Municipality, KwaZulu-Natal
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Appointment Date	16 September 2025

Document Details

Report Title	Proposed Upgrade of Bayhead and Langeberg Roads in the Port of Durban, eThekwini Municipality, KwaZulu-Natal: Terrestrial Biodiversity Compliance Statement	
Version No.	2.0	
Report Reference Number	VE25-38-02	
Date	08 July 2026	
Authors	David Styles, James Harvey and Juliette Lagesse	
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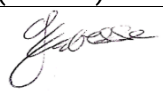
Declaration of Independence

This is to certify that the following report has been prepared as per the requirements of:

- Section 32 (3) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) Environmental Impact Assessment Regulations 2017 as per Government Notice No. 40772 Government Gazette, 4 December 2014 (as amended).

Declaration	I, **Ryan Edwards**, hereby declare that this report has been prepared independently of any influence or prejudice as may be specified by the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA).
Signed	
Date	**08 July 2026**

Declaration	I, **Juliette Lagesse**, hereby declare that this report has been prepared independently of any influence or prejudice as may be specified by the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA).
Signed	
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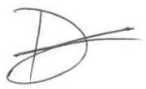
Signed	
Date	**08 July 2026**

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Date	**08 July 2026**

Executive Summary

The infield survey confirmed the presence of four (4) vegetation communities, namely:

1. Alien dominated woodland/shrubland
2. Road Verges with scattered trees and mowed lawn
3. Hygrophilous Grassland and Scattered Indigenous Trees
4. Mixed alien and indigenous woodland

In addition, five (5) faunal habitats were identified, namely:

1. Alien dominated woodland/shrubland
2. Road Verges with scattered trees and mowed lawn
3. Hygrophilous Grassland and Scattered Indigenous Trees
4. Mixed alien and indigenous woodland
5. Secondary Grassland and degraded mixed alien and indigenous woodland/shrubland

In terms of the Plant Species Theme; Communities 1 and 2 are considered of 'Very Low' Site Ecological Importance due to the moderate to high cover of alien plant invasion observed, their high level of fragmentation and edge impacts that have resulted in a deterioration of both their biodiversity and their level of functioning. Community 4 is considered of 'Low' Site Ecological Importance, as although this community has also been highly impacted by direct loss and fragmentation, it still comprises some diversity of indigenous vegetation and is considered in better condition in comparison to Community 1 and Community 2. Community 3 is considered of 'Medium' Site Ecological Importance as this community occurs within the Bayhead Heritage Site with indigenous vegetation comprising most of the cover, with low alien plant invasion observed. However, this community is also isolated and fragmented due to historical development in the area and therefore although in an intact state this Community should have a 'High' conservation importance rating (driven by the Critically Endangered threat status of the reference vegetation type at the provincial scale), the area adjoining the road within 32m of the project site has likely been affected by edge impacts in the past and therefore the conservation importance rating has been revised to 'Medium' and likewise its functional integrity has been compromised and has been rated as 'Medium' resulting in a 'Medium' biodiversity importance rating.

In terms of the Animal Species Theme, although much of the site has been disturbed and transformed in the past, Faunal Habitats 3, 4 and 5 are still of value as habitat for the KwaZulu

Dwarf Chameleon, and therefore these faunal habitats are considered to be of 'Medium' SEI with remaining two faunal habitats (Faunal Habitat 1 & 2) considered to be of 'Very Low' SEI.

In terms of the terrestrial biodiversity theme, the estuarine and terrestrial ecosystems within the study area have been modelled as a CBA due to the ecosystems being located within the Durban Bay EFZ, the Critically Endangered threat status of the reference vegetation types, and there being intact Mangrove Forest. The site assessment confirmed that much of the site has been disturbed and transformed and is considered of 'Very Low' Site Ecological importance (in the case of Vegetation Communities 1 & 2 and Faunal Habitats 1 & 2). However, vegetation within the Bayhead Nature Reserve mapped as Vegetation Community 3 & Faunal Habitat 3 as well as areas considered important for fauna, in particular the KwaZulu-Dwarf Chameleon i.e. Faunal Habitat 4 and Faunal Habitat 5 are considered of 'Medium' Site Ecological Importance under the Terrestrial Biodiversity Theme.

The proposed road upgrade will have a small but intense impact on the vegetation communities and faunal habitats along the existing road reserve comprising degraded communities and habitats. The most serious impacts are the direct and indirect impacts to the small local KwaZulu Dwarf Chameleon population, a Near Threatened SCC and the larger associated ecological corridor. It is anticipated that the area to be impacted by the road upgrade will be a very small area to be impacted (provided mitigation measures in this report are strictly adhered to, particularly limiting construction and operation phases activities to the footprint provided and avoiding sensitive KwaZulu Dwarf Chameleon habitat beyond this footprint). However, there could be some localised fatalities of chameleons if indiscriminate and poorly planned construction practices occur, which is undesirable and should be avoided. Every effort must be made to reduce the impacts to potential chameleon habitat and movement corridors through the strict implementation of:

- Construction phase measures:
    - A search and rescue plan, to be implemented by an appropriately qualified specialist prior to work commencing on site.
    - Working area and no-go area demarcation and fencing.
    - Erosion and sediment control.

- Operational phase measures:
    - The design and installation of appropriate stormwater management measures.

- The inclusion of recommended mitigation measures in the relevant maintenance plans for the project.

Provided all mitigation measures recommended in this report are strictly adhered to, anticipated impacts will be of moderately low or low significance.

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1. Introduction & Background

1.1. Location and Description of the Proposed Development Activities

The applicant is proposing the widening of the Bayhead and Langeberg Roads in the Port of Durban, in the eThekwini Municipality, KwaZulu-Natal (KZN). The project entails the following:

- Widening existing carriageways by one lane in each direction
- Modification to six bridges (rail and canals) for lane extension and structural integrity
- Stormwater management enhancements, including improved drainage systems and designated discharge points.
- Modification of the existing canal upstream of Bridge 3-6 to splay the abutments and repair erosion damage.
- Expansion of existing culvert at Bridge 3-6 with an additional 3.4m x 7m culvert and associated widening of upstream and downstream of canal.
- Proposed route for sewer rising main.

The proposed development activity constitutes listed activities in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA) that require Environmental Authorisation (EA). In this regard, Verdant Environmental were appointed by the applicant to compile a site sensitivity verification report and thereafter a terrestrial compliance statement report to inform environmental planning for the project.

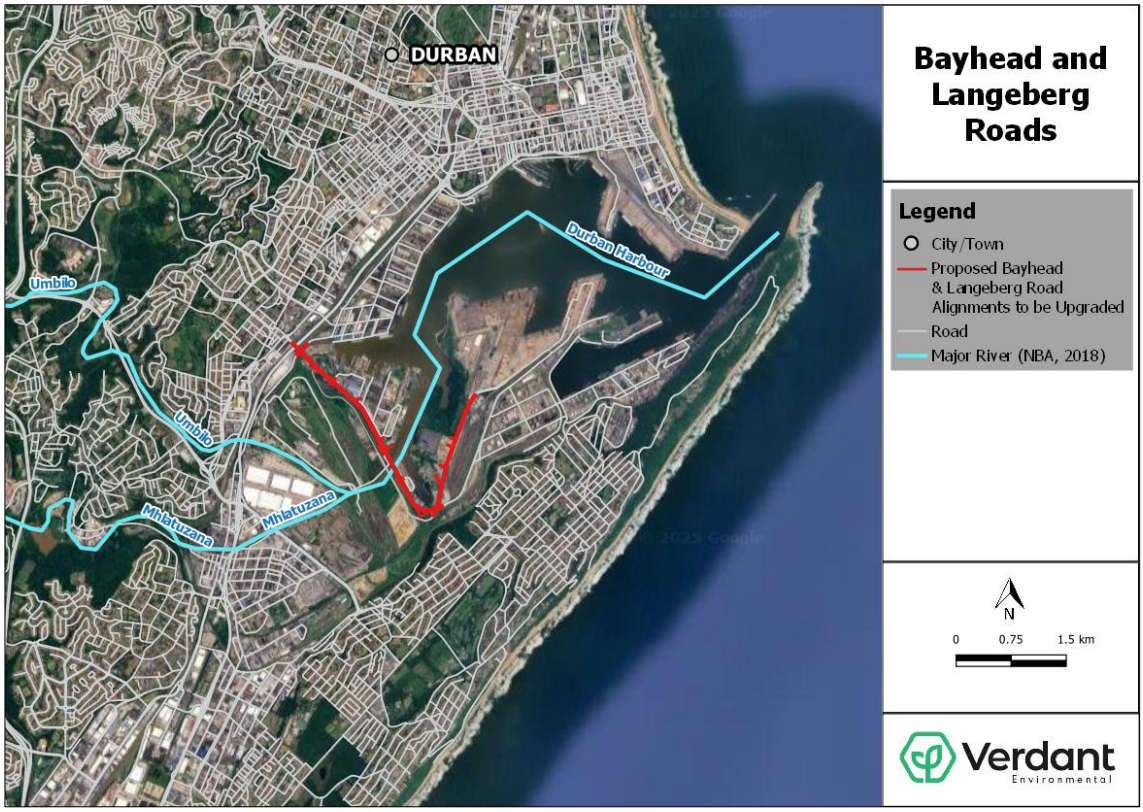

Figure 1. Project locality map.

1.2. Scope of Work

The scope of work completed as part of this assessment was as follows:

- Contextualization of the study area in terms of important biophysical characteristics and conservation planning using available spatial datasets and conservation plans.
- Desktop assessment of the floral and faunal species of conservation concern that may occur within the development footprint based on available species records for the region.
- Floral assessment component:
    - Undertaking of a field survey of the study area to identify, describe and map the dominant vegetation communities onsite and record necessary information required to assess the condition and the ecological importance and sensitivity (EIS) of the vegetation communities. The survey was a visual survey with no formal plant sampling.
    - Mapping of the vegetation communities within the study area based on the onsite findings and analysis of recent aerial photography.

  - Provision of descriptions of the mapped vegetation communities with emphasis on reporting on the dominant species and species of conservation significance.
  - Compilation of plant species lists for the mapped vegetation communities.
  - Assessment of the ecological condition of the vegetation communities based on key variables including species composition, vegetation structure and the presence of ruderal, pioneer and invasive alien species.
  - Assessment of the ecological importance and sensitivity of the vegetation communities based on key criteria such as threat status, presence of red data species or suitability to support key species of conservation significance, habitat condition, etc.
- Fauna assessment component:
  - Undertaking of a rapid site walkover and field survey of the development site to identify faunal species and habitats onsite based on visual observations only. The survey was largely a visual survey of habitat types with no formal fauna sampling or application of searching techniques.
  - Mapping of the faunal habitats within the study area based on the onsite findings and analysis of recent aerial photography.
  - Provision of descriptions of the mapped faunal habitats.
  - Compilation of fauna species lists for the mapped faunal habitats. These lists were of what was encountered and observed onsite only and are not exhaustive.
  - Undertaking of a threatened faunal species likelihood of occurrence assessment based on the findings of the rapid field survey.
- Compilation of an ecological importance and sensitivity map for the mapped vegetation communities onsite including an indication of the location of protected and/or species of conservation concern.
- Provision of recommended best practice and site-specific project design (layout and design) measures to avoid and minimise impacts to local terrestrial biodiversity and ecosystems.
- Provision of construction and operational impact mitigation to avoid and minimise direct and indirect impacts, including long-term rehabilitation and management measures.
- Identification and reporting on any other permit/licensing requirements that may be relevant to the site (for example protected plant/tree permits/license requirements).

1.3. Key definitions and concepts

1.3.1. Terrestrial Ecosystems and Ecosystem Services

An ecosystem is a group of plants, animals and other organisms interacting with each other and with non-living (abiotic) components of their environment. Ecosystems can be classified broadly into terrestrial and aquatic ecosystems. Terrestrial ecosystems occur on land where water is a limiting factor, whereas aquatic ecosystems occur within landforms that are permanently or periodically inundated with flowing or standing water (Ollis et al., 2013).

Ecosystems can be classified at different scales from local to regional depending on what is being studied. Vegetation and soils are the most easily studied ecosystem components and thus typically form the basis of ecosystem classification. This is true for South Africa where ecosystems have been formally classified at a regional scale in terms of landscapes with broadly uniform / homogenous climate, soil and vegetation characteristics, as reflected in the national vegetation map developed by Mucina & Rutherford (2006). It is important to note however that this classification is coarse in resolution and is often not detailed enough to pick up ecosystem and vegetation community variation at the local level.

1.3.2. Biodiversity and its Value

Biodiversity (or biological diversity) is the variety of all life and its processes. It includes the variety of all organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning (eThekwini Municipality, 2012). This includes all species, habitats and ecosystems and the connections between these.

Ecosystems support biodiversity and biodiversity supports the integrity of ecosystems. Biodiversity is essential for the self-organizing capacity of complex-systems (Levin, 1999), both in terms of absorbing disturbance and of subsequently regenerating and reorganizing the system (Folke et al., 2004).

There is also a strong link between biodiversity and the supply of ecosystem services. We now know that human flourishing, well-being and development rely on the functions, goods and services provided by ecosystems, collectively referred to as ecosystem services. Ecosystem functions refer to the capacity of ecological processes and structure to provide services that satisfy human well-being (de Groot, 1992). Ecosystem services are the benefits provided by ecosystems that contribute to making human life both possible and worth living (Díaz et al.,

2006). Thus, biodiversity assists in supporting and maintaining the provision of important ecosystem services.

Biodiversity is also valuable in and of itself, particularly in the provision of food, medicines, breeding stock, wood products and ornamental plants to name a few goods.

Biodiversity also forms a critical part of many areas valued for tourism and recreational purposes. The 'draw cards' for such spaces is often due to the aesthetic qualities and/or target species supported by natural biodiversity. Similarly, biodiversity has cultural value through supporting spaces and resources with cultural significance, educational value and spiritual value.

It is also important to note that South Africa ranks as the third most biologically diverse country in the world, based on an index of species diversity and endemism, and is one of twelve (12) "mega-diverse" countries which collectively contain more than two-thirds of global biodiversity (Endangered Wildlife Trust and DEA et al., 2013).

1.4. Relevant Environmental Legislation related to Terrestrial Ecosystems & Biodiversity

Terrestrial ecosystems, their relevant species, vegetation, habitats and biodiversity in general are governed in South Africa by the following legislation:

- National Environmental Management Act (NEMA) No. 107 of 1998) inclusive of all amendments;
- National Environmental Management: Biodiversity Act (NEMBA) No. 10 of 2004;
- The National Environmental Management: Protected Areas Act No. 57 of 2003;
- Conservation of Agricultural Resources Act No. 43 of 1983; and
- National Forests Act No. 84 of 1998.

At a Provincial level, flora of conservation significance are protected by the KZN Nature Conservation Ordinance (No. 15 of 1974).

2. Methods

2.1. Desktop Review

The following data sources and GIS spatial listed in Table 1 were consulted to inform the biophysical and conservation context of the biodiversity onsite. The data type, relevance to the project and source of the information has been provided.

Table 1. Data sources and GIS information consulted to inform the baseline terrestrial ecosystem assessment.

Data/Coverage Type		Relevance	Source
Biophysical / Ecological Context	**Latest Google Earth ™ imagery**	*To supplement available aerial photography where needed and to inform catchment level impacts*	Google Earth™ On-line
	National Rivers (GIS Coverage)	*Highlight potential onsite and local rivers and map local drainage network*	DWS
	South African Quaternary catchments	*Locates the project area within the principal water resource management units in South Africa*	DWS
	South African Quinary catchments	*Locates the project area within the principal water resource management units in South Africa*	DWS
	DWA Eco-regions (GIS Coverage)	*Understand the regional biophysical context in which water resources within the study area occur*	DWA (2005)
	South African Vegetation Map (GIS Coverage)	*Classify vegetation types and determination of reference vegetation*	SANBI (2006 - 2018)
	South African Inventory of Inland Aquatic Ecosystems (SAIIAE), 2018 – River Ecosystems	*Shows location of river within the relevant inventories*	Van Deventer *et al.* (2018a)
	South African Inventory of Inland Aquatic Ecosystems (SAIIAE), 2018 – Wetland Ecosystems	*Shows location of wetlands within the relevant inventories*	Van Deventer *et al.* (2018a)
	NEMBA Listed Threatened Ecosystems – Original Extent (GIS Coverage)	Classify vegetation types and determination of reference vegetation	NEMBA
	NEMBA Listed Threatened Ecosystems – Remaining Extent (GIS Coverage)	Classify vegetation types and determination of reference vegetation	NEMBA
	KwaZulu-Natal Vegetation Map (GIS Coverage)	Classify vegetation types and determination of reference vegetation	Scott-Shaw and Escott (2011)
Conservation	**Key Biodiversity Areas (2022)**	*Shows location of Key Biodiversity Areas*	IUCN (2022)

Data/Coverage Type		Relevance	Source
	Strategic Water Sources Areas (2017)	*Shows location Strategic Water Source Areas*	(WRC, WWF-SA & CSIR, 2017)
	National Biodiversity Assessment – Terrestrial Realm (GIS Coverage)	*Terrestrial ecosystem / vegetation type threat status*	Skowno et al. (2018)
	KZN Terrestrial Biodiversity Sector Plan (GIS Coverage)	*Provincial conservation planning importance.*	EKZNW (2016)
	KZN Terrestrial KZN Systematic Conservation Plan (GIS Coverage)	*Provincial conservation planning importance.*	EKZNW (2011)
	Durban Metropolitan Open Space System (GIS Coverage)	*Municipal conservation planning importance.*	EPCPD (2018)

The conservation status of each species identified as potentially occurring onsite was determined using various Red Lists, each of which are based on the IUCN categories (Figure 2).

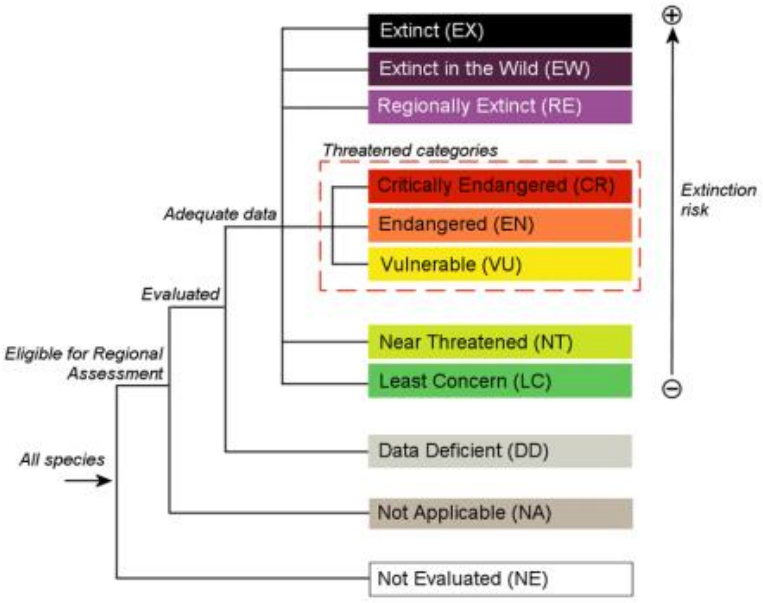

Figure 2. Graphical representation of the IUCN Red List categories[1].

Each of the IUCN categories can be described as follows[2]:

- **Data Deficient** (DD) - Inadequate information exists to make an assessment of a species' risk of extinction based on its distribution or population status.
- **Least Concern** (LC) - When evaluated against the Red List criteria a species does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened status.

[2] https://www.iucnredlist.org. Accessed 5th April 2021.

- **Near Threatened** (NT) - When evaluated against the Red List criteria a species does not qualify for Critically Endangered, or Vulnerable at present but is likely to qualify for one of those categories in future.
- **Vulnerable** (VU) - A species is considered to be facing a high risk of extinction in the wild based on the IUCN criteria.
- **Endangered** (EN) - A species is considered to be facing a very high risk of extinction in the wild based on the IUCN criteria.
- **Critically Endangered** (CE) - A species is considered to be facing an extremely high risk of extinction in the wild based on the IUCN criteria.
- **Extinct in the Wild** (EW) - A species is known only to survive in cultivation, captivity or as a naturalized population/s outside of its historical range.
- **Extinct** (EX) - There is no reasonable doubt that the last individual of the species has died.

2.2. Floral Baseline Assessment

2.2.1. Infield Survey

The field survey was undertaken on the **18th of March 2025** and the **23rd of October 2025** by Juliette Lagesse. The site survey entailed undertaking a site walkover of the site and surrounds. For the floral assessment the following data was collected in the field:

- **Broad vegetation and structural type** – The vegetation communities encountered were classified into broad vegetation structural types e.g. grassland, forest, bushland, scrubland etc. where applicable. Overall morphology and architecture of the plant community were also recorded where applicable.
- **Qualitative plant species composition** – Species composition refers to the relative proportions (%) of various plant species in relation to the total on a given area. The relative abundance of each species encountered was rated qualitatively.
- **Species of conservation concern** – Species of conservation concern are species that have a high conservation importance in terms of preserving South Africa's biodiversity and include rare and threatened species. This category also includes those classified in the categories Extinct in the Wild (EW), Regionally Extinct (RE), Near Threatened (NT), Critically Rare, Rare, Declining and Data Deficient - Insufficient Information (DDD).
- **Observable onsite impacts** – Evidence of the physical disturbance to vegetation and soils and indirect impacts like erosion, sedimentation, contamination etc. were recorded.

- **Distinct vegetation boundaries** – Clear boundaries between distinct vegetation communities were recorded onsite. Between sampling points boundaries were extrapolated using the latest colour aerial photography for the area.

All sampling points were recorded using a handheld GPS device. Where species could not be identified in the field, samples and photographs were taken to confirm at a later stage using available literature.

2.2.2. Vegetation Mapping and Classification

Distinct vegetation communities were broadly mapped based on observed changes in species composition that were recorded using a hand-held GPS. These GPS waypoints were imported into GIS for mapping purposes.

2.2.3. Condition Assessment

Vegetation communities / habitat units defined for the study area were assessed qualitatively in terms of their ecological condition. Ecological condition refers to the extent to which the composition, structure and function of an area or biodiversity feature has been modified from a natural reference condition.

2.3. Faunal Baseline Assessment

2.3.1. Data Sourcing and Review

A range of literature, spatial databases, distribution records, as well as existing ecological studies and high-level strategic plans relating to faunal biodiversity were interrogated in order to collate lists of and assess mammals, avifauna, reptiles, amphibians, and selected invertebrates that do or may potentially occur within the project properties, most notably this included:

- All existing published information regarding distribution, habitat and other requirements, and conservation statuses, of all relevant fauna assessed.
- Information on online citizen science data collection public platforms, including iNaturalist. Data current as of October 2025 were evaluated.

The study area was also assessed prior to and following the field survey, using aerial imagery and relevant environmental spatial datasets and information. Note that while the primary

focus was on the proposed footprint, consideration was given to a large area surrounding the proposed footprint, extending to 32m, but also considering the broader landscape beyond that, given the potential for impacts on sensitive features. Due to budget and time constraints associated with the study, and the nature of the proposed development, the aim of the study was not to compile a complete faunal inventory of the study sites, but rather to determine whether any Red List species, or habitat suitable for such species, were present onsite or within a broad area of influence, and the relative value of the site for these species.

2.3.2. Infield Survey

The field survey was undertaken on the **23rd of October 2025** by James Harvey. The primary objectives of the site visit were to:

- Verify the sensitivity of the study area as identified by the screening tool and a preliminary desktop analysis;
- Identify and assess the diversity, integrity and suitability of habitats within study sites to support Red List faunal species and general faunal biodiversity; and
- Identify Red List species present, or likely to be present, onsite and in surrounding areas.
- Assess potential impacts to faunal communities and sensitive faunal species

The assessment involved a systematic walkthrough of the site, assessing important habitats. Specific attention was paid to habitat types and quality, presence or absence of important landscape features for fauna, as well as considering the broader landscape surrounding the site.

2.4. Site Ecological Importance (SEI)

Site Ecological Importance (SEI) was assessed based on the approach outlined in the “Draft Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols” compiled by SANBI (2020) according to recommended best-practice for environmental impact assessments in South Africa for both faunal habitats and vegetation communities on site to produce an SEI rating for fauna and flora respectively. The approach detailed below is largely reproduced verbatim with minor adjustments from the document referenced above.

All the vegetation communities that have been mapped as well as any rare or threatened flora and fauna recorded occurring or expected to occur on-site were considered ‘receptors of

impacts' within this terrestrial assessment report. Each receptor (e.g., a threatened floral/faunal species or a mapped vegetation community) was taken into consideration to determine the Floral or Faunal SEI associated with the development project. The process of assessing SEI is described in more detail below (SANBI, 2020).

SEI is considered to be a function of the Biodiversity Importance (BI) of the receptor (e.g., species of conservations concern, the vegetation /community or habitat type present on the site) and its resilience to impacts – Receptor Resilience (RR) as follows:

SEI = BI+RR

BI in turn is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows:

BI = CI + FI

CI is defined here as: "*The importance of a site for supporting biodiversity features of conservation concern present e.g., populations of IUCN Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.*"

Key criteria used to inform the CI at a site include the following (SANBI, 2020):

- **IUCN Threatened and Near-Threatened Species (CR, EN, VU & NT)** - Either the global or national assessments, where the global and national assessments differ for the same taxon, the most recent evaluation of status was used in calculating SEI.
- **Rare species i.e. those included on South Africa's National Red List as Rare or Critically Rare or Extremely Rare** - These are highly restricted species that are currently not declining. However, should any development impact on a population of these species they will immediately qualify under one of the IUCN categories of threat.
- **Range-restricted species** – The presence of terrestrial flora with a global population extent of occurrence (EOO) of 10 000 km^2 or less.
- **Significant areas of threatened vegetation types** – This is a function of both the area (size) being considered in relation to the total extent of that vegetation type (i.e. proportion) and how threatened (CR, EN, VU) the vegetation types are; and
- **Natural processes** – Natural unmanaged areas with low levels of ecological disturbance have largely intact natural processes such as pollination, seed dispersal and migration, and thus have greater intrinsic conservation importance than those that are modified through ecological disturbance.

Please note, the SEI has only been assessed for SCC and vegetation communities/faunal habitat that fall within the project footprint and does not extend to the entire Project Area of Influence which falls beyond the project footprint. Assessment of Conservation Importance will include an assessment of the suitability/potential of the vegetation communities to support floral and faunal populations which fall under one of the criteria included for threatened and rare species.

Table 2. Conservation Importance Criteria (SANBI, 2020)

Conservation Importance	Fulfilling Criteria
Very High	• Confirmed or highly likely occurrence of CR, EN, VU or Critically Rare species that have a global EOO of < 10 km^2 • Any area of natural habitat[3] of a CR ecosystem type or large area (> 0.1 % of the total ecosystem type extent[4]) of natural habitat of EN ecosystem type • Globally significant populations of congregatory species (>10% of global population)
High	• Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO > 10 km2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. • Small area (>0.01% but < 0.1 % of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1 %) of natural habitat of VU ecosystem type. • Presence of Rare species. • Globally significant populations of congregatory species (>1% but <10% of global population).
Medium	• Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under A criterion only and which have more than 10 locations or more than 10 000 mature individuals. • Any area of natural habitat of threatened ecosystem type with status of VU Presence of range-restricted species • > 50 % of receptor contains natural habitat with potential to support SCC
Low	• No confirmed or highly likely populations of SCC • No confirmed or highly likely populations of range-restricted species • < 50 % of receptor contains natural habitat with limited potential to support SCC
Very Low	• No confirmed and highly unlikely populations of SCC • No confirmed and highly unlikely populations of range-restricted species • No natural habitat remaining

FI of the receptor (e.g., the vegetation/fauna community or habitat type) is defined here as the receptors' current ability to maintain the structure and functions that define it, compared to its known or predicted state under ideal conditions.

[3] This excludes areas of transformed habitat within a defined ecosystem even if these are partially restored, e.g. Highveld grasslands that have been converted to maize fields and then abandoned so that some form of functional grassland is restored; this is not natural habitat as it does not and will not in the future have species composition representative of the original natural habitat.
[4] Calculated from the threatened ecosystem of South Africa shapefile available from the SANBI (current available version 2011: http://bgis.sanbi.org/Projects/Detail/49)

Simply stated, FI is: *"A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts."* (SANBI, 2020)

These criteria can be defined as (SANBI, 2020):

- **Connectivity to other natural areas** - Connectivity, which can also be measured conversely as the degree of habitat fragmentation, refers to how connected habitat patches are to each other, which has a significant influence on numerous ecological processes, such as migration and dispersal opportunities of biota and therefore genetic exchange between populations. Connectivity to other similar habitats becomes more important as the remaining intact and functional area of a habitat decreases, mainly because population sizes decrease and are therefore at greater risk from ecological perturbations and inbreeding effects. The degree of connectivity between habitat patches varies greatly with the dispersal ability of the taxon or taxon group (e.g., fossorial reptiles) in question;
- **Degree of current persistent negative ecological impacts** - Persistent negative impacts such as uncontrolled spread of alien and invasive flora effectively decreases both the remaining intact area and ecosystem functioning of a particular habitat; and
- **Remaining intact and functional area** – The proportion of the receptor that supports natural habitat with intact ecological processes - small areas are less likely to withstand ecological degradation compared to large areas and are therefore better able to maintain structure and function allowing for intact ecological processes.

Ecological processes can be considered to be mostly intact and functional if the receptor area has low levels of current ecological disruptors, has good connectivity to other areas and is a relatively large area.

Table 3. Functional Integrity Criteria (SANBI, 2020).

Functional Integrity	Fulfilling Criteria
Very High	• Very large (>100 ha) intact area for any conservation status of ecosystem type or >5 ha for CR ecosystem types • High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches • No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing)
High	• Large (>20 ha but <100 ha) intact area for any conservation status of ecosystem type or >10 ha for EN ecosystem types

Functional Integrity	Fulfilling Criteria
	• Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches • Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential
Medium	• Medium (>5 ha but <20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types • Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches • Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance; moderate rehabilitation potential
Low	• Small (>1 ha but <5 ha) area • Almost no habitat connectivity but migrations still possible across some transformed or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential • Several minor and major current negative ecological impacts
Very Low	• Very small (<1 ha) area • No habitat connectivity except for flying species or flora with wind-dispersed seeds. • Several major current negative ecological impacts

Recalling that BI is a function of CI and the FI of a receptor, BI was thereafter derived from a simple matrix of CI and FI as follows:

Table 4. Biodiversity Importance Matrix (SANBI, 2020).

Biodiversity Importance		Conservation Importance				
		Very High	High	Medium	Low	Very Low
Functional Integrity	Very High	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very Low
	Low	Medium	Medium	Low	Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low

RR is defined here as: "*The intrinsic capacity of the receptor to resist major damage from disturbance and /or to recover to its original state with limited or no human intervention.*" (SANBI, 2020).

The fulfilling criteria to evaluate RR is based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor (Table 5). Each rare and threatened species and mapped vegetation community will be assigned a RR Rating ranging from Very High Resilience to Very Low Resilience with a short rationale provided for each rating.

Receptor resilience is dependent on the nature of the disturbance or impact and therefore needs to be assessed in relation to these factors in the accompanying rationale for each rating assigned. Thus, a receptor is likely to have multiple ratings associated with a suite of anticipated impacts linked to the proposed development. However, only the lowest receptor resilience rating assigned to each receptor will be reported on to highlight the most notable vulnerability associated with a receptor and the relevant anticipated impact that represents the greatest threat.

Table 5. Receptor Resilience Criteria (SANBI, 2020).

Resilience	Fulfilling Criteria
Very High	Habitat that can recover rapidly (~ less than 5 years) to restore > 70 % of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed
High	Habitat that can recover relatively quickly (~ 5-10 years) to restore > 70 % of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed
Medium	Will recover slowly (~more than 10 years) to restore > 70 % of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~less than 50 % of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed
Very Low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed

Finally, once both BI and RR were assessed SEI was determined from the final matrix as follows:

Table 6. SEI Matrix (SANBI, 2020).

Site Ecological Importance	Biodiversity Importance				
	Very High	High	Medium	Low	Very Low
Receptor Resilience: Very Low	Very High	Very High	High	Medium	Low
Receptor Resilience: Low	Very High	High	Medium	Medium	Low
Receptor Resilience: Medium	High	Medium	Medium	Low	Very Low
Receptor Resilience: High	Medium	Medium	Low	Low	Very Low

	Very High	Medium	Low	Very Low	Very Low	Very Low

SEI was then clearly mapped for each vegetation community/faunal habitat in relation to the proposed development activities and infrastructure. Interpretation of SEI in the context of the proposed development activities was then provided according to Table 7 below.

Table 7. Interpretation of SEI in relation to proposed development activities (SANBI, 2020).

Site Ecological Importance	Interpretation in relation to proposed development activities
Very High	Avoidance mitigation - No destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages. Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimization mitigation – Changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimization & restoration mitigation - Development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimization & restoration mitigation - Development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimization mitigation - Development activities of medium to high impact acceptable and restoration activities may not be required.

3. Desktop Assessment

3.1. Review of Ecosystem Context and Setting

3.1.1. Climate

An overview of the key climatic characteristics of the national vegetation type (i.e. KwaZulu Natal Coastal Belt – within the Indian Ocean Coastal Belt Bioregion) and Ecoregion (North Eastern Coastal Belt) is provided in Table 8 below.

Table 8. Overview of the key climatic characteristics of the region.

Aspect	Description
Elevation Above Mean Sea Level	0 - 300 a.m.s.l.
Mean Annual Precipitation (MAP)	600 - 700 mm/annum
Potential Evapotranspiration (PET)	1646 mm/annum
Mean Annual Simulated Runoff for Quaternary Catchment	150 - 250 mm
Rainfall seasonality	**Mid Summer, Late Summer,** Early Summer

3.1.1. Geology and Topography

The study area is underlain predominantly by calcarenite, clayey sand, red and grey dune sand, limestone, conglomerate of the Maputaland Group on the north-westernmost end of Bayhead Road, the remainder of the study area is underlain by quaternary alluvium, sand and calcrete.

The site topology is predominantly flat with some minor rises and fluctuations in micro-topography.

3.1.2. Drainage Setting

The project activities fall within the Estuarine Functional Zone (EFZ) of the Durban Bay Estuary, within quaternary catchment U60F. (Figure 3). Several canalised rivers feed into the estuary and cross the study area, namely:

- Durban Harbour Canal (below the confluence of the Mhlatuzana and uMbilo Rivers), and
- Amanzimyana Stream (canalised), located along the southern section of Bayhead Road which is approximately 100m from the intersection with Langeberg Road.

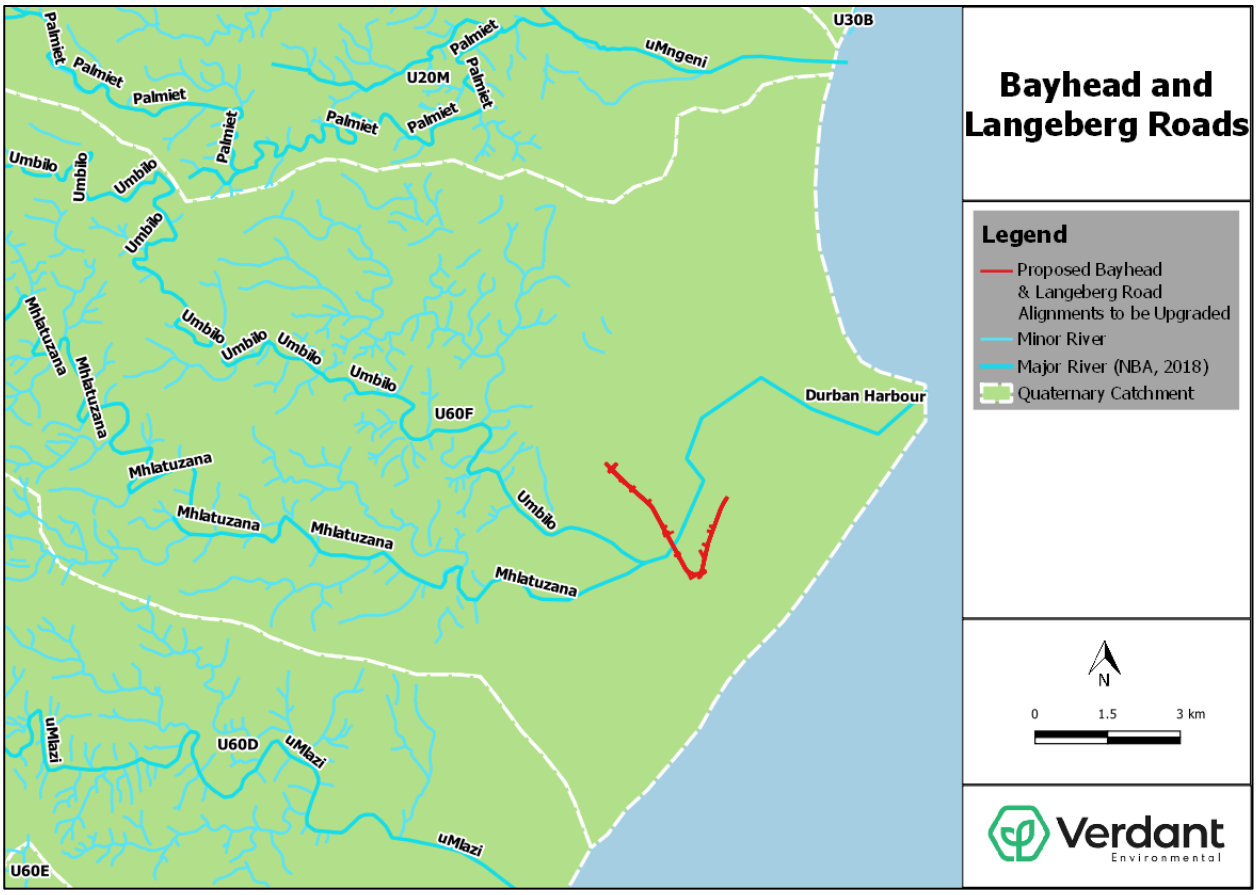

Figure 3. Drainage and river ecosystem setting of the study area, within catchment U60F.

3.1.3. Terrestrial Vegetation Type

The majority of the study area is classified as non-terrestrial and forms part of the Estuarine Functional Zone (EFZ) for the Durban Bay Estuary; with the exception of the north-western-most portion of Bayhead Road which falls within KwaZulu-Natal Coastal Belt Grassland and a patch of Mangrove Forest which adjoins a portion of Langeberg Road.

KwaZulu-Natal Coastal Belt Grassland falls within the KwaZulu-Natal Coastal Belt vegetation type in Mucina and Rutherford (2006) which forms part of the Indian Ocean Coastal Belt. This vegetation type is described by Mucina & Rutherford (2006) as comprising "*Highly dissected undulating coastal plains which presumably used to be covered to a great extent with various*

types of subtropical coastal forest (the remnants of one of which are described in Chapter 12 as Northern Coastal Forest). Some primary grassland dominated by Themeda triandra still occurs in hilly, high rainfall areas, where pressure from natural fire and grazing regimes prevailed. At the present the KwaZulu Natal Coastal Belt is affected by an intricate mosaic of very extensive sugarcane fields, timber plantations and coastal holiday resorts with interspersed secondary Aristida grasslands, thickets and patches of coastal thornveld".

Mangrove Forest is described by Mucina & Rutherford (2006) as comprising "*Species-poor and often monospecific, low and dense forests of mangroves (and fringing thickets of Hibiscus tiliaceus and Acrostichum aureum) in tidal zones of lagoons and estuaries*."

3.2. Review of Conservation Datasets

3.2.1. Key Biodiversity Areas

Key Biodiversity Areas (KBAs) are 'sites that contribute significantly to the global persistence of biodiversity', which means they are the most important places in the world for species and their habitats, based on a guideline document that provides global standards for identifying KBAs (IUCN 2022). As of 2024, 263 terrestrial sites are recognised in South Africa. underpinned by 3598 species triggers and 309 ecosystem triggers. KBAs are useful in guiding expansion of protected areas and in conservation planning to minimise biodiversity loss and negative impacts. It can be used by the development sector to ensure impacts to biodiversity are avoided or reduced to the greatest extent possible (www.keybiodiversityareas.org).

The proposed footprint does not fall within the KBA network, although three KBAs are located within a 2 – 3 km radius of the project site namely Paradise Valley (KBA No. 213) 1.8 km to the west, Mlazi (KBA No. 165) 2 km to the east and Mhlatuzana Valley (KBA No. 162) 2.5 km to the south.

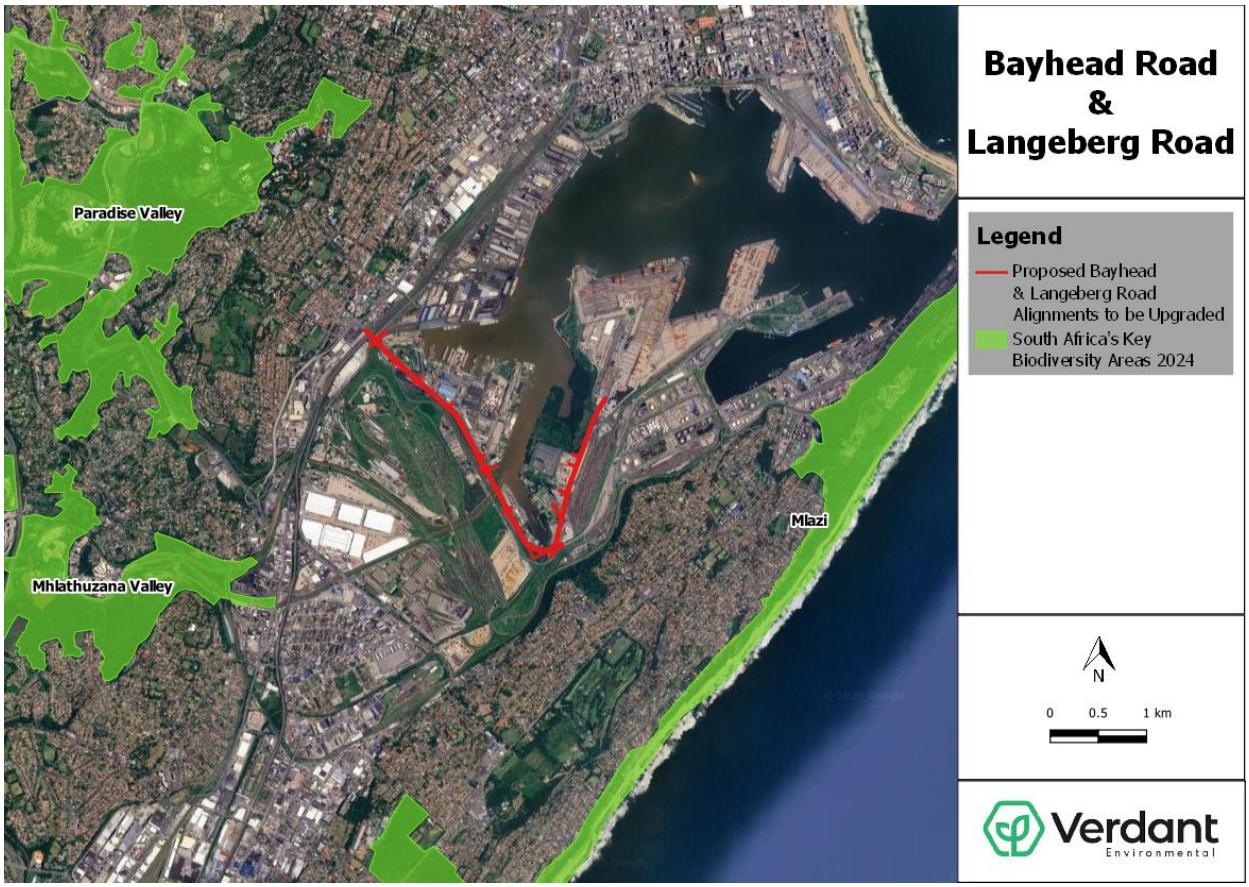

Figure 4. Study area in relation to Key Biodiversity Areas (KBA Standards and Appeals Committee of IUCN SSC/WCPA (2022).

3.2.2. DFFE Screening Tool Outputs

3.2.2.1. Terrestrial Biodiversity Sensitivity

The site is evaluated by the Screening Tool as being 'Very High' sensitivity along most of Langeberg Road and large portions of Bayhead Road, for the following criteria (Table 9 below), with the remainder of the footprint evaluated by the Screening Tool as being 'Low' sensitivity:

Table 9. Terrestrial Biodiversity Theme Sensitivity features.

Sensitivity	Feature(s)
Very High	CBA 1
Very High	Indigenous Forest_Mangrove Forest
Very High	National Protected Area Expansion Strategy (NPAES)

Sensitivity	Feature(s)
Very High	EN_KwaZulu-Natal Coastal Belt Grassland

Figure 5. National Screening Tool: Terrestrial Biodiversity Theme sensitivity.

3.2.2.2. Plant Species Theme Sensitivity

The National Screening Tool provides coarse-scale and desktop indication of the site's possible to likely sensitivity. Because this is in fact coarse, not based on ground-truthing, and can sometimes even be outright wrong, a specialist is needed to confirm actual sensitivity. Using the National Screening Tool, a screening report for the study has been generated. This indicates the Plant Species Theme is Low to Medium for the most part as indicated below with the exception of an area adjoining Langeberg Road to the north and west of the alignment which is flagged as High Sensitivity due to the presence of *Zeuxine africana* which is considered *Endangered*.

The Screening Tool also predicts a number of species, designated "species of conservation concern" (corresponding with species in the National Red List red and orange categories

(http://redlist.sanbi.org/redcat.php), possibly present. These are identified on a site-by-site basis according to coarse-scale assessed habitat considered present (or possibly present) together with known distribution.

It is a requirement that some of these threatened species / species of conservation concern flagged as possibly present by the tool are referred to by numbers only, with the number allocation and database and management thereof curated by SANBI. This is to protect locality information of species where in addition to other factors dictating threatened status, are known to be targets of private, commercial or medicinal collectors. Species which are predicted as possibly present on the site are as follows:

Named species:

- *Aspalathus gerrardii* (No suitable habitat, species of primary grassland)
- *Cassipourea gummiflua var. verticillata* (Not seen, possibly present on margins of Mangrove Forest away from construction and disturbance areas)
- *Dahlgrenodendron natalense* (No suitable habitat, species of Scarp Forest or forest where there are sandstone exposures)
- *Fimbristylis aphylla* (Not seen, would only occur in wetland areas and not historically recorded from Durban, only Maputaland and the KZN South Coast)
- *Helichrysum pannosum* (No suitable habitat, species of primary grassland and not on the coastal littoral as far as Durban)
- *Hyobanche fulleri* (Not seen, presence unlikely in disturbed vegetation alongside roads)
- Sensitive species 1252 (Not seen, not likely present as occurs in well developed forest not present very close to the construction areas)
- Sensitive species 150 (Not seen, no suitable habitat, mainly known from rocky forest further inland)
- Sensitive species 89 (Not seen, not known from forest on the Durban littoral, only forest further back from the coast)
- *Thesium polygaloides* (Not seen, considered extinct in Durban and if present likely a species of more primary vegetation than along roadsides)
- *Zeuxine africana* (Suitable habitat exists in proximity to Langeberg Road but only likely to occur beyond the 30-metre buffer where wetter ground occurs – it is important that disturbance does not extend more than 15 metres from the road edge)

None of these were found and such an occurrence would be surprising given the disturbed and transformed nature of the vegetation close to impact areas, or mismatch with known habitat, described further below.

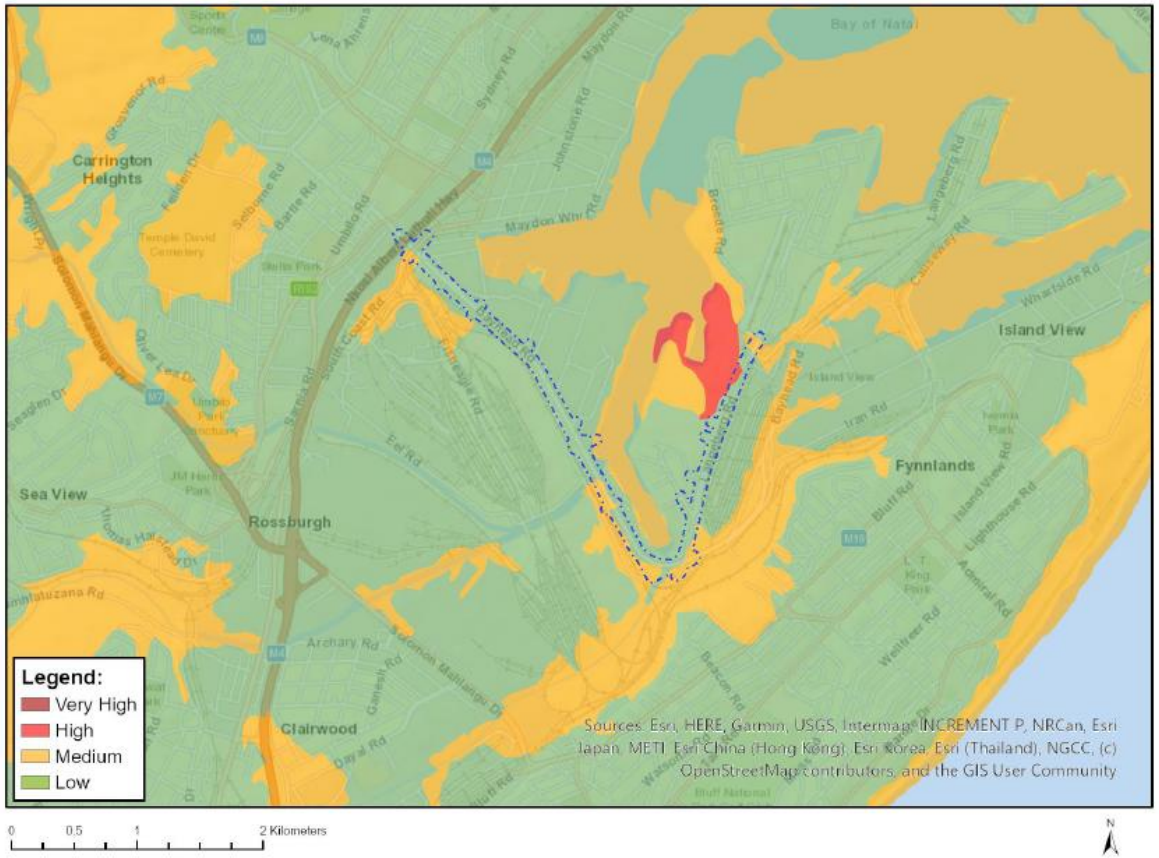

Figure 6. National Screening Tool: Plant Species Theme sensitivity.

3.2.2.3. Animal Species Theme Sensitivity

The Screening Tool classifies the site as being of high sensitivity, given the potential predicted presence of several sensitive faunal species. Sensitive fauna predicted to occur are listed in Table 10 and a brief comment made on their likelihood of occurrence. Based on the site assessment, none of these species are expected to be present within or in close proximity to the proposed development footprint. This is primarily due to the transformed and highly disturbed nature of the study area, and lack of natural habitats that these species require.

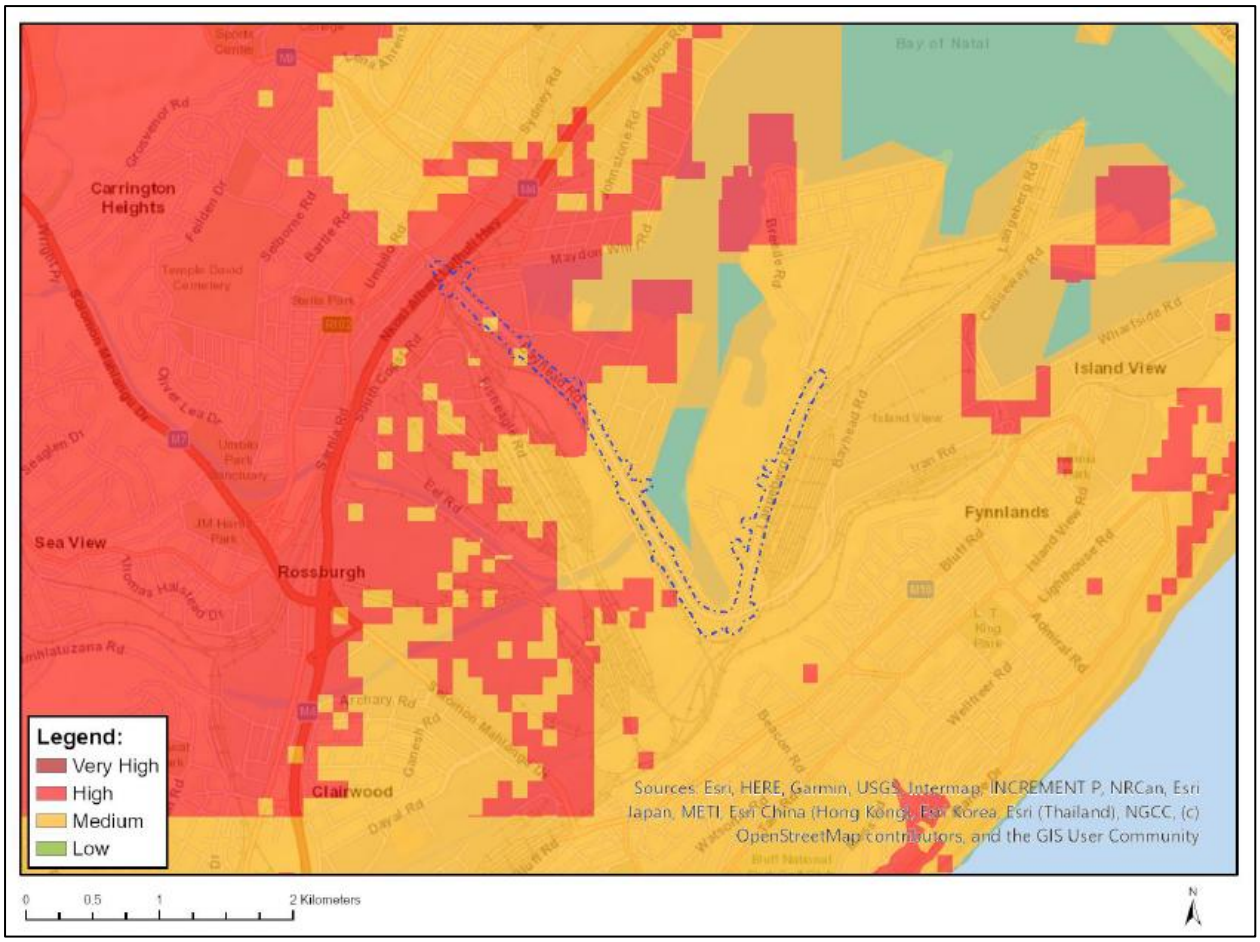

Figure 7. National Screening Tool: Animal Species Theme sensitivity.

Table 10. Sensitive fauna predicted to occur on the site (under the Animal Species Theme), based on the National Environmental Screening Tool.

Sensitivity	Feature(s)	English Name	Likelihood of Occurrence
High	*Stephanoaetus coronatus*	Crowned Eagle	Will not occur. Habitat is unsuitable.
High	*Hydroprogne caspia*	Caspian Tern	Will not occur. Habitat is unsuitable.
High	*Pelecanus onocrotalus*	Great White Pelican	Will not occur. Habitat is unsuitable.
High	*Pelecanus rufescens*	Pink-backed Pelican	Will not occur. Habitat is unsuitable.
High	*Microparra capensis*	Lesser Jacana	Will not occur. Habitat is unsuitable.
High	*Polemaetus bellicosus*	Martial Eagle	Will not occur. Habitat is unsuitable.

Sensitivity	Feature(s)	English Name	Likelihood of Occurrence
High	*Halcyon senegaloides*	Mangrove Kingfisher	Will not occur. Habitat is unsuitable.
High	*Geokichla guttata*	Spotted Ground-Thrush	Will not occur. Habitat is unsuitable.
Medium	*Hyperolius pickersgilli*	Pickersgill's Reed Frog	Will not occur. Habitat is unsuitable.
Medium	*Podica senegalensis*	African Finfoot	Will not occur. Habitat is unsuitable.
Medium	*Chrysospalax villosus*	Rough-haired Golden Mole	Will not occur. Habitat is unsuitable.
Medium	Sensitive species 8		Will not occur. Habitat is unsuitable.
Medium	*Arytropteris basalis*	Flat-necked Shieldback	Will not occur. Habitat is unsuitable.
Medium	*Pomatonota dregii*	East Coast Katydid	Will not occur. Habitat is unsuitable.
Medium	*Phymeurus illepidus*	Durban Agile Grasshopper	Will not occur. Habitat is unsuitable.
Medium	*Doratogonus rubipodus*	Ruby-footed Black Millipede	Will not occur. Habitat is unsuitable.

3.2.3. Revised National List of Threatened Ecosystems

In terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA), developers and land managers have a responsibility to limit further loss of biodiversity and conserve endangered ecosystems. Insofar as vegetation aspects are concerned, EIA regulations (2014, as amended) state that an environmental assessment process must be followed in terms of:

- Listed Activity 27 of Listing Notice 1 of EIA Regulations (2014, as amended) – "*The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.*"
- Listed Activity 12 of Listing Notice 3 of EIA Regulations (2014, as amended) – "*The clearance of an area of 300 m^2 or more of indigenous vegetation –*
    - *(iv) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;*

- *(v) Within a Critical Biodiversity Areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans."*

It is mentioned that the definition of indigenous vegetation in the regulations is extremely broad – it is defined as "*vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding 10 years*."

A Revised National List of Threatened Ecosystems was promulgated in 2022 in the Government Gazette 47526 (Notice No. 2747), in terms of NEM:BA. This is based on the National Spatial Biodiversity Assessment (NSBA) carried out mainly by staffers of the South African National Biodiversity Institute (SANBI) in 2018, which in turn follows the National Vegetation Map (SANBI 2018).

The main feature of the revised list is to make the listed ecosystems synonymous with vegetation types identified in the National Vegetation Map, and threat status correlating with those that were identified as Critically Endangered, Endangered or Vulnerable in the 2018 NSBA.

The relevant parts of national environmental regulations must now be read against these new ecosystems, and the descriptions and mapping thereof. In respect of the Revised List of Threatened Ecosystems, and out of the NSBA assessment, there are two associated sets of spatial data/mapping. One shows the original estimated extent of threatened ecosystems and the other the remnants (Figure 8). However, mapping in the latter (Figure 9), while usually indicative, is not always precise and important remnants are sometimes omitted. One of the purposes of specialist vegetation assessment is to determine whether remnants are present or not, which then irrespective of the mapping may cause the 300 m^2 trigger to apply.

The 2021 Revised National Threatened Ecosystems assessment (SANBI, 2021) remaining extent layer which is based on the NSBA, 2018 is presented in Figure 9. It shows the following vegetation types in the larger area:

- KwaZulu-Natal Coastal Belt Grassland (Endangered)
- Northern Coastal Forest (Least Concern)
- Mangrove Forest (Least Concern)

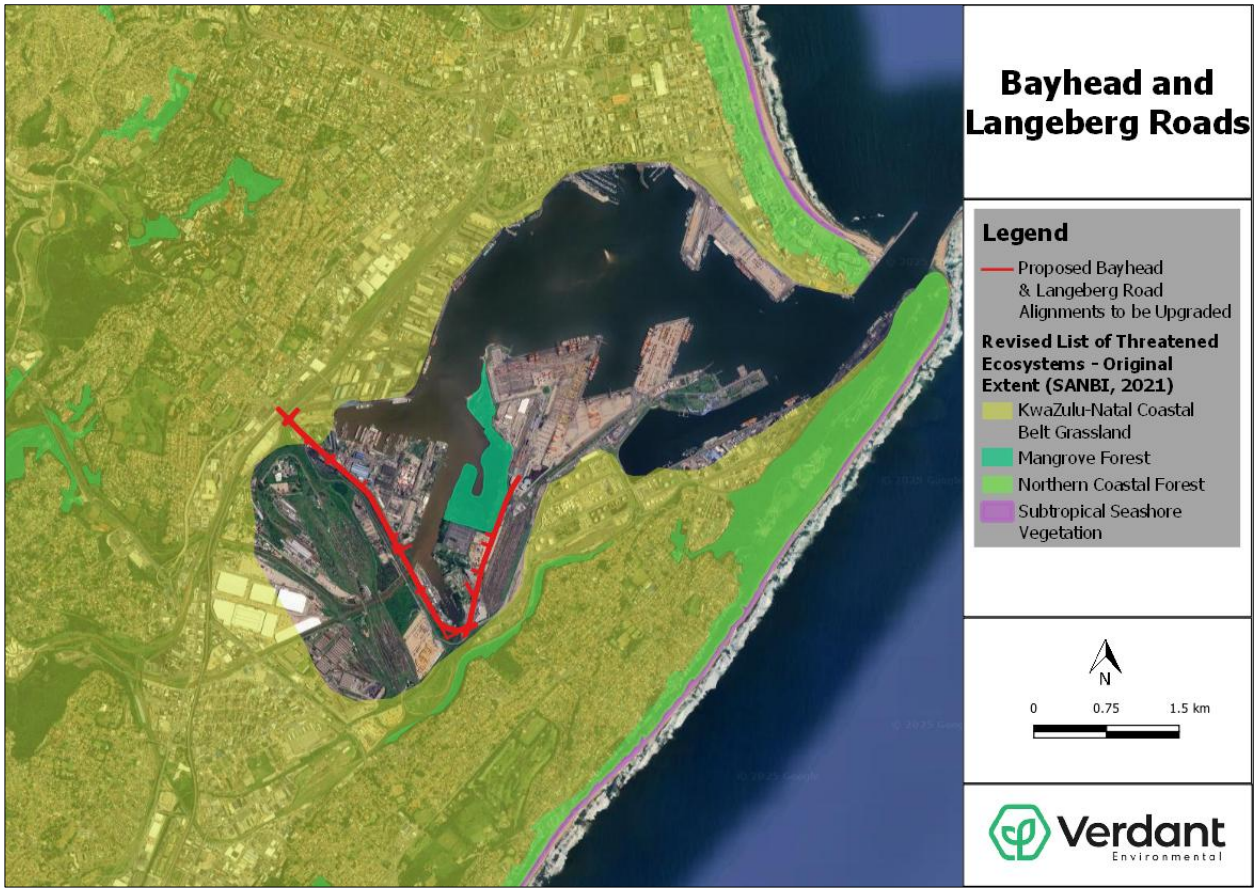

Figure 8. Original extent of threatened ecosystems (SANBI, 2021) in relation to the project area.

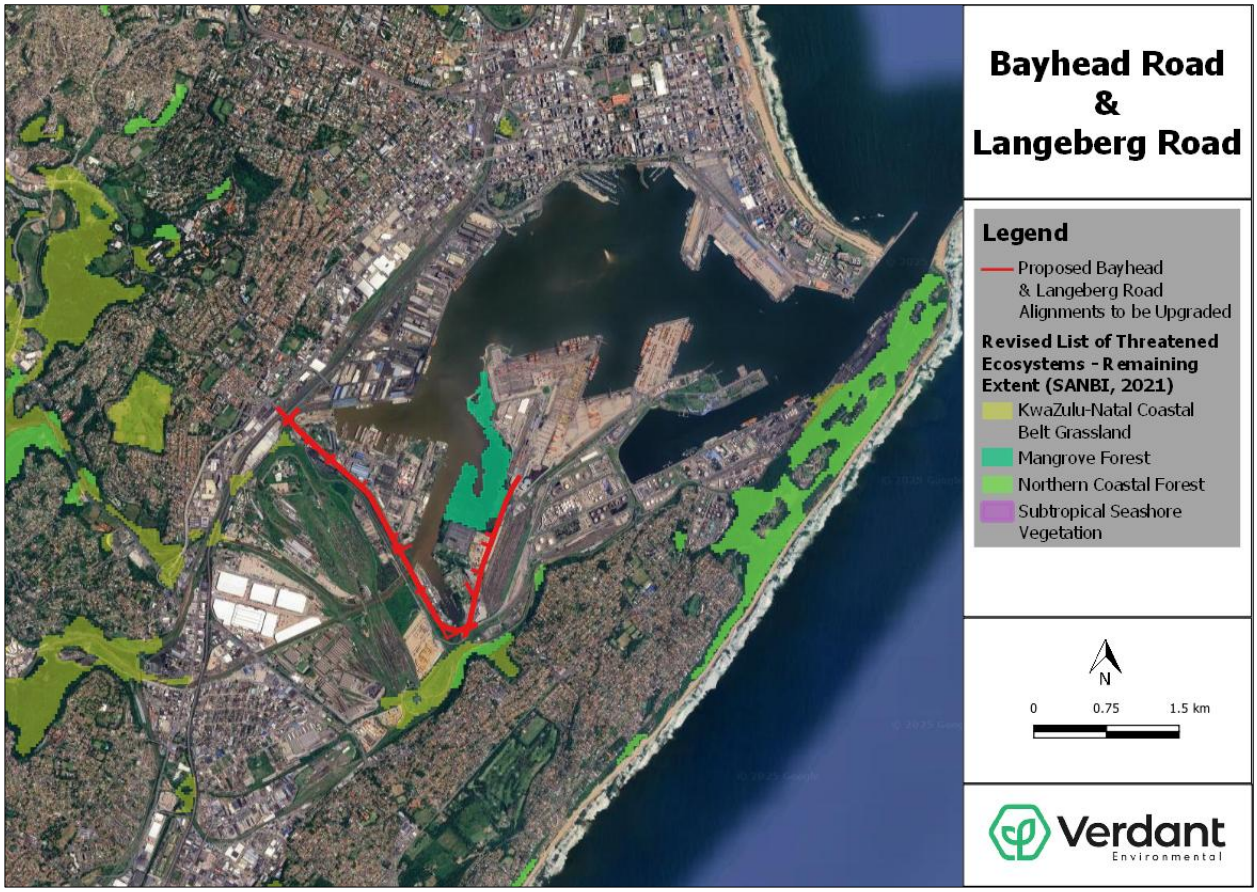

Figure 9. Remaining extent of threatened ecosystems (SANBI, 2021) in relation to the project area.

3.2.4. Strategic Water Source Areas (WRC, WWF-SA & CSIR, 2017)

"Water Source Areas (WSAs) have historically been defined using the criterion of the production of relatively large volumes of runoff which sustain lowland areas downstream. The National Freshwater Priority Areas (NFEPA) study applied this broad concept and identified sub-quaternary catchments with relatively high mean annual runoff as high-water yield areas, as well as identifying high groundwater recharge areas. This work was then taken further in a study by WWF-SA and CSIR which identified 21 Strategic WSAs for surface water (SWSA-SW) which covered 8% of South Africa and supplied 50% of the mean annual runoff. This dataset has now been archived and replaced by a new dataset produced by a Water Research Commission funded study which identified water source areas for both ground and surface water resources and involved extensive stakeholder inputs. Strategic Water Source Areas (SWSAs) are now defined as areas of land that either: (a) supply a disproportionate (i.e. relatively large) quantity of mean annual surface water runoff in relation to their size and so

are considered nationally important; or (b) have high groundwater recharge and where the groundwater forms a nationally important resource; or (c) areas that meet both criteria (a) and (b). They include transboundary Water Source Areas that extend into Lesotho and Swaziland."

Surface water SWSAs

"The 2018 national and transboundary surface-water SWSAs (refer to the map that follows) cover about 124 075 km2 (10% of the region) and provide a MAR of 24 954 million m3 (50% of the total MAR). "

Groundwater SWSAs

"The newly defined groundwater SWSAs cover around 9% of the land surface of South Africa" (see Figure 10). "They account for up to 42% of the river baseflow generated by these water source areas and have a key role in sustaining surface water flows during the dry season."

Their protection and importance

Currently, "Only 11% of these areas receive some form of formal protection. There is a need to look closely at development plans in these areas to ensure we maintain and increase the benefits they provide. The study by WWF-SA and CSIR has shown that the water produced by these areas supports at least 50% of the population, 64% of the economy, and supplies about 70% of the water used by irrigated agriculture. Gauteng gets about 65% of its water from these areas, and Cape Town and eThekwini about 98%. About 24% of the settlements reliant on groundwater are located within groundwater SWSAs, which is equivalent to 10% of all settlements in South Africa. These SWSAs supply about 46% of the groundwater used by agriculture and 47% of the groundwater used for industrial purposes in South Africa."

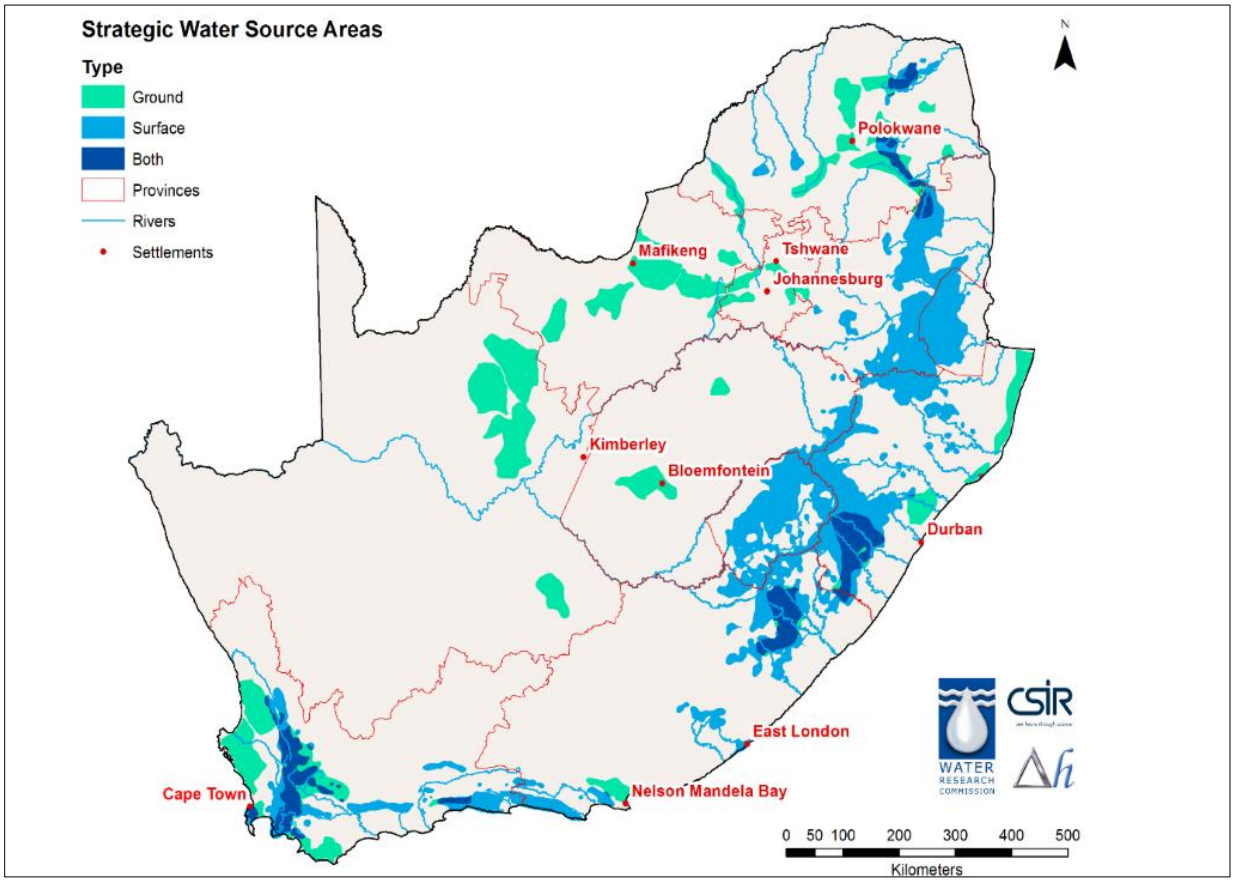

Figure 10. Map showing the location and extent of SWSAs at a national level (WRC, WWF-SA & CSIR, 2017).

The study area falls within the Zululand Coast Surface Water Strategic Water Source Area (See Figure 11).

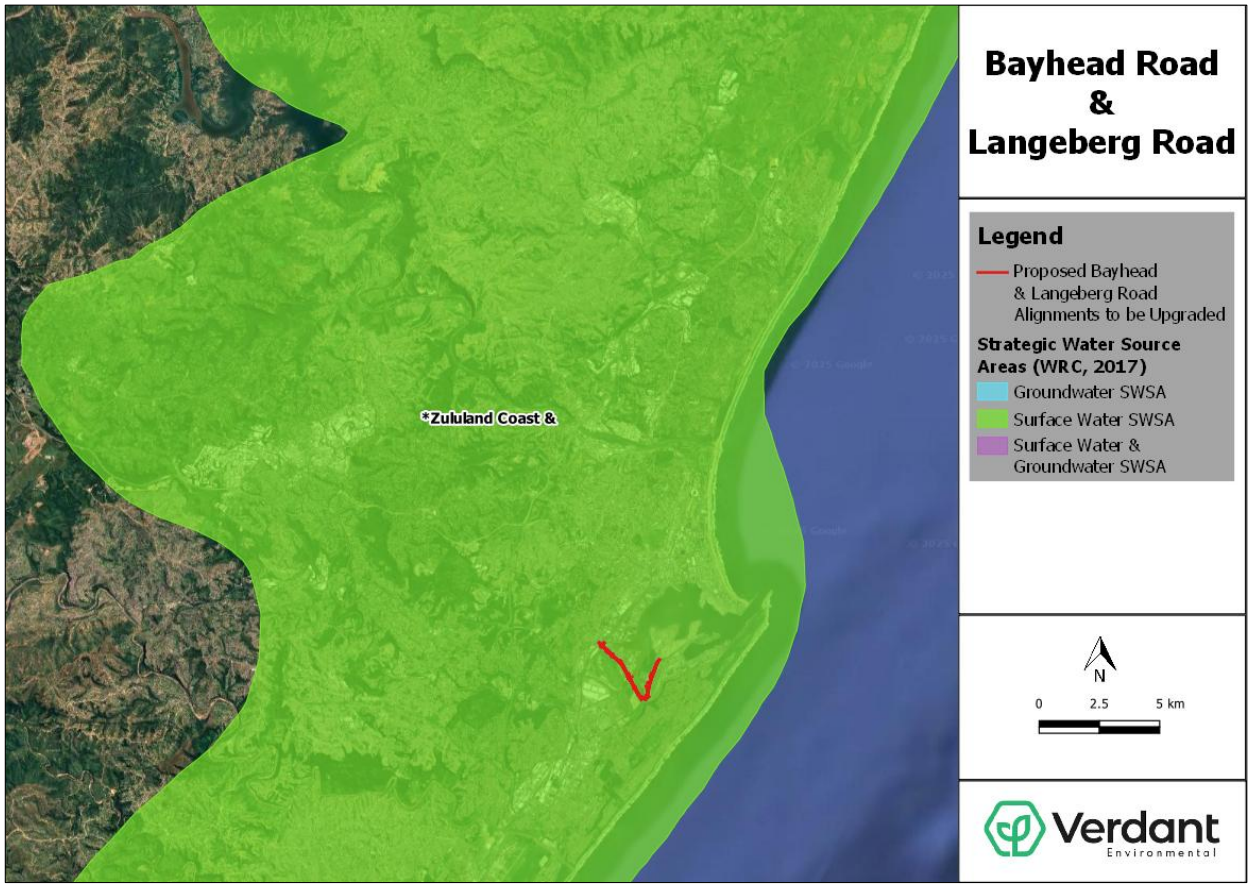

Figure 11. Study area in relation to SWSAs (WRC, WWF-SA & CSIR, 2017).

3.2.5. KwaZulu-Natal Terrestrial Systematic Conservation Plan (TSCP) (EKZNW: 2011, 2016)

The Provincial Systematic Conservation Plan is a strategic conservation plan developed by the Provincial Conservation Authority, Ezemvelo KZN Wildlife (EKZNW, 2016) to ensure that representative subsets of species and ecosystems are conserved in the province. It serves as a land use decision support tool in KwaZulu-Natal and builds on the 2010 version of the Terrestrial Systematic Conservation Plan (EKZNW, 2010). The updated spatial plan was derived from merging the 2010 Terrestrial Systematic Conservation Plan (TSCP) with other relevant conservation datasets. In terms of outputs of the updated spatial plan, three conservation categories were developed including (i) CBA: Irreplaceable, (ii) CBA: Optimal, and (iii) Ecological

Support Area (ESA). Table 11 below describes each of the categories contained in the EKZNW (2016) updated outputs and outlines how each was derived.

Table 11. Summary of updated terrestrial systematic provincial conservation plan map categories

Map Categories	Description	Datasets used
Critical Biodiversity Area (CBA): Irreplaceable	Areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems.	The coverage was created by merging the following datasets: • 2010 MINSET – Irreplaceable and high irreplaceable categories. • National Threatened Ecosystems – Critically endangered category • KZN Threatened Ecosystem - Critically Endangered and Endangered category. • Landscape Corridor critical linkages - Corridor type
Critical Biodiversity Area (CBA): Optimal	Areas that represent an optimised solution to meet the required biodiversity conservation targets while avoiding high-cost areas as much as possible.	The coverage was created by merging the following datasets: • 2010 MINSET – Optimal categories. • Local Knowledge – aquatic and terrestrial optimal categories.
Ecological Support Area (ESA)	ESAs are functional but not necessarily entirely natural terrestrial or aquatic areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the CBAs.	The coverage was created by merging the following datasets: • Local Knowledge – aquatic and terrestrial ESA categories. • Local corridor • Landscape corridor

Portions of the footprint and adjacent areas along Bayhead Road are classified as falling within the edge of areas classified as Critical Biodiversity Areas (CBAs): Irreplaceable (EKZNW, 2016) which extend beyond the footprint to the north, south and east.

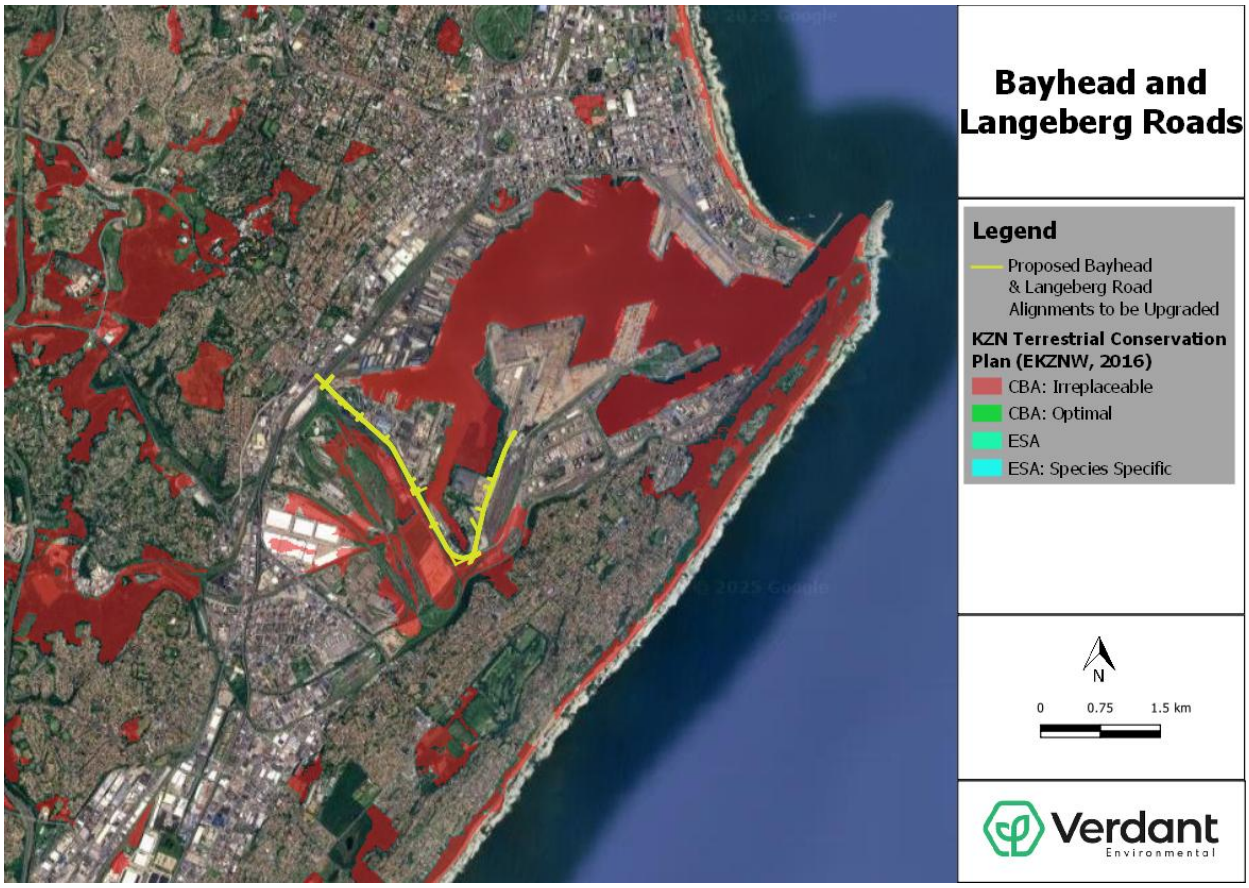

Figure 12. Study area in relation to Critical Biodiversity Areas and Ecological Support Areas (EKZNW, 2016).

3.2.6. Durban's Metropolitan Open Space System (DMOSS)

The eThekwini Municipality has a long history of open space planning, dating back to the early 1980's. At a municipal level, there are a number of biodiversity/conservation planning datasets and documents that have been produced by eThekwini Municipality's Environmental Division, one being the municipal conservation plan produced by the City which is linked to the Durban Metropolitan Open Space System (DMOSS).

DMOSS is essentially a system made up of a series of interconnected open spaces that incorporate areas of high biodiversity value and other supporting elements, delivering a range of ecosystem goods and services including water supply, food, raw materials, soil formation processes, nutrient cycling, erosion control, flood attenuation and climate change mitigation (i.e.

carbon storage capacity). The ecosystem goods and services provided free of charge by DMOSS were conservatively valued in 2017 to be in the order of at least R4.2 billion per annum, excluding the value that open space contributes to tourism. Without these free services, the municipality would require an unaffordable increase to its budget to provide these services, especially in rural areas where communities rely heavily on the natural environment for daily needs. DMOSS is mapped by the Biodiversity Planning Branch of the EPCPD (Environmental Planning and Climate Protection Department) of eThekwini Municipality using the Systematic Conservation Planning approach which is recognised at both the National and Provincial levels. The mapped coverage is incorporated into the city's Integrated Development Plan (IDP), associated Strategic Development Framework (SDF) and the regional Spatial Development Plans (SDP).

The most recent and current (2018) DMOSS coverage for the project area by eThekwini Municipality's spatial planning division is shown on the map in Figure 13 which indicates that most of the study area falls outside of DMOSS with the exception of the two canals that feed into the Durban Bay.

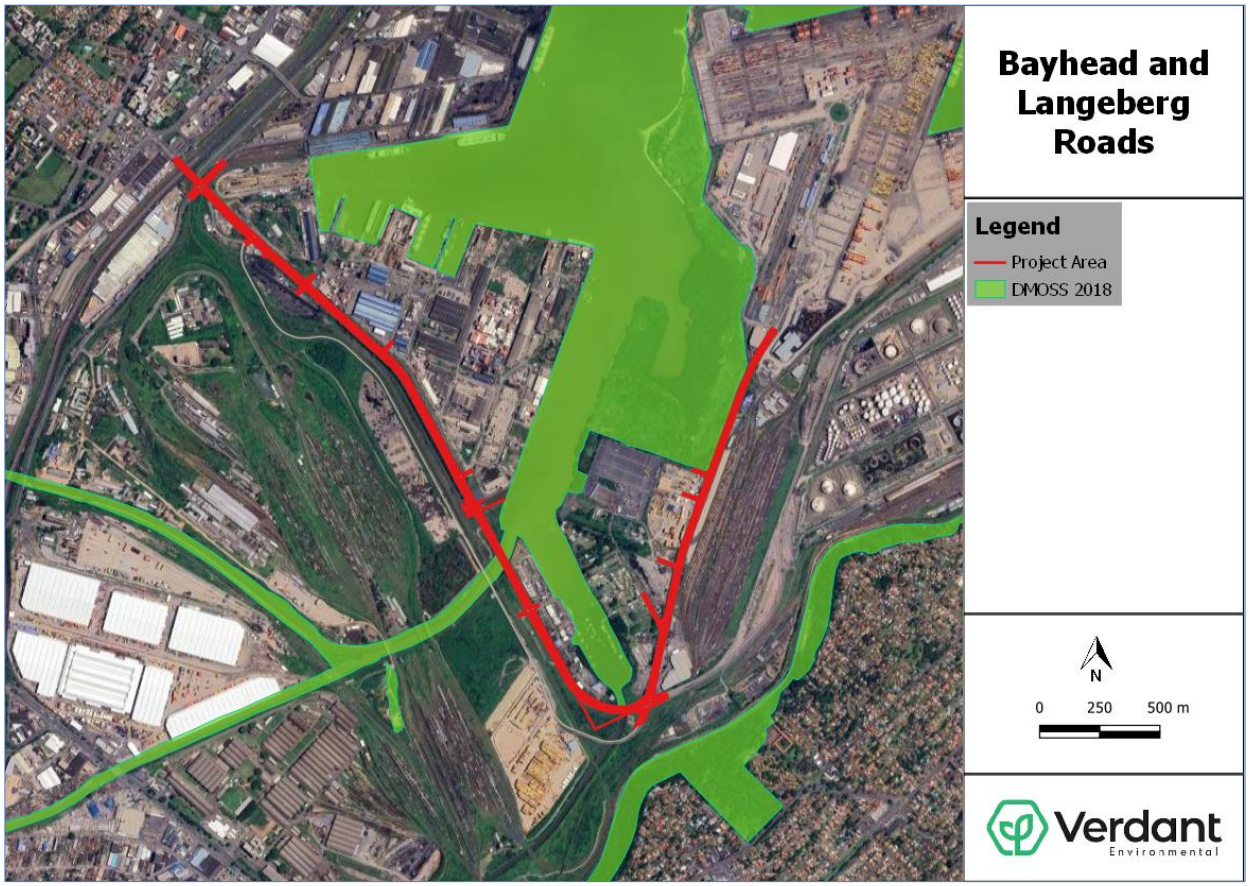

Figure 13. Map showing the extent of DMOSS coverage across the development footprint, according to eThekwini Municipality (2019).

3.2.7. Conservation Context Summary

A summary of the conservation planning and threat status of the ecological features in the study area is provided below. Noteworthy features include:

- The proposed footprint does not fall within the KBA network, although three KBAs are located within a 2 – 3 km radius of the project site namely Paradise Valley (KBA No. 213) 1.8 km to the west, Mlazi (KBA No. 165) 2 km to the east and Mhlatuzana Valley (KBA No. 162) 2.5 km to the south.
- Large portions of Bayhead Road and most of Langeberg Road is evaluated by the DFFE Screening Tool as **Very High Sensitivity** with the remainder of the footprint considered of **Low Sensitivity** for the **Terrestrial Biodiversity Theme** (Figure 5), **Low** to **High Sensitivity** for the **Plant Species Theme** (Figure 6), and **Medium to High Sensitivity** for the **Animal Species Theme** (Figure 7).

- The terrestrial vegetation types within the study area, i.e. **Northern Coastal Forest, Mangrove Forest** and **KwaZulu-Natal Coastal Belt Grassland** are currently listed as **Least Concern, Least Concern** and **Endangered** at the national level respectively in the latest National Biodiversity Assessment (SANBI, 2018).
- The terrestrial vegetation types at the provincial level namely **KwaZulu-Natal Coastal Forests: Southern Moist Coastal Lowlands Forest, Mangrove Forest** and **KwaZulu-Natal Coastal Belt Grassland** are all currently listed as **Critically Endangered** (Jewitt, 2018).
- The study area falls within the **Zululand Coast Surface Water Strategic Water Source Area** (WRC, WWF-SA & CSIR, 2017)– see Figure 11.
- Portions of the footprint and adjacent areas along Bayhead Road are classified as falling within the edge of areas classified as **Critical Biodiversity Areas (CBAs): Irreplaceable** (EKZNW, 2016) which extend beyond the footprint to the north, south and east– see Figure 12.
- Bayhead Natural Heritage Site (also known as the Bayhead Mangrove Swamps) along Langeberg Road and the canals that pass underneath Bayhead Road are flagged as part of D'MOSS (2018) – Figure 13.

4. Baseline Assessment

4.1. Floral Assessment

4.1.1. Description of Vegetation Communities

The vegetation communities encountered on site were mapped as follows (Figures 14 - 17) and take into account the disturbance history on site:

1. Alien dominated woodland/shrubland
2. Road Verges with scattered trees and mowed lawn
3. Hygrophilous Grassland and Scattered Indigenous Trees
4. Mixed alien and indigenous woodland

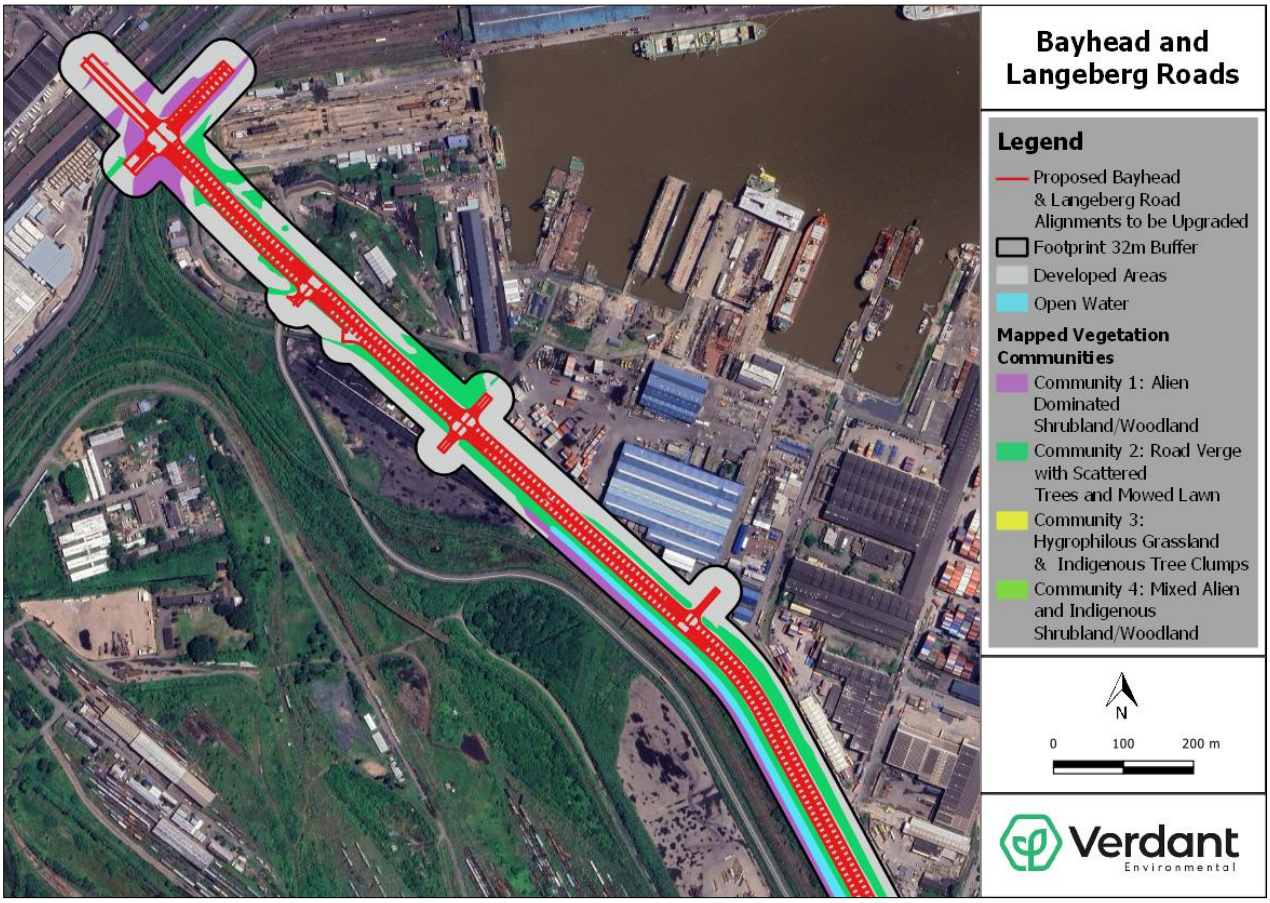

Figure 14. Mapped vegetation communities along the north-western portion of Bayhead Road.

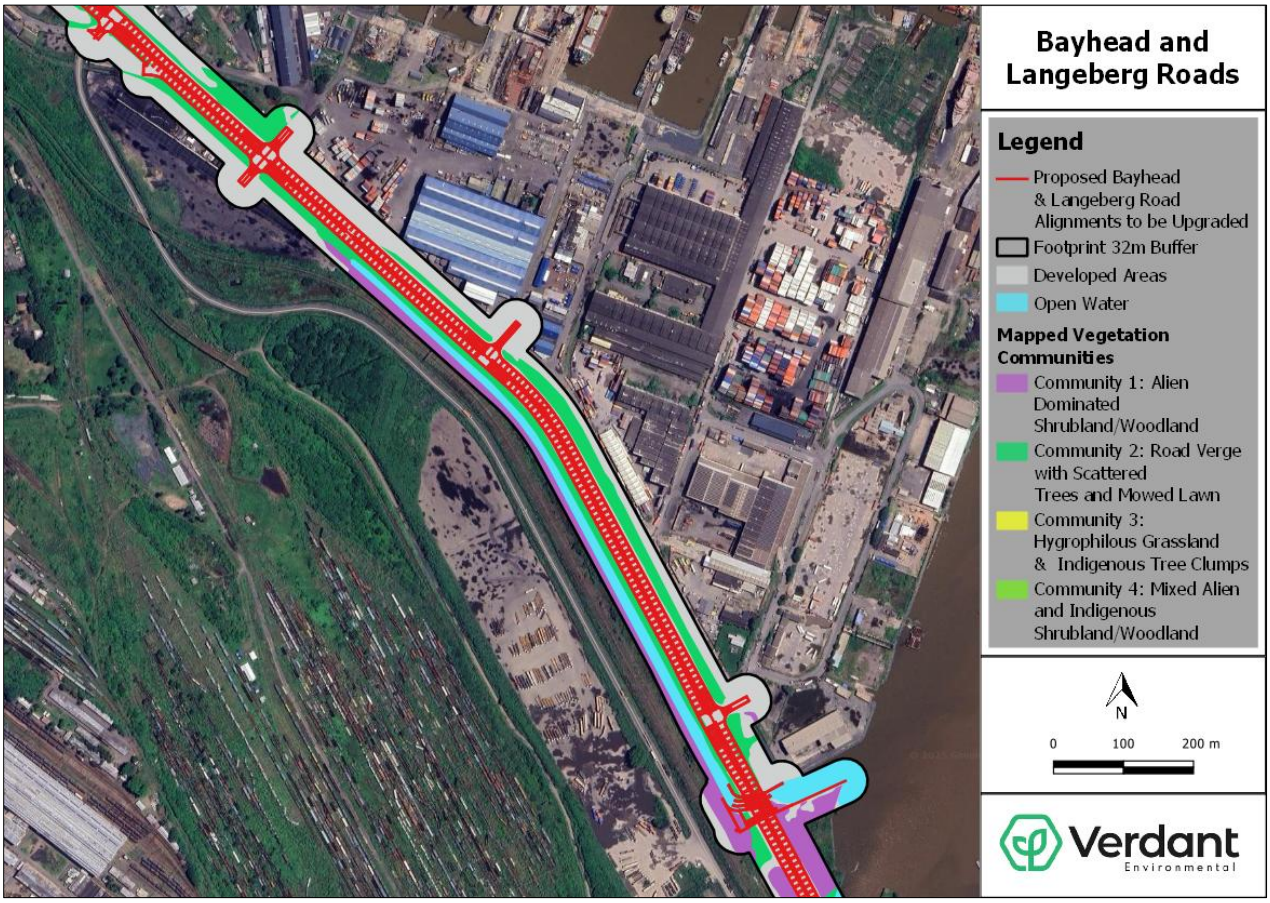

Figure 15. Mapped vegetation communities along the mid-section of Bayhead Road.

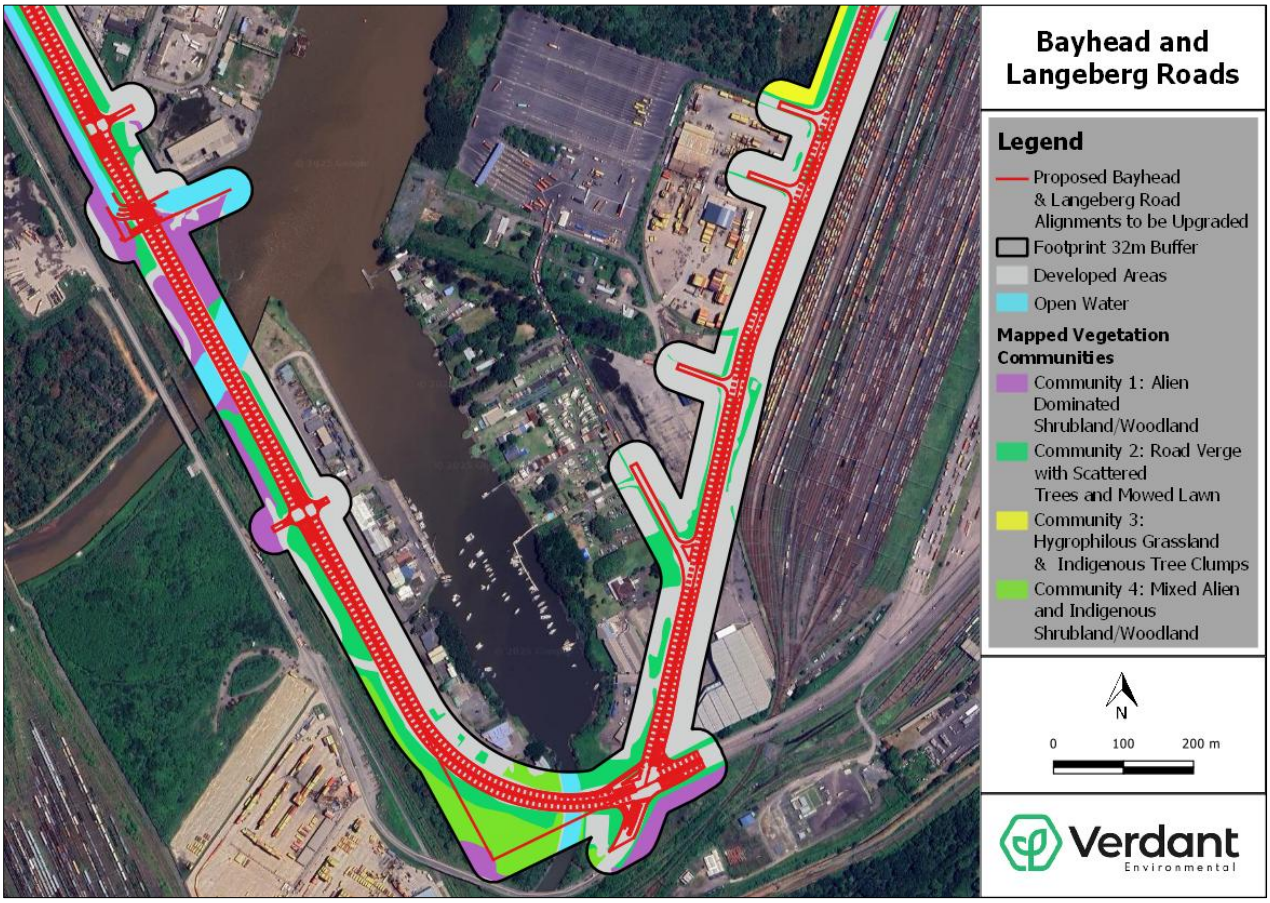

Figure 16. Mapped vegetation communities along the south-eastern portion of Bayhead Road and the south-western portion of Langeberg Road.

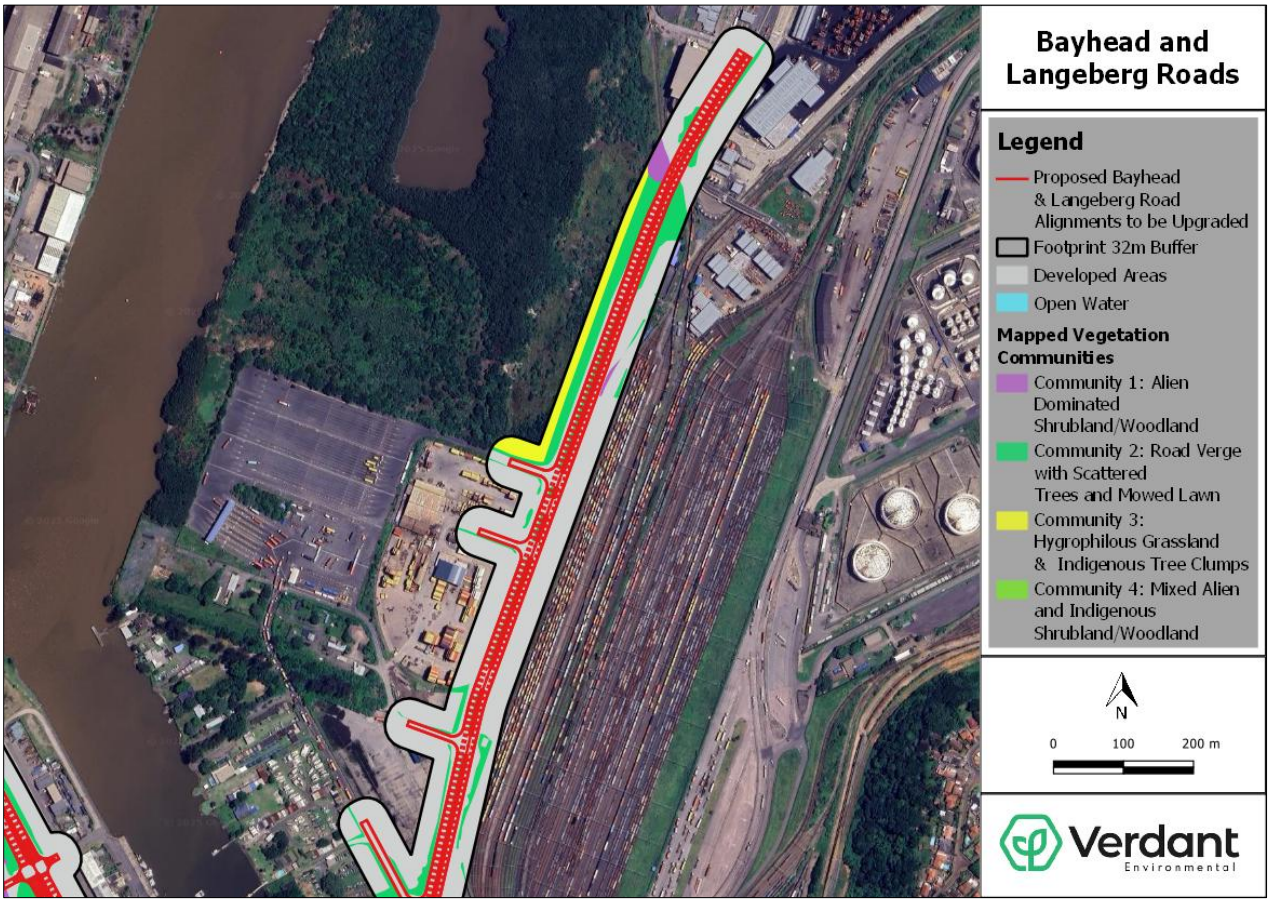

Figure 17. Mapped vegetation communities along the north-eastern section of Langeberg Road.

A brief description of the vegetation communities is provided in the sections that follow.

4.1.1.1. Community 1: Alien dominated woodland/shrubland

This community occurs along the old railway line and in areas not maintained as part of the road verges or road servitude within the study area and is primarily dominated by almost monotypic dense stands of *Tecoma stans* in some areas with the margins of these dense stands adjoining maintained road verges comprising more of a mixture of other alien invasive species including *Ricinus communis*, *Lantana camara*, *Tithonia diversifolia*, *Chromolaena odorata*, *Solanum mauritianum*, *Tagetes minuta*, *Bidens pilosa*, *Ipomoea purpurea* and *Cascabela thevetia*.

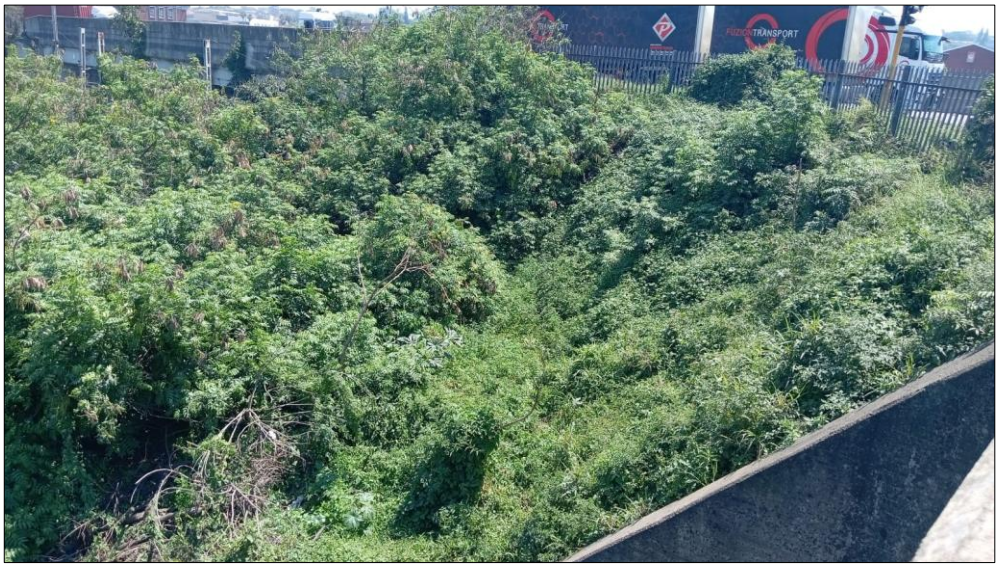

Figure 18. **Photo 01:** View of a mixture of dense alien vegetation growing along the railway line embankment that runs underneath the north-westernmost section of Bayhead Road.

Figure 19. **Photo 02:** *Tecom stans* invasion visible in the foreground and background (Community 1) with mowed lawn in between (Community 2) along Bayhead Road.

4.1.1.2. Community 2: Road Verges with Scattered Trees and Mowed Lawn

These areas primarily comprised shortly cropped grass cover with a mixture of ruderal grasses including *Sporobolus africanus, Digitaria eriantha, Sporobolus pyramidalis*, *Panicum maximum*, *Digitaria eriantha*, *Imperata cylindrica* (in localised patches along Langeberg Road) and *Cynodon dactylon* with low scattered cover of *Senecio madagascariensis* as well as *Plantago lanceolata*, *Heliotropium amplexicaule*, *Conyza sp*, *Tagetes minuta* and *Bidens pilosa* in some areas. Scattered clumps of trees which include a mixture of indigenous and planted exotic trees and shrubs are interspersed between more open areas of shortly cropped grass. Vegetation within these tree clumps include various indigenous *Ficus* species, *Brachylaena discolour*, *Strelitzia nicolai*, *Phoenix reclinata*, *Erythrina lysistemon* and *Vachellia xanthophloea* and exotic species including *Casuarina equisetifolia*, *Plumeria sp*, and *Acalypha wilkesiana* with *Ipomoea purpurea* growing over this exotic hedge. More shaded areas underneath mature trees were dominated by *Asystasia gangetica*. Low scattered cover of alien shrubs such as *Ricinus communis*, *Solanum mauritianum* and *Chromolaena odorata* were also noted in some areas. It was noted during the rapid site visit that cement barriers had been installed along the proposed alignment already (See Photo 4) and that construction rubble had been piled along the road verge in one instance (see Photo 7).

Figure 20. **Photo 03:** Example of a mowed road verge with *Casuarina equisetifolia* and other planted trees and shrubs visible in the foreground and background along Bayhead Road.

Figure 21. **Photo 04:** Mowed lawn with scattered ruderal weed cover along Bayhead Road.

Figure 22. **Photo 05:** Shortly cropped lawn with *Phoenix reclinata* visible in the background along Langeberg Road.

Figure 23. **Photo 06:** Shortly cropped lawn with *Phoenix reclinata* clumps visible in the background along Langeberg Road.

Figure 24. **Photo 07:** Construction rubble located along the road verge on Bayhead Road.

4.1.1.3. Community 3: Hygrophilous Grassland and Scattered Indigenous Trees

This vegetation community adjoins the road verge along Langeberg Road and occurs within the fenced off Bayhead Heritage Site. Along the fenceline looking through the other side the

vegetation comprised a hygrophilous grassland dominated by *Imperata cylindrica* with *Digitaria eriantha* also prevalent in some areas. Scattered tree cover along the fenceline but within the reserve included clumps of *Brachylaena discolour*, mixed with *Stelitzia nicolai*, *Phoenix reclinata* and *Clerodendrum glabrum*.

Figure 25. **Photo 08:** View of hygrophilous grassland with scattered tree cover.

Figure 26. **Photo 09:** View of hygrophilous grassland with scattered tree cover.

4.1.1.4. Community 4: Mixed alien and indigenous woodland/shrubland

A small patch on the south-easternmost end of Bayhead Road adjoining the Amanzimyana Stream (which has been canalised), appeared to exhibit a higher cover and diversity of indigenous species with alien invasives also represented but not as extensively as in Community 1. Indigenous species represented within this patch of woodland/shrubland included moderate cover of *Trema orientalis*, moderate cover of *Clerodendrum glabrum*, high cover of *Brachylaena discolour* and *Strelitzia nicolai* low cover of *Apodytes dimidiata* and *Searsia chirindensis.* This was interspersed with invasive shrubs such as *Chromolaena odorata, Ricinus communis* and *Lantana camara*, Poinsettia (*Euphorbia heterophylla*), *Tagetes minuta*, with the understorey characterised by a mixture of *Asystasia gangetica*, *Senecio tamoides*, *Rivina humilis* low cover of *Smilax anceps* intertwined amongst other vegetation and low cover of *Morus alba* and *Tecoma stans*. Along the canal vegetation comprised a mixture of *Strelitzia nicolai*, *Brachylaena discolour* and *Chrysanthemoides monilifera* mixed with *Tecom stans*, *Lantana camara* and *Chromolaena odorata* primarily.

Figure 27. **Photo 10:** View of Community 4 from road above.

Figure 28. **Photo 11:** View of Community 4.

4.1.2. Rare, Threatened and Protected Species

4.1.2.1. Red Listed Species

No Red Listed species were encountered.

4.1.2.2. Orange Category Species

No Orange Category species were encountered.

4.1.2.3. Protected Species

According to the National Forests Act (Act No. 84 of 1998):

Communities of indigenous trees where the crowns are contiguous are considered forest and are similarly protected, although licenses may ultimately not be required for vegetation that is not tall or closed enough to constitute forest (such as thicket vegetation). "*No person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister*."

Disturbance, removal, pruning or transplanting of such a protected tree species requires a license from the administrators of the National Forests Act, in this case the Department of Environment, Forestry and Fisheries (DEFF) based in Pietermaritzburg. No such protected tree species were found during the rapid site visit, although some are likely to occur in the surrounding area (e.g. *Ficus trichopoda*, *Barringtonia racemosa*, *Sideroxylon inerme subsp. inerme*, *Bruguiera gymnorrhiza* and *Rhizophora mucronata*.

The KwaZulu-Natal provincial conservation ordinance provides special protection to a range of indigenous plant species, including other tree species and smaller herbs. These plants may not be disturbed, damaged, destroyed or relocated without permit authorization from the provincial conservation authority Ezemvelo KwaZulu-Natal Wildlife (EKZNW).

The KwaZulu-Natal provincial conservation ordinance is dated and specially protects a wide range of plant families, genera, groups as well as some individual species. However, many of the members of these families, genera or groups are not threatened and some are common. This results in a somewhat paradoxical situation in which many quite common species, which are not threatened, require that a permit be obtained from Ezemvelo KZN Wildlife before they can be disturbed, destroyed or relocated. No such species were found during the rapid site visit, although some may occur in the surrounding area.

4.1.3. Floral Ecological Importance and Sensitivity

Communities 1 and 2 are considered of 'Very Low' Site Ecological Importance due to the moderate to high cover of alien plant invasion observed and the high level of fragmentation and edge impacts that have resulted in a deterioration of both their biodiversity and their level of functioning. Community 4 is considered of 'Low' Site Ecological Importance, as although this community has also been highly impacted by direct loss and fragmentation it still comprises some diversity of indigenous vegetation and is considered in better condition in comparison to Community 1 and Community 2. Community 3 is considered of 'Medium' Site Ecological Importance as this community occurs within the Bayhead Heritage Site with indigenous vegetation comprising most of the cover, with low alien plant invasion observed. However, this community is also isolated and fragmented due to historical development in the area and therefore although in an intact state this Community should have a 'High' conservation importance rating (driven by the Critically Endangered threat status of the reference vegetation type at the provincial scale), the area adjoining the road within 32m of the project site has likely

been affected by edge impacts in the past and therefore the conservation importance rating has been revised to 'Medium' and likewise its functional integrity has been compromised and has been rated as 'Medium' resulting in a 'Medium' biodiversity importance rating.

Based on the SEI Ratings for the various vegetation communities' general guidelines for each SEI rating category have been provided by SANBI (2020 – see Table 7 in this report) and are outlined briefly below:

- **Very Low SEI (for Community 1 & 2) -** Minimization mitigation - Development activities of medium to high impact acceptable and restoration activities may not be required.
- **Low SEI (for Community 4)** – Minimisation and restoration mitigation – development of activities of medium to high impact acceptable followed by appropriate restoration activities.
- **Medium (for Community 3)** – Minimisation and restoration mitigation – development of activities of medium impact acceptable followed by appropriate restoration activities.

Table 12. A summary of the Site Ecological Importance (SEI) ratings for vegetation communities on site.

	Community 1: Alien Dominated Woodland/Shrubland	Community 2: Road Verge with Scattered Trees and Mowed Lawn	Community 3: Hygrophilous Grassland with Scattered Indigenous Trees	Community 4: Mixed Alien and Indigenous Woodland
CONSERVATION IMPORTANCE	Very Low	Low	Medium	Medium
FUNCTIONAL INTEGRITY	Very Low	Low	Medium	Low
BIODIVERSITY IMPORTANCE	Very Low	Low	Medium	Low
RECEPTOR RESILIENCE	Very Low	Very Low	Medium	Medium
SITE ECOLOGICAL IMPORTANCE RATING	Very Low	Very Low	Medium	Low

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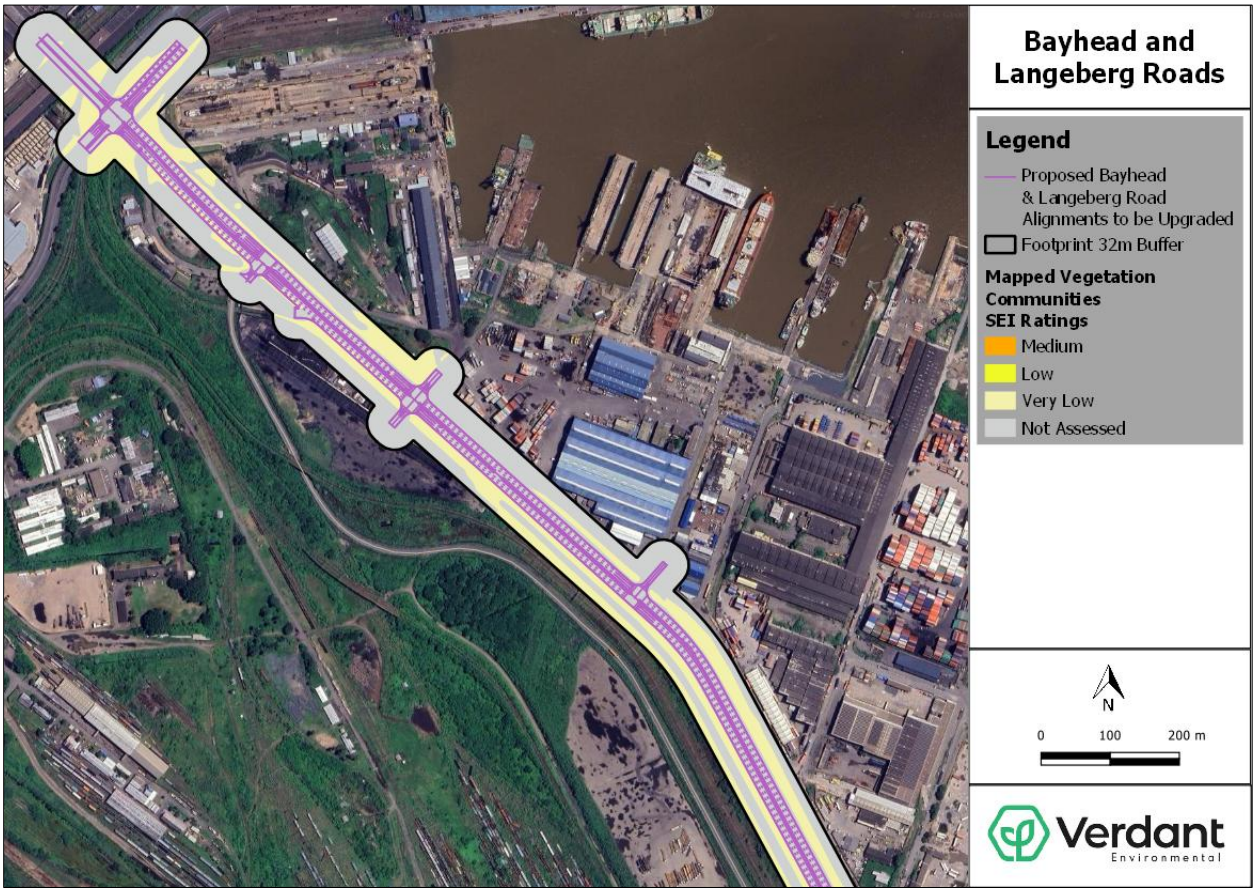

Figure 29. EIS ratings of mapped vegetation communities along the north-western portion of Bayhead Road.

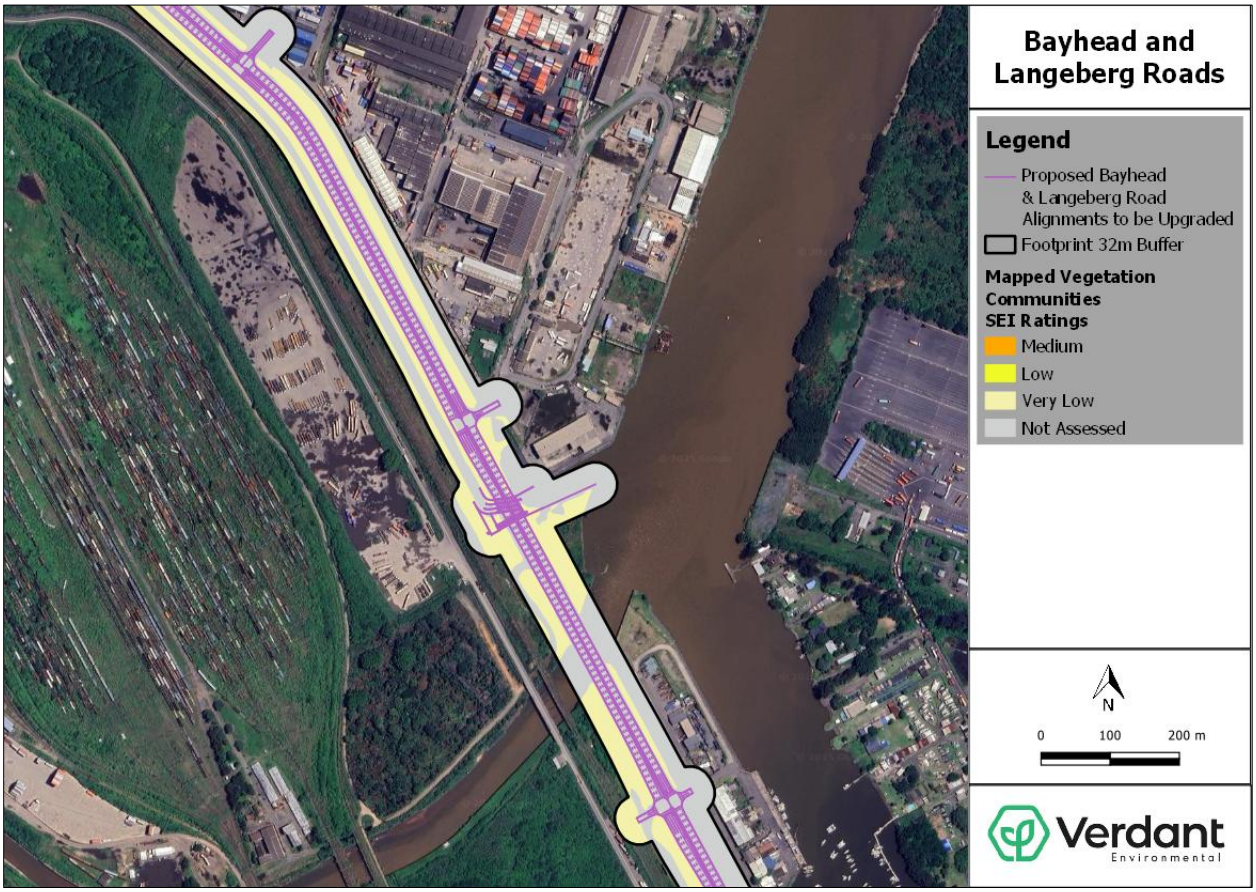

Figure 30. EIS ratings of mapped vegetation communities along the mid-section of Bayhead Road.

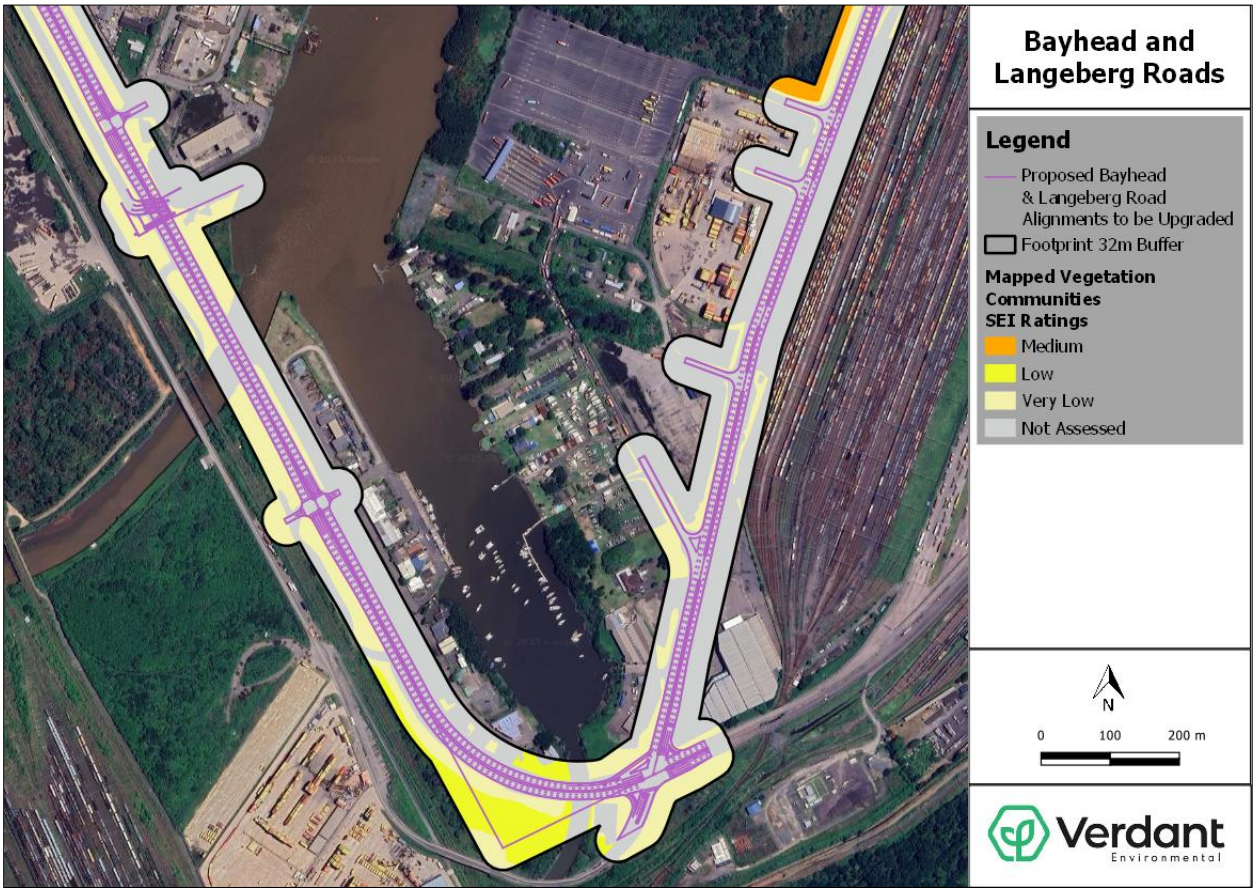

Figure 31. EIS ratings of mapped vegetation communities along the mid-section of Bayhead Road.

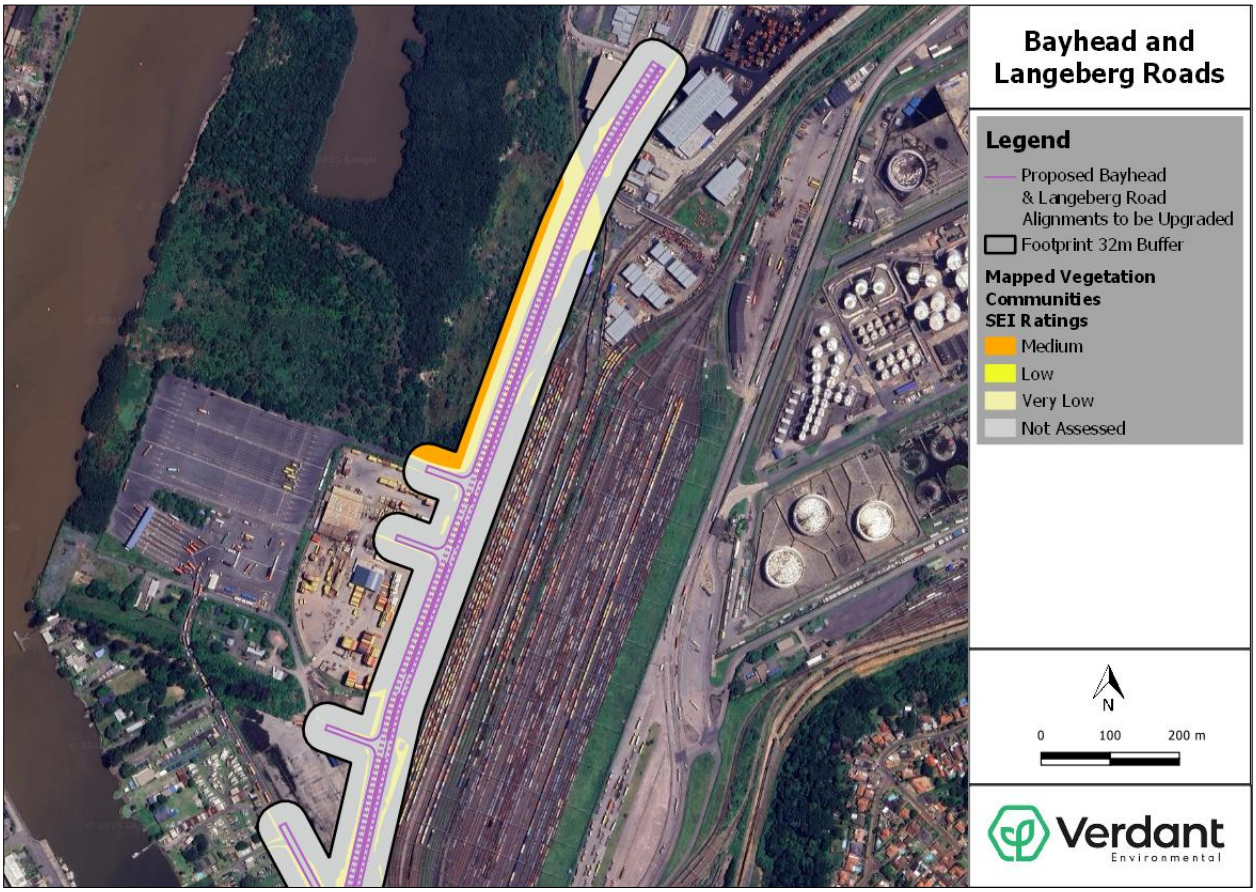

Figure 32. EIS ratings of mapped vegetation communities along the north-eastern section of Langeberg Road.

4.2. Faunal Assessment

4.2.1. Description of Faunal Habitats

Vegetation is described in more detail in the previous section, but a brief description of broad faunal habitats is given here. Examination of the site and areas immediately adjacent to it showed that the large majority of the footprint falls within existing transformed areas with hardened surfaces, and lawn verges immediately adjacent to existing road infrastructure including localised patches of secondary grassland along the southern end of Bayhead Road (Faunal Habitat 2) and areas of dense alien vegetation (Faunal Habitat 1). A portion of the 32m buffer area extends into the Bayhead Heritage Site along Langeberg Road and comprises grassland with scattered indigenous trees (Faunal Habitat 3) and there are some localised areas in the southern section

of Bayhead Road that comprise thickets of mixed indigenous and alien vegetation (Faunal Habitat 4).

The majority of the footprint offers no or very low value to faunal communities, given its transformed or highly disturbed nature. However, Faunal Habitat 3 within the Bayhead Heritage Site and Faunal Habitat 4 (localised patches of mixed indigenous and alien thicket along the southern end of Bayhead Road) provide valuable habitat for the KwaZulu Dwarf Chameleon (*Bradypodion melanocephalum*). These two faunal habitats, as well as areas of secondary grassland and in some cases dense alien/indigenous thicket that is more degraded provide some value as linkages for the KwaZulu Dwarf Chameleon (*Bradypodion melanocephalum*). These more degraded areas of secondary grassland and alien invaded thicket of very low value for most species have been grouped into a fifth faunal habitat to flag their importance as an ecological corridor for this species (Faunal Habitat 5 secondary grassland and mixed indigenous and alien thicket).

Faunal Habitats 1, 2, 4, and 5 are of low value for the majority of fauna (with the exception of the KwaZulu Dwarf Chameleon (*Bradypodion melanocephalum*) in the case of habitat 4 and 5 as mentioned above), and faunal communities will be species-poor, and primarily consist of generalist, disturbance-tolerant species across all fauna groups.

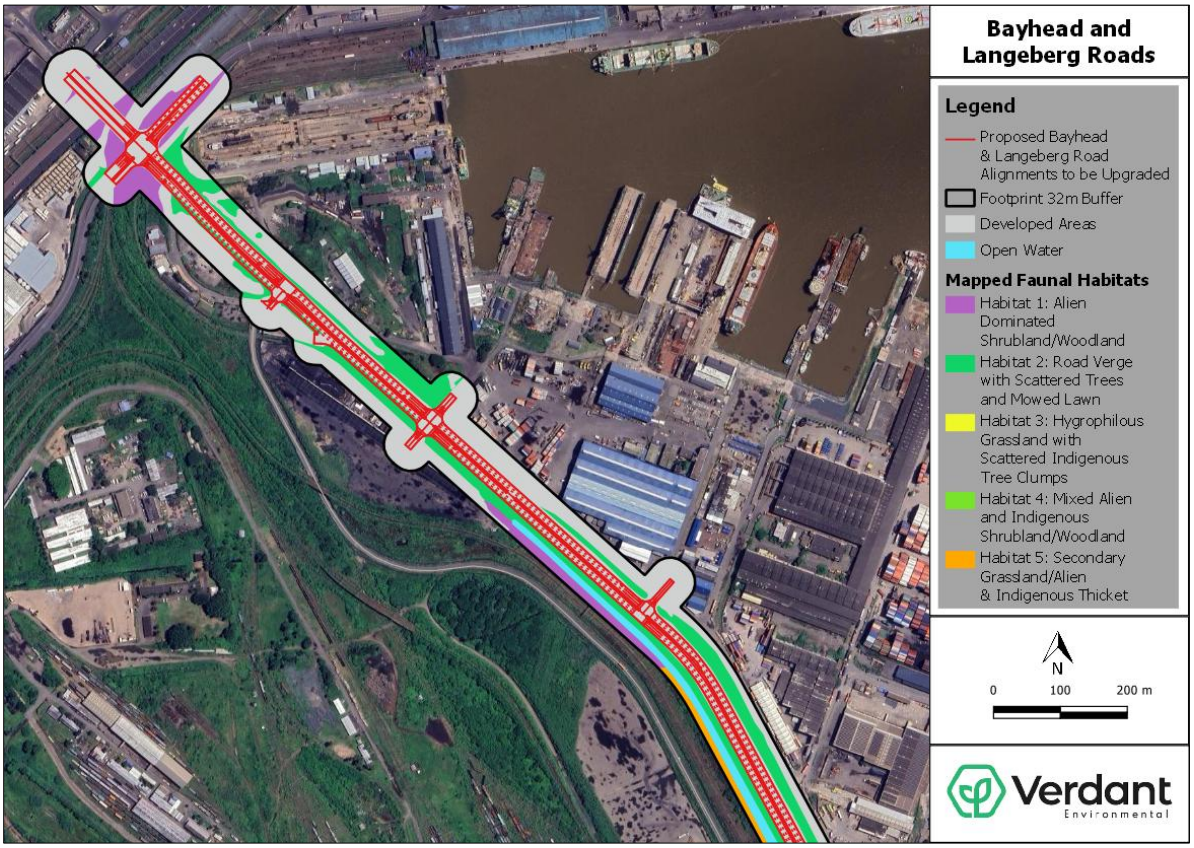

Figure 33. Mapped faunal habitats along the north-western portion of Bayhead Road.

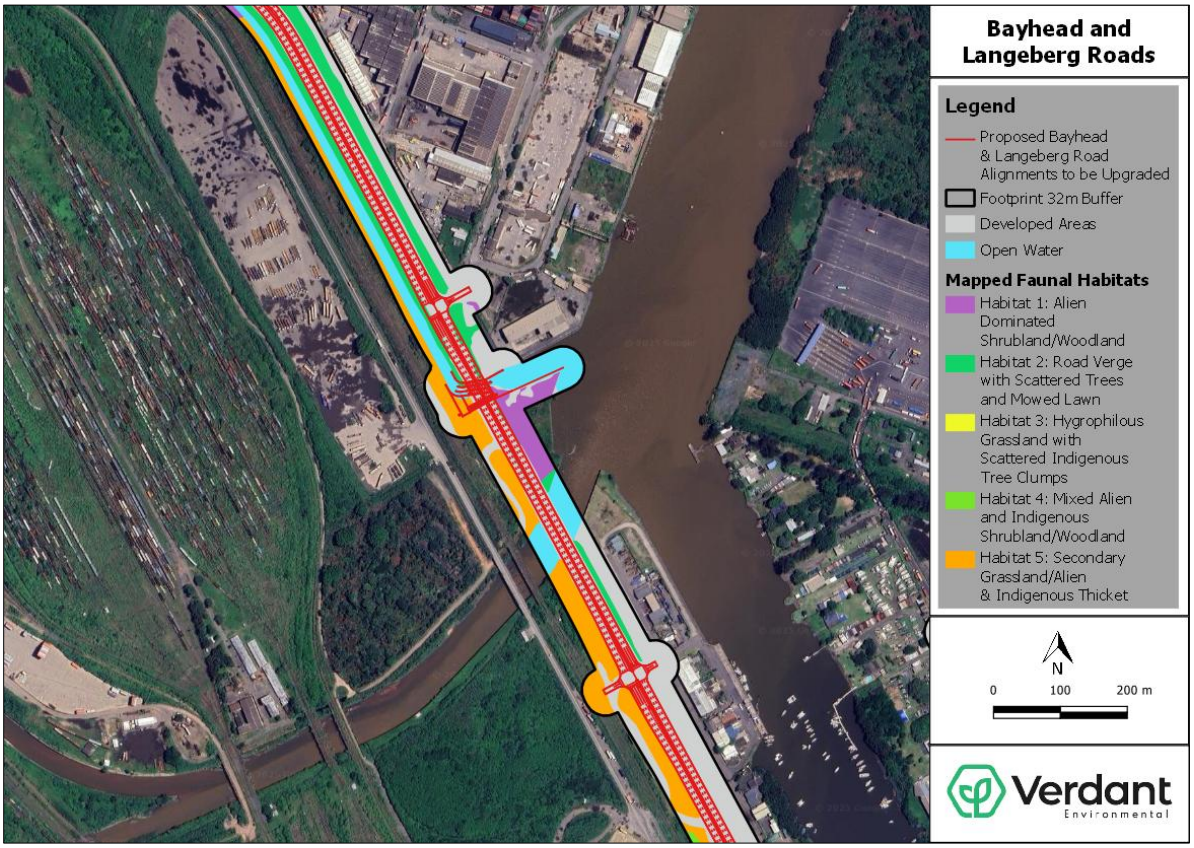

Figure 34. Mapped faunal habitats along the mid-section of Bayhead Road and the south-western section of Langeberg Road.

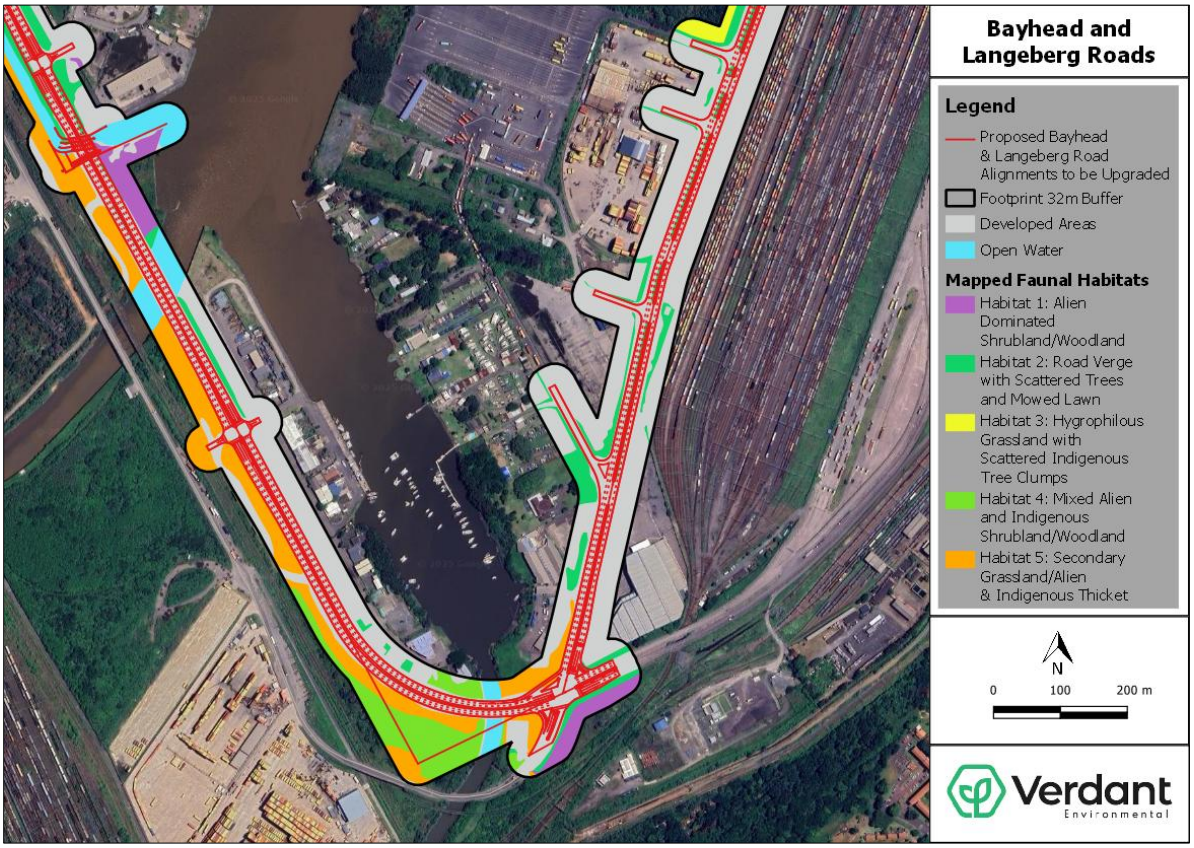

Figure 35. Mapped faunal habitats along the south-eastern end of Bayhead Road and the south-western end of Langeberg Road.

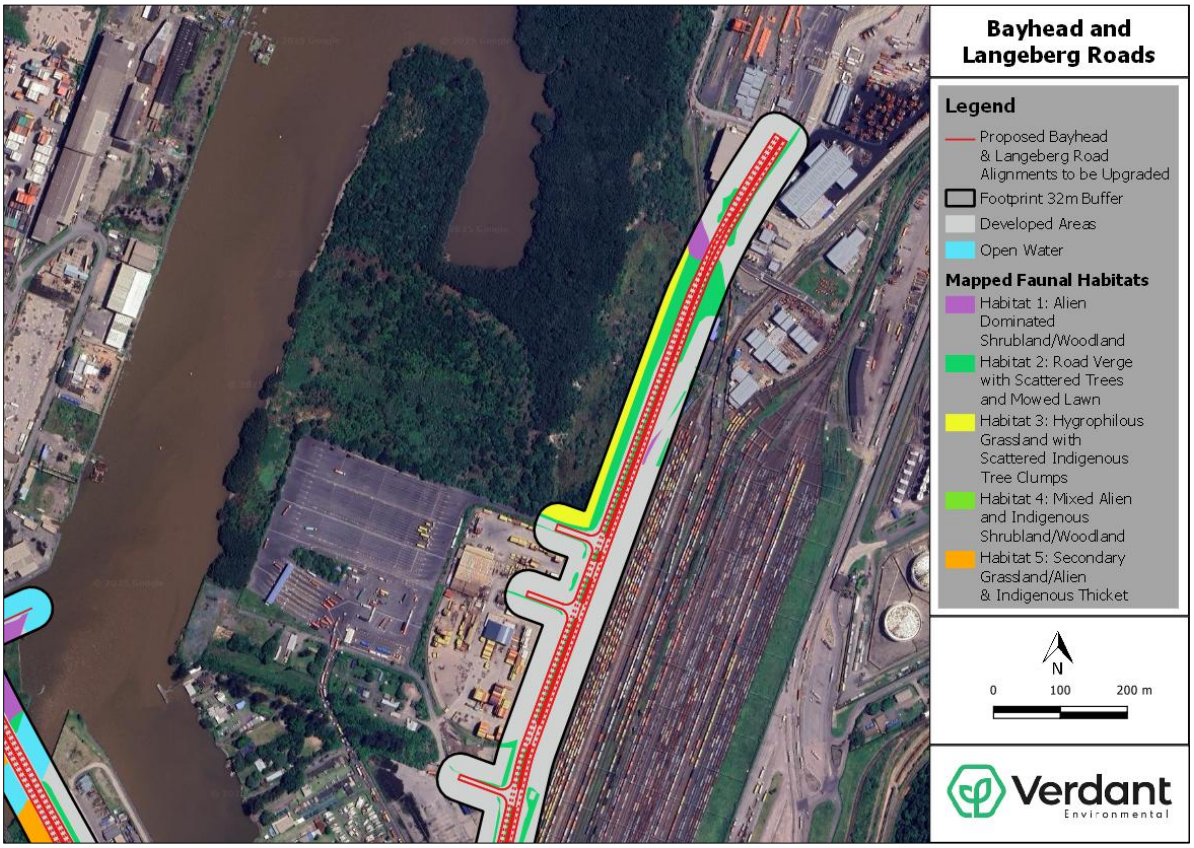

Figure 36. Mapped faunal habitats along the north-eastern end of Langeberg Road.

4.2.2. Faunal Potential Occurrence Assessment

The vast majority of SCC known from the broader area will not be present within or in close proximity to the proposed development. However, one sensitive species, the KwaZulu Dwarf Chameleon *Bradypodion melanocephalum*, is known to occur in the broader area, and does use these vegetation patches described above, which function both as supporting habitat and as areas of connectivity for the species in the landscape (Harvey 2019, EKZNW database records, iNaturalist). Given the limited remaining patches of vegetation in the broader area, and the tenuous connectivity they provide for this species, they need to be kept at the greatest extent and quality possible. These areas maintain connectivity between vegetated areas and chameleon subpopulations 1) west of the Bayhead Road, 2) the vegetated areas on the Bluff ridge, and 3) Bayhead Natural Heritage Site. Although the chameleons will be absent from the majority of the footprint, they will utilise a block of vegetation in the southern portion of the footprint, south-west of the Bayhead-Langeberg Road intersection. They will also utilise grassy areas immediately adjacent to the proposed footprint in the southern third of the Bayhead Road section.

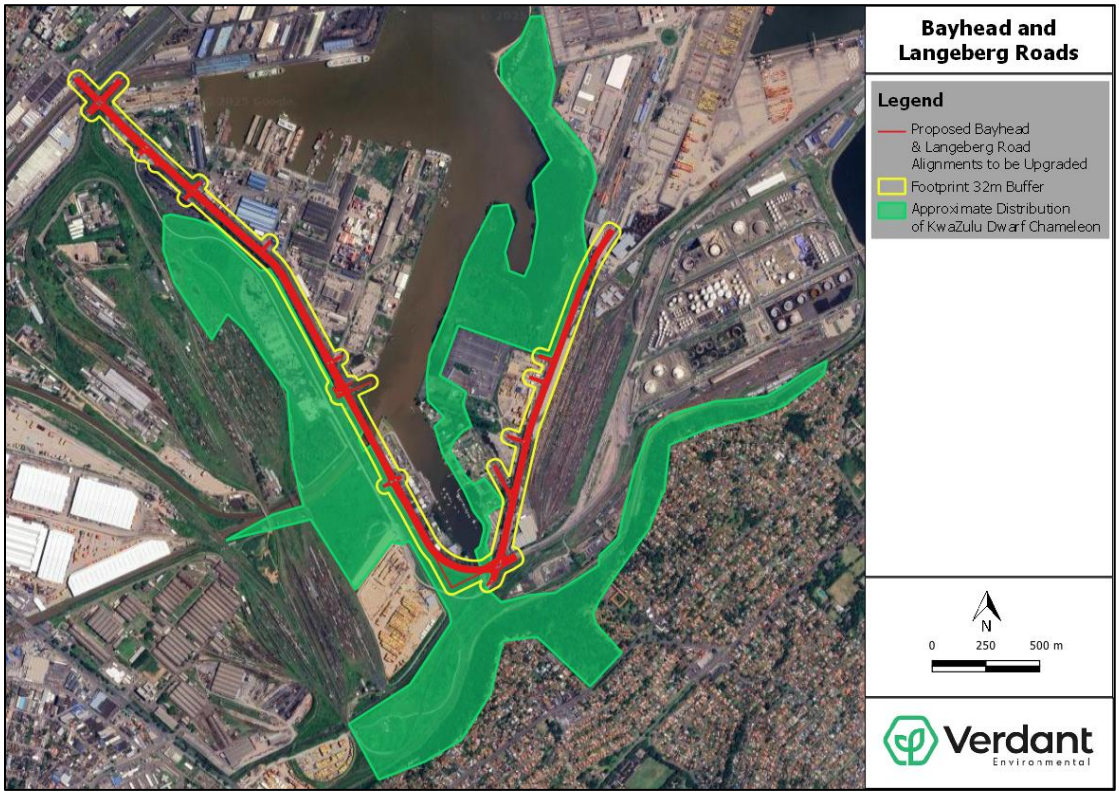

Figure 37. Approximate distribution and movement corridors of KwaZulu Dwarf Chameleon relative to the proposed footprint.

4.2.3. Faunal Ecological Importance and Sensitivity

Within the footprint, all areas can be considered to be of Very Low SEI, with the exception of the southern vegetation portion shown in Figures 27 - 30, which is best evaluated as Medium. (BI – Medium, FI = Medium, Resilience – Medium). For an SEI categorisation of Medium, the following guidance criteria are given (SANBI 2020):

- **Medium SEI** - Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.

Table 13. A summary of the Site Ecological Importance (SEI) ratings for faunal habitats on site.

	Habitat 1: Alien Dominated Woodland/Shrubland	Habitat 2: Road Verge with Scattered Trees and Mowed Lawn	Habitat 3: Hygrophilous Grassland with Scattered Indigenous Trees	Habitat 4: Mixed Alien and Indigenous Woodland	Habitat 5: Road Verge with Secondary Grassland & Mixed Alien & Indigenous Woodland/Shrubland suitable for KwaZulu Dwarf Chameleons
CONSERVATION IMPORTANCE	Very Low	Low	Medium	Medium	Medium
FUNCTIONAL INTEGRITY	Very Low	Low	Medium	Medium	Medium
BIODIVERSITY IMPORTANCE	Very Low	Low	Medium	Medium	Medium
RECEPTOR RESILIENCE	Very High	Very High	Medium	Medium	Medium
SITE ECOLOGICAL IMPORTANCE RATING	Very Low	Very Low	Medium	Medium	Medium

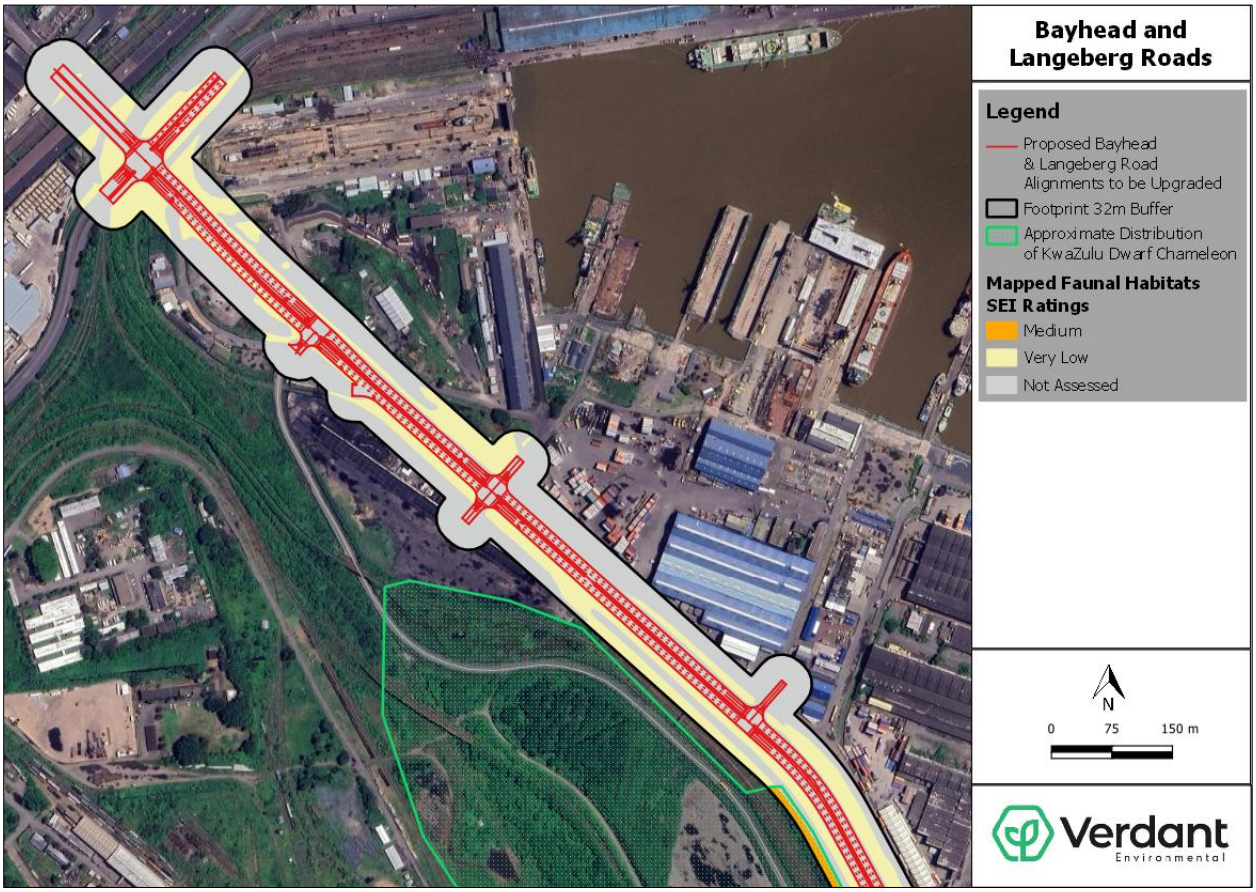

Figure 38. EIS ratings of faunal habitat value mapped along the north-western portion of Bayhead Road.

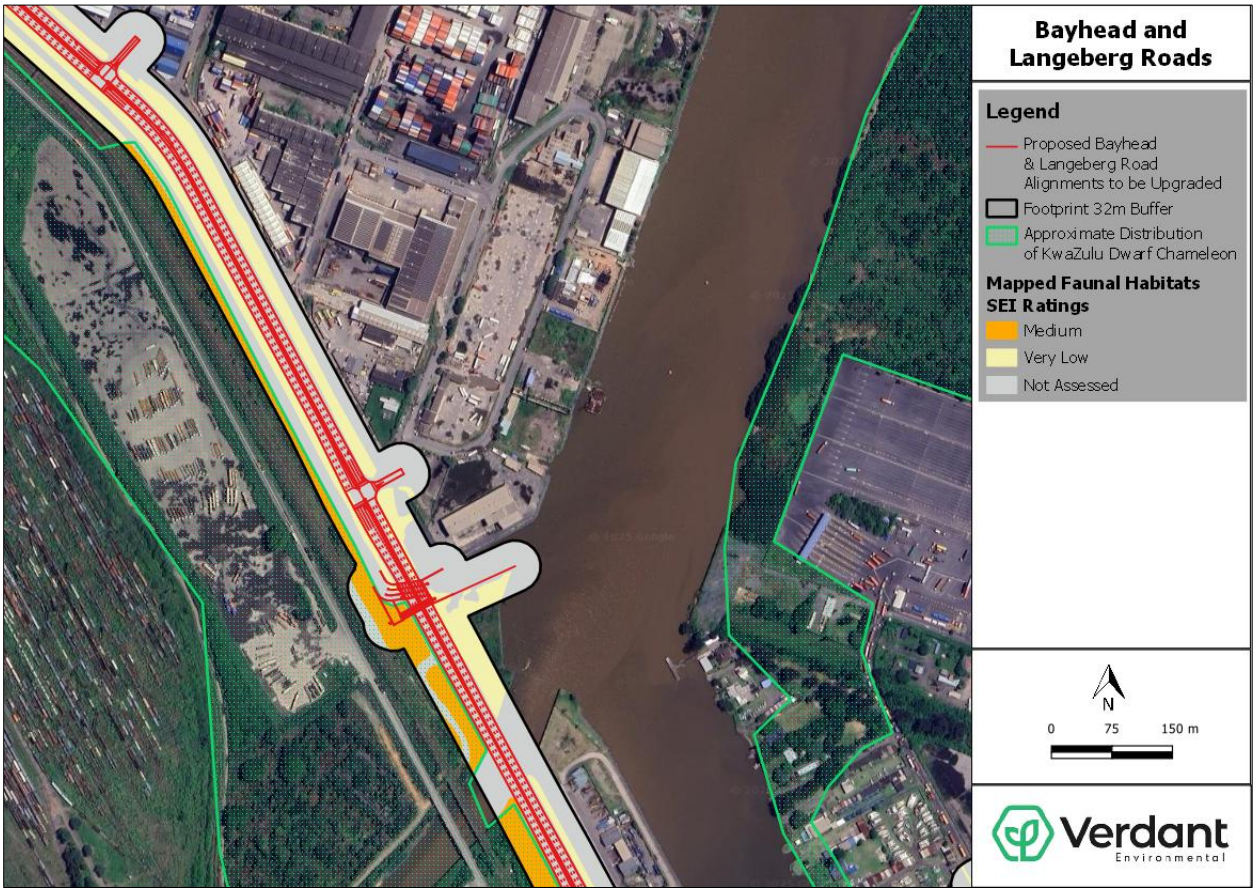

Figure 39. EIS ratings of faunal habitat value mapped along the mid-section of Bayhead Road.

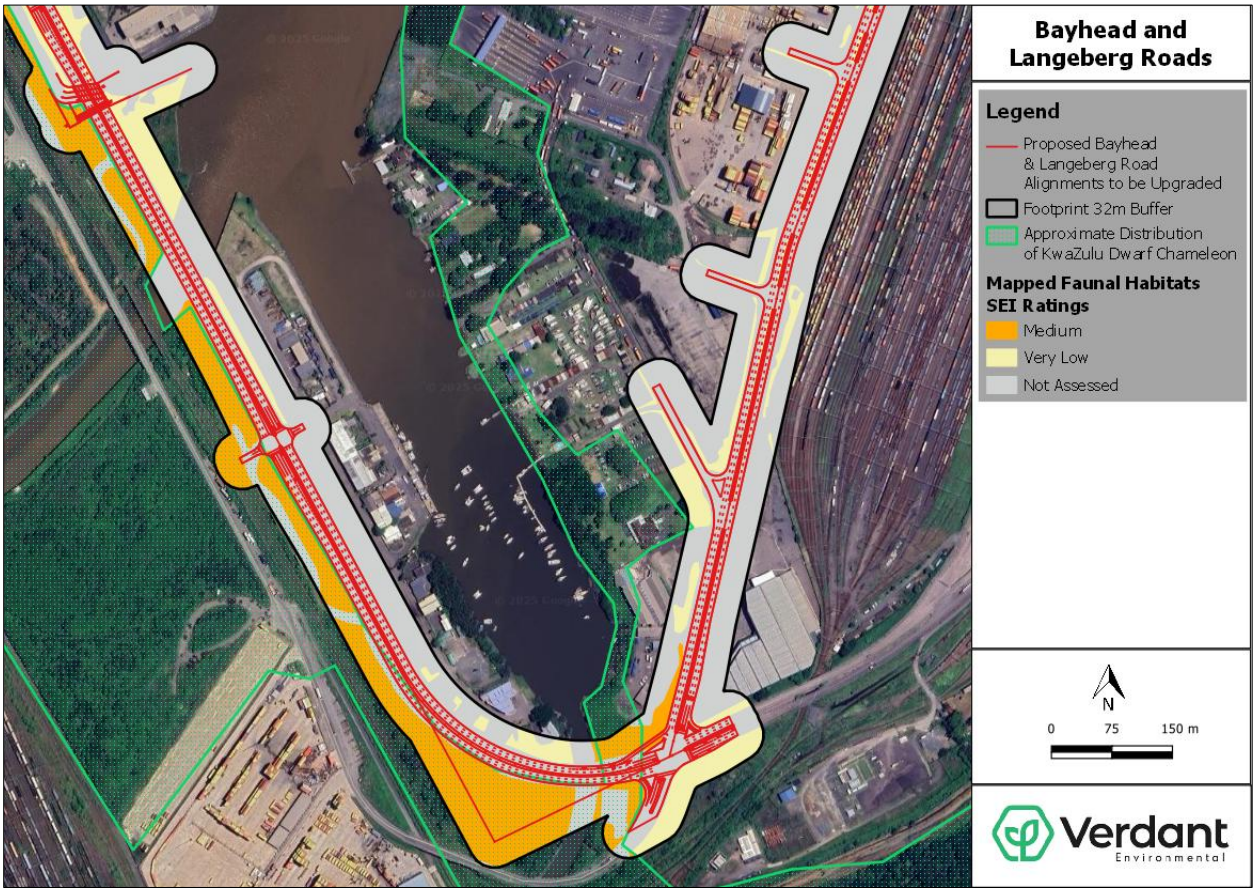

Figure 40. EIS ratings of faunal habitat value mapped along the south-eastern end of Bayhead Road and the south-western portion of Langeberg Road.

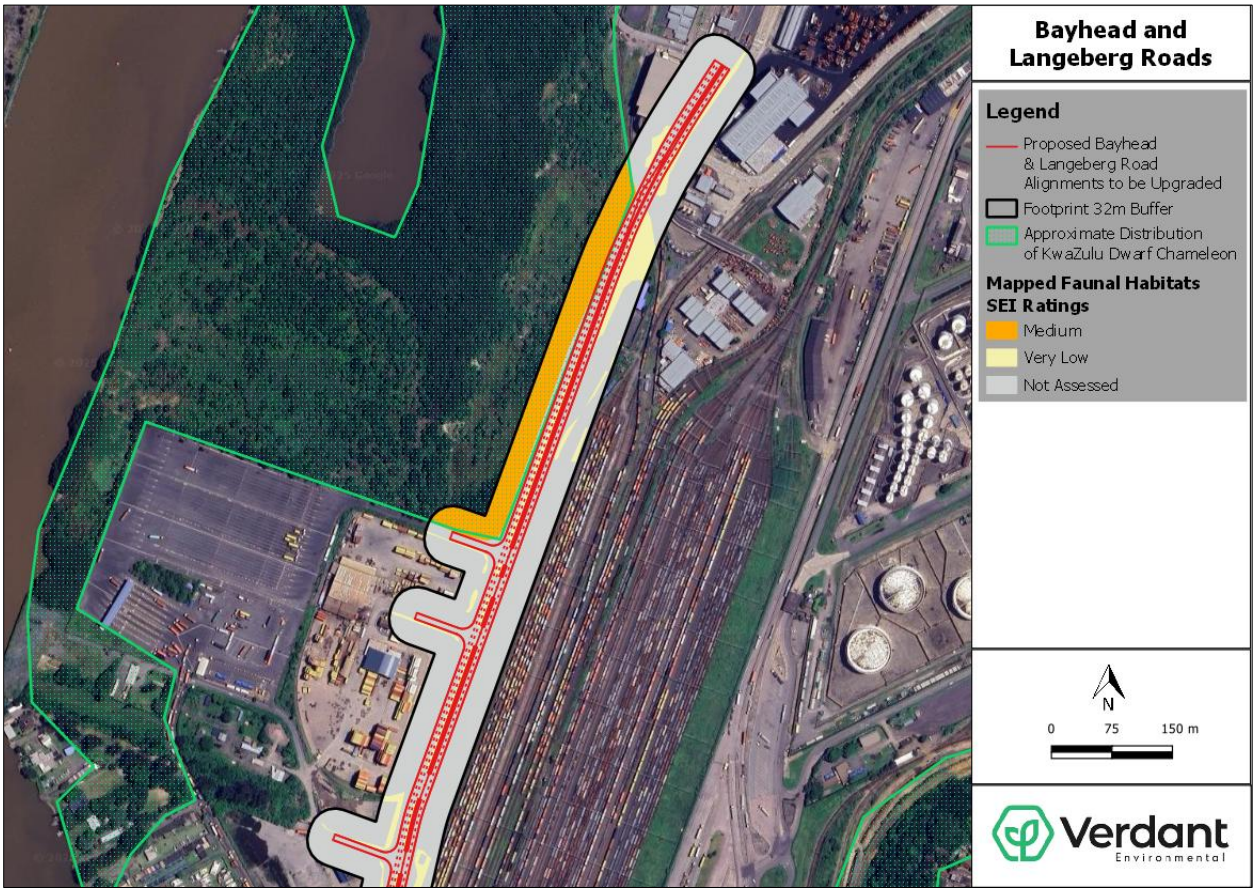

Figure 41. EIS ratings of faunal habitat value mapped along the north-eastern section of Langeberg Road.

5. Recommended Mitigation Measures

This section outlines the mitigation measures recommended to avoid, reduce / minimise, anticipated terrestrial ecosystem impacts as well as measures to rehabilitate affected ecosystems.

'Impact Mitigation' is a broad term that covers all components involved in selecting and implementing measures to conserve biodiversity and prevent significant adverse impacts as a result of potentially harmful activities to natural ecosystems. The mitigation of negative impacts on terrestrial ecosystems is a legal requirement for authorisation purposes and must take on different forms depending on the significance of impacts and the particulars of the target area being affected.

5.1. Project Planning and Design Measures

5.1.1. No-Go Areas and Buffer Zone Determination

'Buffer zones' (also termed development "set-backs") are essentially strips of vegetated undeveloped land typically designed to act as a protective barrier between human activities and sensitive habitats such as grasslands and forests. Research shows that buffer zones are useful at performing a wide range of functions such as sediment trapping and nutrient retention, and in doing so, play an important role in protecting terrestrial ecosystems from the adverse impacts that are typically associated with various land-uses and developments. Although there are no legislative requirements regarding the establishment of buffers around important / sensitive terrestrial ecosystems in the South African legislation, the application of buffers is aligned with the principles of the National Environmental Management Act (1998), which is to minimise and reduce impacts to important and sensitive ecosystems and apply duty of care in respect to impacts to the natural environment.

As the proposed project is a road upgrade project, buffer zones and no-go areas are not applicable. Rather the key measures are that the extent of the working and operational footprints

be reduced as far as practically possible and that this footprint is confined to areas already modified and transformed. In particular, the impacts to the habitats in the southern periphery of the footprint, west of the Bayhead-Langeberg Road intersection, must be minimised and care must be taken not to disturb vegetation immediately adjacent to the footprint in this area, as this vegetation supports KwaZulu Dwarf Chameleons, and is already highly reduced in extent. In addition, strict mitigation measures will be needed to ensure that impacts are strictly confined to the approved development footprint only.

5.1.2. Road Stormwater Management

When revising stormwater infrastructure for the road, it will be important to incorporate the following best practice stormwater management design measures recommended based on our understanding of the soils, geology and sensitivity of the terrestrial ecosystems traversed by the road alignment:

- Stormwater outlets should not be located at low points within the watercourses.
- Stormwater generated by the upgraded road should be discharged at regular intervals and many small outlets should be favoured over few large.
- All outlets must be designed to dissipate the energy of outgoing flows to levels that present a low erosion risk. In this regard, suitably designed energy dissipation and erosion protection structures (Reno-mattresses) will need to be installed at appropriate locations. Pre- and post-discharge velocities at each outlet should be calculated to inform the appropriate design of the energy dissipation and erosion protection measures.
- All outlet erosion protection measures (e.g. Reno-mattresses) must be established to reflect the natural slope of the surface and located at the natural ground-level.
- As far as practically possible, conveyance from the road drains to the outlets should be via open drains with rough surfaces that are armoured with erosion protection.

5.2. Construction Phase

The following mitigation measures must be implemented in conjunction with any generic measures provided in the Environmental Management Programme (EMPr).

5.2.1. Demarcation of 'No-Go' areas and construction corridors

- Prior to the commencement of any construction activities, the following features must be staked out by a surveyor and demarcated using brightly coloured shade cloth:
    - The outer edges of the entire construction corridor / right-of-way.
- The construction servitude (working area / corridor) width must be minimised as far as practically possible.
- All excavated soils and soil stockpiles must be stored / sited inside the demarcated working areas as defined above.
- All equipment laydown or storage areas must occur inside the demarcated working areas as defined above.
- The demarcation work must be signed off by the Environmental Control Officer (ECO) before any work commences.
- Demarcations are to remain until construction and rehabilitation is complete.
- All areas outside of this demarcated working servitude must be considered no-go areas for the entire construction phase. Any contractor found working within No-Go areas must be fined as per fining schedule/system setup for the project.
- Access to and from the project area should be either via existing roads or within the construction servitude.
- No equipment laydown or storage areas must be located within important or sensitive indigenous vegetation.
- All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated immediately to the satisfaction of the ECO.

5.2.2. Access and Haulage Roads

A construction phase access and haulage road plan must be developed prior to construction commencing and should consider the following:

- All temporary and permanent construction access and haulage roads should follow the existing road network as far as practically possible.
- Where the creation of new access / haulage roads is required, the following measures must be implemented:
    - The access road should comprise two parallel tyre tracks only and must not involve vegetation clearing or soil stripping.
    - The access road should be minimised in length as far as practically possible and should bisect the most disturbed vegetation where possible.
    - The access road should not encroach upon any areas of medium or high sensitivity.

5.2.3. Threatened and Protected Plant Search and Rescue

Prior to construction commencing, the following must be undertaken:

- The protected plants within and in the vicinity of the development footprint must be relocated to suitable areas by a person with suitable horticultural experience, and in particular experience in relocating indigenous plants within natural habitats. The translocation should occur in mid-summer to ensure that all individuals are picked up during the relocation.
- Permits to translocate such species must be acquired and a search and rescue plan must be compiled and implemented.
- All mature trees that are to remain in place must be cordoned off/marked so that all personnel involved during the construction phase are aware these trees need to be retained and damage to these individuals avoided.

5.2.4. Faunal Search and Rescue

Note: based on the faunal potential occurrence assessment undertaken, KwaZulu Dwarf Chameleon (*Bradypodion melanocephalum* – Near Threatened) may potentially occur within some of the vegetation communities on-site. In this regard, the following must be implemented:

- A search and rescue exercise for the KwaZulu Dwarf Chameleon should be planned and performed immediately prior to clearance of any of the site's vegetation.
- Any chameleons detected can be released to an intact area outside of the footprint, that forms part of the no-go area. This would require appropriately trained specialists to perform.

5.2.5. Runoff, erosion and sediment control

- Wherever possible, existing vegetation cover along the construction corridor should be maintained during the construction phase. The unnecessary removal of groundcover from slopes must be prevented, especially on steep slopes which will not be developed.
- Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.
- All bare slopes and surfaces to be exposed to the elements during clearing and earthworks must be protected against erosion using rows of hay-bales, sandbags and/or silt fences aligned along the contours and spaced at regular intervals (e.g. every 1m) to break the energy of surface flows.
- Once shaped, all exposed/bare surfaces and embankments must be re-vegetated immediately as per the revegetation plan for the project.
- If re-vegetation of exposed surfaces cannot be established immediately due to phasing issues, temporary erosion and sediment control measures like silt fences and sandbags must be maintained until such a time that re-vegetation can commence.
- All temporary erosion and sediment control measures must be monitored for the duration of the construction phase and repaired immediately when damaged. All temporary erosion and sediment control structures must only be removed once vegetation cover has successfully re-colonised the affected areas.
- After every rainfall event, the contractor must check the site for erosion damage and rehabilitate this damage immediately. Erosion rills and gullies must be filled-in with appropriate material and silt fences or fascine work must be established along the gulley for additional protection until vegetation has re-colonised the rehabilitated area.

5.2.6. Hazardous substances / materials management

- The proper storage and handling of hazardous substances (e.g. fuel, oil, cement, etc.) needs to be administered.
- Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of stormwater.

- Drip trays should be utilised at all dispensing areas and under stationary and parked heavy vehicles. / machinery.
- No refuelling, servicing or chemical storage should occur within 32m of any watercourse.
- No vehicles transporting concrete, asphalt or any other bituminous product may be washed on site.
- Vehicle maintenance should not take place on site unless a specific bunded area is constructed for such a purpose.
- Hazardous storage and refuelling areas must be bunded prior to their use on site during the construction period following the appropriate SANS codes. The bund wall should be high enough to contain at least 110% of any stored volume. The surface of the bunded surface should be graded to the centre so that spillage may be collected and satisfactorily disposed of.
- All necessary equipment for dealing with spills of fuels/chemicals must be available at the site. Spills must be reported to the Environmental Officer (EO) and cleaned up immediately and contaminated soil/material disposed of appropriately at a registered site.
- Contaminated water containing fuel, oil or other hazardous substances must never be released into the environment. It must be disposed of at a registered hazardous landfill site.

5.2.7. Invasive Alien Plant control

- All alien invasive vegetation that colonise the construction site must be removed, preferably by uprooting and hand pulling. Hand pulling / uprooting is recommended for herbs, saplings, shrubs. The contactor should consult the ECO regarding the method of removal.
- All bare surfaces across the construction site must be checked for IAPs every two weeks and IAPs removed by hand pulling/uprooting and adequately disposed.
- Herbicides should be utilised where hand pulling/uprooting is not possible. ONLY herbicides which have been certified safe for use in wetlands by independent testing authority are to be used. The ECO must be consulted in this regard.

5.2.8. Prohibitions related to animals

- The handling and or killing of any animal species present is strictly prohibited and all staff/personnel must be notified.
- It must be noted that poaching/snaring is strictly prohibited.
- Any burrows or nests identified in the construction footprint should be reported immediately.

5.2.9. Noise, dust and light pollution minimisation

- Temporary noise pollution due to construction works should be minimized by ensuring the proper maintenance of equipment and vehicles and tuning of engines and mufflers as well as employing low noise equipment where possible.
- Water trucks will be required to suppress dust by spraying water on affected areas producing dust. This will likely be required daily in the drier months or during dry periods.
- No lights must be established within the construction area near the watercourses and buffer zones.

5.2.10. General rehabilitation guidelines

- The area between the footprint boundary and any important or sensitive indigenous vegetation should be actively managed and rehabilitated through a management plan to improve the biodiversity value of this area.
- In addition, all land impacted by the proposed development must be rehabilitated by undertaking the following general tasks:
    - All foreign material must be removed from site.
    - Land must be regraded / reshaped and topsoils must be reinstated.
    - Compacted soils must be adequately ripped/loosened where compacted, as informed by the ECO.
    - Re-vegetation should take place via hydroseeding as advised by a botanist. Typically, a commercially available indigenous seed mixes are suitable as well as seeding with Bermuda Grass (*Cynodon dactylon*) or Buffalo Grass (*Stenotaphrum secundatum*).

- The re-vegetation should be timed to occur before the wet season (ideally at the onset of the wet season in early spring – August to October) so that watering requirements are minimized and plant growth is most vigorous.
- Watering should be gentle so that rill erosion is avoided and minimised.
- Any erosion damage resulting from watering/irrigation must be repaired immediately.
- Alien and weed vegetation that colonize the rehabilitation areas must be removed and eradicated immediately via hand pulling and should be adequately disposed of. It is assumed that in the short-term alien plants will include herbs, shrubs and saplings.
- Once the initial re-vegetation is completed, the planting contractor will need to conduct weekly site visits to remove alien plants (in accordance with the latest revised NEMBA requirements) and address any re-vegetation concerns until re-vegetation is considered successful (i.e. >90% indigenous cover). Thereafter, the rehabilitation must be signed off by the ECO.

5.2.11. Construction phase monitoring measures

- Compliance monitoring will be the responsibility of a suitably qualified/trained ECO (Environmental Control Officer) with any additional supporting EO's (Environmental Officers) having the required competency skills and experience to ensure that monitoring is undertaken effectively and appropriately.
- A photographic record of the state of the site and surrounding area prior to the commencement of clearing/construction must be kept for reference and rehabilitation monitoring purposes.
- The ECO must undertake monthly compliance monitoring audits. Aspects that must be monitored include:
    - The condition of the demarcation fence.
    - Evidence of any no-go area incursions.
    - The condition of the temporary runoff, erosion and sediment control measures and evidence of any failures.
    - Evidence of sedimentary deposits / plumes and elevated rates of sedimentation (i.e. vegetation smothering / burial).
    - Evidence of gully or bed/bank erosion.
    - The condition of waste bins and the presence of litter within the working area.
    - Evidence of solid waste within the no-go areas.
    - Evidence of hazardous materials spills and soil contamination.

- Presence of alien invasive and weedy vegetation within the working area.
- Rehabilitation and re-vegetation methods and success.

- Once the construction and rehabilitation has been completed, the ECO should conduct a close out site audit 1 month after the completion of rehabilitation.

5.3. Operational Phase

5.3.1. Maintenance and management

- It is the applicant's responsibility to ensure the proper functioning of all road infrastructure that is likely to require regular on-going maintenance.
- A management plan, that includes 1) an alien plant control programme and 2) allows for some grassy areas, away from the immediate verge, to grow to a height exceeding 60cms that allows for the chameleons to utilise this area, must be put in place for the areas highlighted as being important for KwaZulu Dwarf Chameleons.
- In terms of management, alien invasive plant control must be practiced on an on-going basis in line with the requirements of Section 2(2) and Section 3 (2) the National Environmental Management: Biodiversity Act (NEM:BA), which obligates the landowner/developer to control IAPs.

5.3.2. Monitoring

It will be important that long-term monitoring of the potential ecosystem impacts be undertaken to proactively identify any environmental issues and impacts that may arise as a result of the operational phase of the project. The following key aspects should be monitored:

- Erosion and/or sedimentation in the vicinity of the road.
- Presence of alien invasive plants.

6. Licensing, Permitting and Relocation of Protected Plants

Protected plants are listed in the following legislation:

- National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA).
- National Forests Act (Act No. 84 of 1998) (NFA).
- KZN Nature Conservation Ordinance (No. 15 of 1974).

Protected plants in terms of KZN Nature Conservation Ordinance (No. 15 of 1974) require a permit from Ezemvelo KwaZulu-Natal Wildlife, and protected plants in terms of NEM:BA and NFA require a permit from the Department of Forestry Fisheries and the Environment (DFFE) before they can be lawfully disturbed, damaged, destroyed or relocated.

For those plants that are relocated, the following must be carried out:

- Before development occurs, the development areas should be searched on a systematic basis for any protected or red listed plants. This search will need to be made in the summer months.
- One of the main criteria enabling successful relocation is excavation of plants with due care to minimize disturbance and damage to roots. Plants with damaged roots are not resilient and are very likely to perish. As a result, any workers involved in excavation and relocation must be well supervised to ensure this is done with great care.
- Upon planting back, it will be necessary to provide initial watering of the plants, and plants should be monitored thereafter on a daily basis for the first week and then on a weekly basis for the first month after planting to ascertain whether there is a need for further watering.

Notwithstanding what is provided in a method statement, specialist botanical and horticultural expertise will be needed to locate plants, grow and relocate plants successfully and ensure they are planted back into habitat most suitable for the particular species concerned. Planting dryland species into damper areas and vice versa, or from open grassland to scrubbier grassland is one such issue and not always appreciated by a non-specialist.

7. Assumptions and Limitations

The following limitations and assumptions apply to this assessment:

- The study focused on 'terrestrial' or dryland vegetation occurring within the study area. Riverine and wetland vegetation and habitats were not included as these were dealt with separately.
- Given the scope of the proposed rapid site walkover and likelihood of occurrence assessment based on the habitat type and state, no detailed sampling formed part of the assessment. The results presented are based on a single site assessment for flora undertaken in October 2025 and a single site assessment for fauna undertaken in October 2025.
- Please note a Compliance Statement is produced here in line with the sensitivity categories in the Terrestrial Animal Species Protocol published in Government Notice No. 1150 dated 30 October 2020. According to this gazetted protocol, under the Medium Sensitivity Rating for animal species, species of conservation concern (SCCs) are defined as species "listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1." Near Threatened species such as the KwaZulu Dwarf Chameleon do not trigger this category. However, it is important to note that the latest version of the 2020 species environmental assessment guidelines (Version 4.1 2026) define SCCs as also encompassing Near Threatened Species, and indicate that they should be considered in the assessment of Site Ecological Importance which has been done in the SEI sections of this report. Nevertheless, a compliance statement has been produced despite the assessment of faunal habitats as being of medium SEI as the site does not fall within the definition of medium sensitivity outlined in the gazetted protocol.
- It is assumed that all the recommended mitigations measures in this report will be strictly adhered to.
- Floral assessment:
    - Field surveys comprised walkovers of the site and the immediate surrounds to record the plant species composition of the vegetation communities and record the location of protected, rare and/or threatened plants where observed. Sufficient effort was applied to searching for protected and threatened plants at each site.

However, it is important to note that this study does not constitute a formal protected and threatened plant identification and marking exercise.

- Surveying occurred within the appropriate seasonal window recommended by Ezemvelo KZN Wildlife (EKZNW 2013) and SANBI (2020) i.e. between October and April.
- The survey was intended to map vegetation and identify sensitivity on a preliminary basis and this did not extend to identifying and mapping every indigenous tree/protected plant within the study area.

8. Conclusion

The infield survey confirmed the presence of four (4) vegetation communities, namely:

1. Alien dominated woodland/shrubland
2. Road Verges with scattered trees and mowed lawn
3. Hygrophilous Grassland and Scattered Indigenous Trees
4. Mixed alien and indigenous woodland

In addition, five (5) faunal habitats were identified, namely:

1. Alien dominated woodland/shrubland
2. Road Verges with scattered trees and mowed lawn
3. Hygrophilous Grassland and Scattered Indigenous Trees
4. Mixed alien and indigenous woodland
5. Secondary Grassland and degraded mixed alien and indigenous woodland/shrubland

In terms of the Plant Species Theme; Communities 1 and 2 are considered of 'Very Low' Site Ecological Importance due to the moderate to high cover of alien plant invasion observed, their high level of fragmentation and edge impacts that have resulted in a deterioration of both their biodiversity and their level of functioning. Community 4 is considered of 'Low' Site Ecological Importance, as although this community has also been highly impacted by direct loss and fragmentation it still comprises some diversity of indigenous vegetation and is considered in better condition in comparison to Community 1 and Community 2. Community 3 is considered of 'Medium' Site Ecological Importance as this community occurs within the Bayhead Heritage Site with indigenous vegetation comprising most of the cover, with low alien plant invasion observed. However, this community is also isolated and fragmented due to historical development in the

area and therefore although in an intact state this Community should have a 'High' conservation importance rating (driven by the Critically Endangered threat status of the reference vegetation type at the provincial scale), the area adjoining the road within 32m of the project site has likely been affected by edge impacts in the past and therefore the conservation importance rating has been revised to 'Medium' and likewise its functional integrity has been compromised and has been rated as 'Medium' resulting in a 'Medium' biodiversity importance rating.

In terms of the Animal Species Theme although much of the site has been disturbed and transformed in the past, Faunal Habitats 3, 4 and 5 are still of value as habitat for the KwaZulu Dwarf Chameleon, and therefore these faunal habitats are considered to be of 'Medium' SEI with remaining two faunal habitats (Faunal Habitat 1 & 2) considered to be of 'Very Low' SEI.

In terms of the terrestrial biodiversity theme, the estuarine and terrestrial ecosystems within the study area have been modelled as a CBA due to the ecosystems being located within the Durban Bay EFZ, the Critically Endangered threat status of the reference vegetation types, and there being intact Mangrove Forest. The site assessment confirmed that much of the site has been disturbed and transformed and is considered of 'Very Low' Site Ecological importance (in the case of Vegetation Communities 1 & 2 and Faunal Habitats 1 & 2) for terrestrial biodiversity. However, vegetation within the Bayhead Nature Reserve mapped as Vegetation Community 3 & Faunal Habitat 3 as well as areas considered important for fauna, in particular the KwaZulu-Dwarf Chameleon i.e. Faunal Habitat 4 and Faunal Habitat 5 are considered of 'Medium' Site Ecological Importance under the Terrestrial Biodiversity Theme.

The proposed road upgrade will have a small but intense impact on the vegetation communities and faunal habitats along the existing road reserve comprising degraded communities and habitats. The most serious impacts are the direct and indirect impacts to the small local KwaZulu Dwarf Chameleon population, a Near Threatened SCC and the larger associated ecological corridor. It is anticipated that the area to be impacted by the road upgrade will be a very small area to be impacted (provided mitigation measures in this report are strictly adhered to, particularly limiting construction and operation phases activities to the footprint provided and avoiding sensitive KwaZulu Dwarf Chameleon habitat beyond this footprint). However, there could be some localised fatalities of chameleons if indiscriminate and poorly planned construction practices occur, which is undesirable and should be avoided. Every effort must be made to reduce the impacts to potential chameleon habitat and movement corridors through the strict implementation of:

- Construction phase measures:
  - A search and rescue plan, to be implemented by an appropriately qualified specialist prior to work commencing on site.
  - Working area and no-go area demarcation and fencing.
  - Erosion and sediment control.
- Operational phase measures:
  - The design and installation of appropriate stormwater management measures.
  - The inclusion of recommended mitigation measures in the relevant maintenance plans for the project.

Provided all mitigation measures recommended in this report are strictly adhered to, anticipated impacts will be of moderately low or low significance.

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Thank you. If you have any questions, please contact us via the contact details below.

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SPECIALIST DECLARATION

forestry, fisheries
& the environment

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Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

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SPECIALIST DECLARATION FORM – AUGUST 2023

Specialist Declaration form for assessments undertaken for application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

REPORT TITLE

Proposed Upgrade of Bayhead and Langeberg Roads in the Port of Durban, eThekwini Municipality, KwaZulu-Natal: Terrestrial Biodiversity Site Sensitivity Verification Report

Kindly note the following:

1. This form must always be used for assessment that are in support of applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting, where this Department is the Competent Authority.
2. This form is current as of August 2023. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.dffe.gov.za/documents/forms.
3. An electronic copy of the signed declaration form must be appended to all Draft and Final Reports submitted to the department for consideration.
4. The specialist must be aware of and comply with *'the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the act, when applying for environmental authorisation - GN 320/2020)'*, where applicable.

1. SPECIALIST INFORMATION

Title of Specialist Assessment	Proposed Upgrade of Bayhead and Langeberg Roads in the Port of Durban, eThekwini Municipality, KwaZulu-Natal: Terrestrial Biodiversity Site Sensitivity Verification Report
Specialist Company Name	Verdant Environmental
Specialist Name	Ryan John Edwards
Specialist Identity Number	8211235044083
Specialist Qualifications:	Master of Science Environmental Science
Professional affiliation/registration:	SACNASP No.: 400089/13
Physical address:	12 Umkuhla Lane, Glen Anil, 4051
Postal address:	12 Umkuhla Lane, Glen Anil, 4051
Postal address	Click or tap here to enter text.
Telephone	073 121 3392
Cell phone	073 121 3392
E-mail	ryan@verdantenv.co.za

2. DECLARATION BY THE SPECIALIST

I, Ryan John Edwards declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols") and in Government Notice No. 1150 of 30 October 2020.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing –
    - any decision to be taken with respect to the application by the competent authority; and;
    - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of section 24F of the NEMA Act.

Signature of the Specialist

Verdant Environmental

Name of Company:

12 Jan 2026

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, _ Ryan John Edwards_____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Verdant Environmental

Name of Company

12 January 2026

Date

Click or tap here to enter text. 1759101 5 Mest P.W Khanyeza

Signature of the Commissioner of Oaths

Click or tap to enter a date. 2026 · 01 · 12

Date

SOUTH AFRICAN POLICE SERVICE
COMMUNITY SERVICE CENTRE
12 JAN 2026
DURBAN NORTH
KWAZULU-NATAL