DRAFT BASIC ASSESSMENT REPORT

Draft Basic Assessment Report (DBAR) for the Proposed Slope Stabilisation located along Route 61 Section 8 Umzimvubu Drive, between km 0.00 and km 2.15 within Port St Johns Local Municipality, Eastern Cape

A Project of the South African National Roads Agency Limited (SANRAL)

June 2026

THIS REPORT WAS COMPILED BY WALLACE AND GREEN (PTY) LTD. IN TERMS OF APPENDIX 1 TO GNR 326 (AS AMENDED)

2014 NEMA EIA Regulations (As amended 2017), Appendix 1- 3(a) a basic assessment report must contain the information that is necessary for the competent authority; (i) EAP who prepared the report and (ii) the expertise of the EAP, including curriculum vitae. 3 (1) (a) details of (i) the EAP who prepared the report; and (ii) the expertise of the EAP. Please see Appendix H for EAP Declaration and full Curriculum Vitae.

DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONERS

Table 1: Details of the Environmental Assessment Practitioner

Contact Persons	Ms. Perushni Naidoo
Postal Address	10 Cherron Avenue, La Lucia, 4051
Telephone	031 563 4466
Facsimile	086 613 8535
E-mail	nicolen@wallaceandgreen.co.za
Qualification	BSc Honours in Environmental Management
Professional Registrations	Reg. EAP (EAPASA)
Experience	11 years

Table 2: Details of the Environmental Assessment Practitioner

Contact Persons	Ms. Sayantha Padayachee
Postal Address	10 Cherron Avenue, La Lucia, 4051
Telephone	031 563 4466
Facsimile	086 613 8535
E-mail	sayantha@wallaceandgreen.co.za
Qualification	BSc Honours in Environmental Management
Experience	3 years

DETAILS OF THE PROJECT APPLICANT

Table 3: Details of the Project Applicant

Applicant	South African National Roads Agency Limited (SANRAL)
Representative	Mr. Mbulelo Peterson
Physical Address	Southern Region 20 Shoreward Drive, Bay West, Port Elizabeth, 6025
Postal Address	P O Box 24210, Bay West, Port Elizabeth, South Africa, 6034
Telephone	041 398 3214
E-mail	PetersonS@nra.co.za

EXECUTIVE SUMMARY

Wallace and Green (Pty) Ltd., were appointed by Geosure (Pty) Ltd on behalf of the South African National Roads Agency Limited (SANRAL) to provide independent Environmental Consulting Services for the Proposed Slope Stabilisation along Route 61 Section 8 Umzimvubu Drive, between km 0.00 and km 2.15 located within Port St Johns Local Municipality, Eastern Cape, by conducting a Basic Assessment (BA) study in terms of the Environmental Impact Assessment (EIA) Regulations of 2014 (GNR 326 of December 2014 as amended), as promulgated under the National Environmental Management Act (NEMA) (Act No. 107 of 1998).

Project Description

South African Roads Agency Limited (SANRAL) intends to implement stabilisation infrastructure on the bank slopes located along Route 61 (R61) Section 8, Umzimvubu Drive within Ward 6 of Port St. Johns Local Municipality, OR Tambo District Municipality, Eastern Cape. As per the Geotechnical Investigation conducted by Gesoure (Pty) Ltd, March 2025 the slope stabilisation was classified as emergency works. The assessment identified a total of five (5) unstable zones and the stabilisation measures were categorised based on geological and geotechnical characteristics.

Refer to **Appendix D1** – Geotechnical Investigation

Table 0-2: Property details

Property no.	Description
1.	Portion 0 of Erf 645 in Port St. Johns
2.	Portion 0 of Erf 1 in Port St. Johns

Table 0-3: Geographical location of the proposed stabilisation zones

Zone No.	Co-ordinates	
1	31°37'5.06"S	29°32'39.14"E
2	31°37'1.29"S	29°32'35.42"E
3	31°36'57.54"S	29°32'31.39"E
4	31°36'50.50"S	29°32'24.88"E
5	31°36'5.18"S	29°31'52.96"E

Appendix A1 – Locality Map and **Figure 1.1** below and illustrates the location of the five (5) proposed zones for stabilisation (outlined in red).

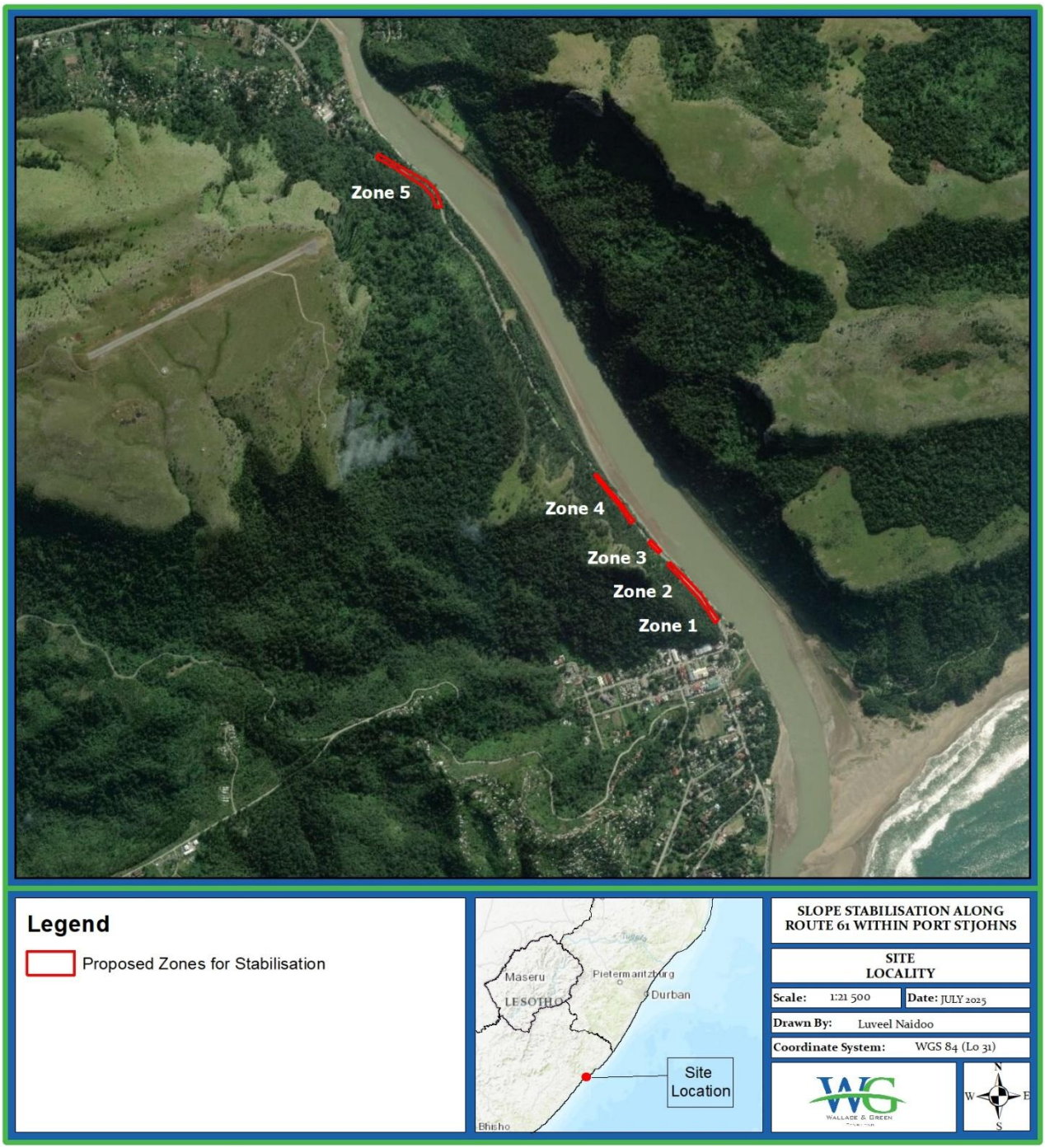

Figure 1.1: Locality Map

Alternatives

Technology Alternatives

Six (6) technology alternatives were investigated for the Proposed Slope Stabilisation along Umzimvubu Drive, Port St. Johns:

- **Technology Alternative T1 (Preferred) – Scaling and Barring, Shotcrete application with soil Nails/ Rock Dowels and a catch fence**

Zone 1

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised catch fence system will be installed, of approximately 215m in length, 6m in height and a minimum energy absorption capacity of 3000 kJ.
- A permanent 134m soil nail wall will be constructed with a shotcrete facing from Km 0.214 to Km 0.348.
- Soil nails comprising threaded bar anchors with 25mm diameter bars and a minimum yield strength of 500 MPa will be installed within 100mm diameter drill holes and inclined at 15º to the horizontal.
- Soil nails will be installed in accordance with the specified arrangement depending on the slope height, and to the specified nail lengths and spacing indicated in the detailed design drawings (refer to Appendix C2 – Detailed Design Drawings).
- All soil nail elements will be galvanised and soil nail heads will comprise 300mm x 300mm x 15mm thick bearing plates completed with dome washers and nuts.
- Approximately 1100 soil nails will be utilised for Zone 1.
- Shotcrete facing will be applied to the slope with a minimum 28-day compressive strength of 30 MPa in two 50mm layers to achieve a total thickness of 100mm, with a single layer of Ref 245 mesh reinforcement.
- Approximately 2000m2 of shotcrete facing will be utilised for Zone 1.
- Provision will be made for horizontal drainage measures via the shotcrete facing to relieve pore water pressures and prevent hydrostatic pressure build up behind the facing. Drainage will comprise 50mm diameter U-PVC weep holes installed on a 1.5m grid pattern across the slope face.

Zone 3

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised catch fence system, approximately 100m in length, 6m in height, with a minimum energy absorption capacity of 3000 kJ, will be installed.
- 150mm thick reinforced shotcrete facing will be applied with 2 layers of 100mm x 100mm steel mesh with a minimum wire diameter of 6mm.
- 750m^2 of shotcrete will be applied with a minimum 28-day compressive strength of 30MPa.
- Approximately 160 isolated rock dowels will be utilised.
- The rock dowels will comprise 6m long, galvanised hot-rolled, high-tensile steel bars with continuous coarse thread, complying with SANS 920, with a nominal diameter of 25mm and minimum yield strength exceeding 500MPa.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- Horizontal drains will be installed through the shotcrete facing where required, to relieve groundwater pressures, improve drainage performance and prevent hydrostatic pressure build up behind the facing system.
- Provision will be made for ongoing inspection and maintenance of the catch fence system, drainage outlets, and shotcrete facing to ensure the long-term performance of the stabilisation measure.

Zone 4

- 150mm thick reinforced shotcrete facing will be installed with 2 layers of 100mm x 100mm steel mesh with a minimum wire diameter of 6mm.
- The shotcrete must achieve a minimum 28-day compressive strength of 30MPa.
- Approximately 2 156m^2 of shotcrete will be utilised.
- Approximately 920 isolated rock dowels will be utilised in accordance with the detailed design drawings.
- Rock dowels will comprise 6m long, galvanised hot-rolled, high-tensile steel bars with continuous coarse thread, complying with SANS 920, with a nominal diameter of 25mm and minimum yield strength exceeding 500MPa.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.

- Horizontal drains will be installed through the shotcrete facing to relieve groundwater pressures, improve drainage performance and prevent hydrostatic pressure build up behind the facing system.
- Provision will be made for ongoing inspection and maintenance of the drainage outlets and shotcrete facing to ensure the long-term performance of the stabilisation measure.

❖ **Technology Alternative T2 (Not Supported) – Shotcrete application and a Catch Fence**

Alternative T2 involves the application of shotcrete facing combined with a catch fence, designed to provide surface protection and intercept falling boulders along Umzimvubu Drive. The dimensions for Zones 1, 3 and 4 are outlined below:

- **Zone 1** – 2000 m^2 Shotcrete cover and a 1200 m^2 Catch Fence.
- **Zone 3** – 600 m^2 Shotcrete cover and a 360 m^2 Catch Fence
- **Zone 4** – 2100 m^2 Shotcrete cover and a 720 m^2 Catch Fence

❖ **Technology Alternative T3 (Preferred) – Gabion Geo-barrier with a Catch Fence**

Zone 2

- The slope will be scaled and barred down to remove loose, detached or potentially unstable boulders and reduce immediate risk of rockfall and falling debris during construction activities.
- A founding surface will be established to provide a stable and suitable platform for the installation of the gabion geo-barrier system.
- A gabion geo-barrier system will be implemented using 1m x 1m x 1m Galfan and PVC coated wire mesh baskets (80mm x 100mm mesh aperture) arranged in a stepped pyramidal configuration comprising four baskets in the bottom row, to an overall height of 4m (refer to **Appendix C2 – Detailed Design Drawings**).
- The bottom row of gabion baskets will be embedded to a depth of 0.5m below the existing ground level to improve resistance against sliding and overturning.
- All gabion baskets will be infilled with hard, durable and unweathered sandstone rockfill.
- A fully galvanised catch fence system of approximately 110m in length, 6m in height and a minimum energy absorption capacity of 3000 kJ will be installed above the gabion geo-barrier system.
- Provision will be made for regular inspection and maintenance measures including the periodic removal of accumulated debris behind the barrier system to maintain capacity, limit excessive loading on the structure and ensure the continued long-term performance of the gabion geo-barrier.

❖ **Technology Alternative T4 (Not Supported) – Concrete Retaining Wall**

Alternative T2 involves the construction of a concrete retaining wall to serve as a rigid barrier, effectively preventing boulders from migrating onto Umzimvubu. A 1 200m^3 concrete wall is proposed for **Zone 2**.

❖ **Technology Alternative T5 (Preferred) – Active Mesh System with isolated Rock Bolts and a Catch Fence**

Zone 5

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised active mesh system will be installed over the full extent of Zone 5.
- The active mesh system will comprise steel wire with a minimum tensile strength between 380MPa and 550MPa and a minimum wire diameter of 2.7mm. The mesh will consist of a double twist hexagonal weave pattern with a maximum aperture size of 80mm and shall incorporate Class A corrosion protection consisting of a 95% Zinc - 5% Aluminium coating.
- Approximately 7800m^2 of mesh will be utilised.

- 3m long grouted, galvanised 500MPa threaded steel bar dowels will be installed on a 2.5m x 2.5m grid spacing both horizontally and vertically.
- Approximately 1607 rock dowels will be installed in accordance with the detailed design drawings.
- A fully galvanised catch fence system will be installed across the full length of Zone 5, approximately 260m in length, 6m in height, and a minimum energy absorption capacity of 3000kJ.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- 20m long 100mm diameter sub-horizontal drainage holes will be drilled at an inclination of 15º above horizontal.
- Provision will be made for ongoing inspection and maintenance of the catch fence system and drainage outlets.

❖ **Technology Alternative T6 (Not Supported) – Scaling and Barring and a Catch Fence**

Alternative T6 involves once-off removal of loose and unstable rock fragments from the slope face and the installation of a catch fence. A 1 800m^2 catch fence is proposed for Zone 5 following the scaling and barring of 10 000 m^2 of the slope.

EIA Process

Based on the project activities the proposed project will require Environmental Authorisation via a Basic Assessment (BA) Process due to the following listed activities in terms of the NEMA EIA Regulations 2014 (as amended):

- **Listing Notice 1, Activity 12** – The proposed slope stabilisation infrastructure for Zones 1 – 5 will have a physical footprint of 15 100m2. The stabilisation infrastructure will occur within 5 - 15m of the Umzimvubu Estuary.

- **Listing Notice 1, Activity 27** – As per the Terrestrial Biodiversity Compliance Statement compiled by the Biodiversity Company, dated August 2025, the proposed slope stabilisation will involve the clearance of 1 – 2Ha of indigenous vegetation (e.g. *Trichilia emetica*, *Erythrina afra*, and *Trema orientale*).

This BA follows the legislative process prescribed in the Environmental Impact Assessment (EIA) Regulations (2014). This report constitutes the Draft Basic Assessment Report which details the environmental outcomes, impacts and residual risks of the proposed activity. The report aims to assess the key environmental issues and impacts associated with the development and to document Interested and Affected Parties' (I&APs) issues and concerns.

To protect the environment and ensure that the development is undertaken in an environmentally responsible manner, there are several significant portions of environmental legislation and specialist studies that were taken into consideration during this assessment and are elaborated further in this report.

The National Department of Forestry, Fisheries and the Environment (DFFE) is the competent authority for this Basic Assessment process, therefore the development needs to be authorised by this Department.

Public Participation Process

The public participation process comprised of the following:

- Notification and distribution of the Background Information Document (this document) to identified stakeholders and I&APs on the 5th of September 2025 to announce the project and inviting stakeholders to register as an I&AP and participate in the public participation process;

- Placement of an advertisement in the local/regional newspaper. An advertisement was placed in the Pondoland Times Newspaper on the 5th of September 2025; and
- Placement of site notices at conspicuous locations on site. Three (3) site notices were erected on site at the start, middle and end points of the proposed development on the 9th of September 2025 notifying I&APs of the proposed activity and inviting them to register.

Specialist Studies

The following specialist studies have been undertaken as part of the Basic Assessment process:

- **Wetland Assessment:**

Seven (7) Hydrogeomorphic HGM units were identified within the 500m delineated regulatory zone. These were classified as;

- one (1) channelled valley-bottom wetlands,
- one (1) unchanneled valley-bottom wetlands,
- two (2) floodplain, and
- three (3) seep wetlands

All delineated wetlands within the project area scored within the "Moderate" class for Ecological Importance and Sensitivity and within the "Moderately Modified" for the Present Ecological State. HGM 1 (Umzimvubu Estuary) and 2 (floodplain) were identified as "At Risk" and were assessed further.

The study concluded that the proposed project will pose a "Low" post-mitigation risk on the Umzimvubu Estuary, provided that the mitigation measures outlined in the report are strictly adhered to during the construction phase.

The specialist is in support of the project and of the opinion that no fatal flaws are evident following the assessment.

- **Aquatic Assessment:**

The project area is adjacent to an NFEPA wetland (i.e., Umzimvubu Estuary) and occurs within a Critical Biodiversity Area (CBA) and Ecological Support Area (ESA).

The riparian habitat integrity of the Umzimvubu Estuary was rated "Largely Modified" due to the encroachment of exotic vegetation and rubbish dumping. The combination of impacts has resulted in habitat loss, encroachment of alien vegetation into the riparian habitat, flow modification, deterioration of water quality, and impacts to instream and riparian integrity.

The Present Ecological State (PES) assessment of the project area is rated as "Moderately Modified" and the Ecological Importance (EI) and Ecological Sensitivity (ES) is rated as "Moderate".

Results of the impact assessment indicated that the construction and operation phases of the project poses "Moderate" pre-mitigation risks to the freshwater ecosystems. Adherence to all mitigation measures can result in "Low" post-mitigation risks.

It is the opinion of the specialist that the project may be considered for authorisation, on condition that all prescribed mitigation measures and recommendations are implemented.

- **Heritage Impact Assessment and Desktop Paleontological Assessment:**

The desktop study noted that it is highly unlikely that archaeological sites or palaeontological deposits will occur within the study area and that majority of the site in an area of no to low palaeontological sensitivity with some areas being of moderate sensitivity.

The project is supported by the specialist provided that the Chance Find Protocol is implemented during the construction phase.

- **Terrestrial Biodiversity Compliance Statement:**

The project area is characterised by Coastal Forest vegetation and falls within a Critical Biodiversity Area (CBA 1). It is estimated that the clearance of indigenous vegetation will be between 1-2ha.

No Species of Conservation Concern (SCC) were identified within the project area. In terms of Site Ecological Importance, the vegetation structure and species composition of the singular habitats have been completely altered and as such, have a very low conservation value and ecological sensitivity from a floral perspective. From a faunal perspective, suitable habitats were noted on site however no faunal SCC were identified within the project area. Habitats within the study area varied from “Very Low” to “Medium” Site Ecological Importance (SEI).

Three (3) protected species were found along the route, namely: *Aloidendron barberae, Dracaena aletriformis and Sideroxylon inerme.*

The study noted that due to the location, state and size of the ecosystem, impacts arising from the proposed activities is unlikely to result in the loss of any functional habitat.

The project is supported provided that mitigation measures are implemented and incorporated into the Environmental Management Programme.

Main findings of the EIA

Construction and operational phase impacts ranged from High - Low pre-mitigation. All the anticipated impacts can however be significantly reduced through the mitigation measures to Medium - Low and Low levels of impact significance ratings.

Residual risks are expected to be of short duration and of Low - Minor impact significance, provided that the mitigation measures in this report are implemented. No significant cumulative effects on the environment are anticipated.

TABLE OF CONTENTS

APPENDICES

Appendix A: Site Plan(s)
Appendix A1 – Locality Map
Appendix A2 – Sensitivity Map

Appendix B: Site Photographs

Appendix C: Design Drawings
Appendix C1: Overall Layout Design
Appendix C2: Detailed Design Drawings

Appendix D: Specialist Reports
Appendix D1 – Geotechnical Investigation
Appendix D2 – Geotechnical Design Report
Appendix D3 – Wetland Assessment
Appendix D4 – Aquatic Assessment
Appendix D5 – Heritage Assessment
Appendix D6 – Terrestrial Biodiversity Compliance Statement
Appendix D7 – Rehabilitation Plan
Appendix D8 – Traffic Assessment

Appendix E: Public Participation
Appendix E1 – PPP Summary
Appendix E2 – Site Notice
Appendix E3 – Proof of Site Notice
Appendix E4 – Proof of Advertisement
Appendix E5 – BID & Comment Form
Appendix E6 – I&AP Database

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and Expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information
Appendix J1 – Email confirmation for Pre-application meeting
Appendix J2 – NEMA Screening Tool Report
Appendix J3 – Zoning Certificates

APPENDIX 1: NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998): ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS 2014 (AS AMENDED)

SECTION OF APPENDIX 1 OF THE EIA REGULATIONS	DESCRIPTION OF THE SECTION	ASSOCIATED SECTION WITHIN THE BAR
3a	Details of the EAP and CV	Page 2
3b	Location of the activity	Section 1.6
3c	A layout plan	Section 1.5 and Appendix C1
3d	Description of the scope of the proposed activity including the triggered and specified activities, associated structures and infrastructure and the way the proposed development relates to the triggered activities	Section 1.2 and 1.4
3e	Description of the policy and legislative context within which the development is proposed and how is each one applicable to the proposed activity	Section 3
3f	The motivation for the need and desirability (including the development at that specific location)	Section 4
3g	The motivation for the preferred site, activity, and technology alternative	Section 1.5
3h (i)	Details of all the alternatives considered	Section 1.5
3h (ii)	Details of the Public Participation Process (PPP) undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs	Section 5
3h (iii)	A summary of the issues raised by interested and affected parties, and an indication of the way the issues were incorporated, or the reasons for not including them	Section 5
3h (iv)	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Section 2
3h (v)	The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed, or mitigated;	Section 6.2
3h (vi)	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives	Section 6.1
3h (vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Section 6.2
3h(viii)	The possible mitigation measures that could be applied and the level of residual risk	Section 6.2 and Appendix F
3h(ix)	The outcome of the site selection matrix	Section 6.2
3h(x)	If no alternatives, including alternative locations for the activity, were investigated, the motivation for not considering such	Section 1.5
3h(xi)	A concluding statement indicating the preferred alternatives, including the preferred location of the activity	Sections 4.2 and 6.3
3i	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including-	Section 6.2

SECTION OF APPENDIX 1 OF THE EIA REGULATIONS	DESCRIPTION OF THE SECTION	ASSOCIATED SECTION WITHIN THE BAR
	(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue, risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures	
3j	An assessment of each identified potentially significant impact and risk	Section 6.2
3k	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	Section 2
3l	An environmental impact statement containing a map and a summary of the positive and negative impacts of the proposed development and alternatives	Section 6.3
3m	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr	Section 6.4
3n	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of the authorisation	Section 6.8
3o	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 6.5
3p	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation	Section 6.8
3q	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post-construction monitoring requirements finalised	Section 6.6
3r	An undertaking under oath or affirmation by the EAP	Refer to Appendix H
3s	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of adverse environmental impacts	Not Applicable

SECTION 1: DESCRIPTION OF THE PROPOSED ACTIVITY & LOCALITY

1.1 PROJECT TITLE

The Proposed Slope Stabilisation located along Route 61 Section 8 Umzimvubu Drive, between km 0.00 and km 2.15 within Port St Johns Local Municipality, Eastern Cape.

1.2 DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN INCLUDING ASSOCIATED STRUCTURE AND INFRASTRUCTURE AS PER SECTION 3(D) (II)

2014 EIA Regulations (as amended), Appendix 1- 3(d) a description of the scope of the proposed activity, including (ii) a description of the activities to be undertaken including associated structures and infrastructure.

South African Roads Agency Limited (SANRAL) intends to implement stabilisation infrastructure on the bank slopes located along Route 61 (R61) Section 8, Umzimvubu Drive within Ward 6 of Port St. Johns Local Municipality, OR Tambo District Municipality, Eastern Cape. As per the Geotechnical Investigation conducted by Gesoure (Pty) Ltd, March 2025 the slope stabilisation was classified as emergency works. The assessment identified a total of five (5) unstable zones and the stabilisation measures were categorised based on geological and geotechnical characteristics.

Refer to **Appendix D1** – Geotechnical Investigation

Table 0-1: Property details

Property no.	Description
1.	Portion 0 of Erf 645 in Port St. Johns
2.	Portion 0 of Erf 1 in Port St. Johns

Table 0-2: Geographical location of the proposed stabilisation zones

Zone No.	Co-ordinates	
1	31°37'5.06"S	29°32'39.14"E
2	31°37'1.29"S	29°32'35.42"E
3	31°36'57.54"S	29°32'31.39"E
4	31°36'50.50"S	29°32'24.88"E
5	31°36'5.18"S	29°31'52.96"E

Appendix A1 – Locality Map and **Figure 1** below and illustrates the location of the five (5) proposed zones for stabilisation (outlined in red).

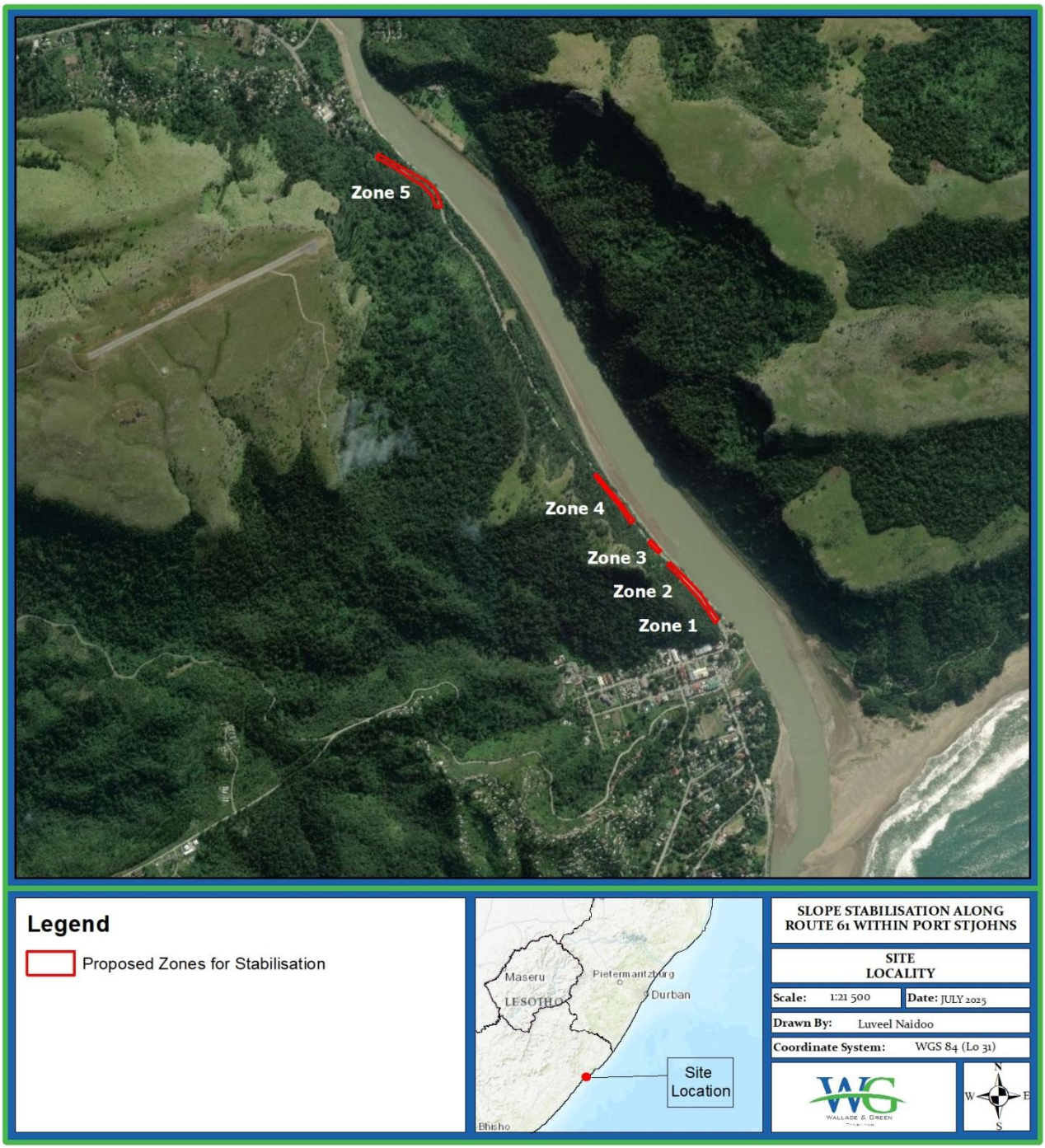

Figure 1.1: Locality Map

The sections below provide details into the five (5) unstable zones and the associated infrastructure proposed to stabilise each zone.

Scaling and Barring, Shotcrete application with Soil Nails/ Rock Dowels and a catch fence

❖ **Zone 1**

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised catch fence system will be installed, of approximately 215m in length, 6m in height and a minimum energy absorption capacity of 3000 kJ.
- A permanent 134m soil nail wall will be constructed with a shotcrete facing from Km 0.214 to Km 0.348.

- Soil nails comprising threaded bar anchors with 25mm diameter bars and a minimum yield strength of 500 MPa will be installed within 100mm diameter drill holes and inclined at 15º to the horizontal.
- Soil nails will be installed in accordance with the specified arrangement depending on the slope height, and to the specified nail lengths and spacing indicated in the detailed design drawings (refer to Appendix C2 – Detailed Design Drawings).
- All soil nail elements will be galvanised and soil nail heads will comprise 300mm x 300mm x 15mm thick bearing plates completed with dome washers and nuts.
- Approximately 1100 soil nails will be utilised for Zone 1.
- Shotcrete facing will be applied to the slope with a minimum 28-day compressive strength of 30 MPa in two 50mm layers to achieve a total thickness of 100mm, with a single layer of Ref 245 mesh reinforcement.
- Approximately 2000m2 of shotcrete facing will be utilised for Zone 1.
- Provision will be made for horizontal drainage measures via the shotcrete facing to relieve pore water pressures and prevent hydrostatic pressure build up behind the facing. Drainage will comprise 50mm diameter U-PVC weep holes installed on a 1.5m grid pattern across the slope face.

❖ **Zone 3**

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised catch fence system, approximately 100m in length, 6m in height, with a minimum energy absorption capacity of 3000 kJ, will be installed.
- 150mm thick reinforced shotcrete facing will be applied with 2 layers of 100mm x 100mm steel mesh with a minimum wire diameter of 6mm.
- 750m^2 of shotcrete will be applied with a minimum 28-day compressive strength of 30MPa.
- Approximately 160 isolated rock dowels will be utilised.
- The rock dowels will comprise 6m long, galvanised hot-rolled, high-tensile steel bars with continuous coarse thread, complying with SANS 920, with a nominal diameter of 25mm and minimum yield strength exceeding 500MPa.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- Horizontal drains will be installed through the shotcrete facing where required, to relieve groundwater pressures, improve drainage performance and prevent hydrostatic pressure build up behind the facing system.
- Provision will be made for ongoing inspection and maintenance of the catch fence system, drainage outlets, and shotcrete facing to ensure the long-term performance of the stabilisation measure.

❖ **Zone 1**

- 150mm thick reinforced shotcrete facing will be installed with 2 layers of 100mm x 100mm steel mesh with a minimum wire diameter of 6mm.
- The shotcrete must achieve a minimum 28-day compressive strength of 30MPa.
- Approximately 2 156m^2 of shotcrete will be utilised.
- Approximately 920 isolated rock dowels will be utilised in accordance with the detailed design drawings.
- Rock dowels will comprise 6m long, galvanised hot-rolled, high-tensile steel bars with continuous coarse thread, complying with SANS 920, with a nominal diameter of 25mm and minimum yield strength exceeding 500MPa.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- Horizontal drains will be installed through the shotcrete facing to relieve groundwater pressures, improve drainage performance and prevent hydrostatic pressure build up behind the facing system.
- Provision will be made for ongoing inspection and maintenance of the drainage outlets and shotcrete facing to ensure the long-term performance of the stabilisation measure.

Gabion Geo-barrier with a Catch Fence

Zone 2

- The slope will be scaled and barred down to remove loose, detached or potentially unstable boulders and reduce immediate risk of rockfall and falling debris during construction activities.
- A founding surface will be established to provide a stable and suitable platform for the installation of the gabion geo-barrier system.
- A gabion geo-barrier system will be implemented using 1m x 1m x 1m Galfan and PVC coated wire mesh baskets (80mm x 100mm mesh aperture) arranged in a stepped pyramidal configuration comprising four baskets in the bottom row, to an overall height of 4m (refer to **Appendix C2 – Detailed Design Drawings**).
- The bottom row of gabion baskets will be embedded to a depth of 0.5m below the existing ground level to improve resistance against sliding and overturning.
- All gabion baskets will be infilled with hard, durable and unweathered sandstone rockfill.
- A fully galvanised catch fence system of approximately 110m in length, 6m in height and a minimum energy absorption capacity of 3000 kJ will be installed above the gabion geo-barrier system.
- Provision will be made for regular inspection and maintenance measures including the periodic removal of accumulated debris behind the barrier system to maintain capacity, limit excessive loading on the structure and ensure the continued long-term performance of the gabion geo-barrier.

Active Mesh System with isolated Rock Bolts and a Catch Fence.

Zone 5

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised active mesh system will be installed over the full extent of Zone 5.
- The active mesh system will comprise steel wire with a minimum tensile strength between 380MPa and 550MPa and a minimum wire diameter of 2.7mm. The mesh will consist of a double twist hexagonal weave pattern with a maximum aperture size of 80mm and shall incorporate Class A corrosion protection consisting of a 95% Zinc - 5% Aluminium coating.
- Approximately 7800m^2 of mesh will be utilised.
- 3m long grouted, galvanised 500MPa threaded steel bar dowels will be installed on a 2.5m x 2.5m grid spacing both horizontally and vertically.
- Approximately 1607 rock dowels will be installed in accordance with the detailed design drawings.
- A fully galvanised catch fence system will be installed across the full length of Zone 5, approximately 260m in length, 6m in height, and a minimum energy absorption capacity of 3000kJ.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- 20m long 100mm diameter sub-horizontal drainage holes will be drilled at an inclination of 15º above horizontal.
- Provision will be made for ongoing inspection and maintenance of the catch fence system and drainage outlets.

Refer to **Appendix C2 – Detailed Design Drawings** and **Appendix D2 – Geotechnical Design Report**

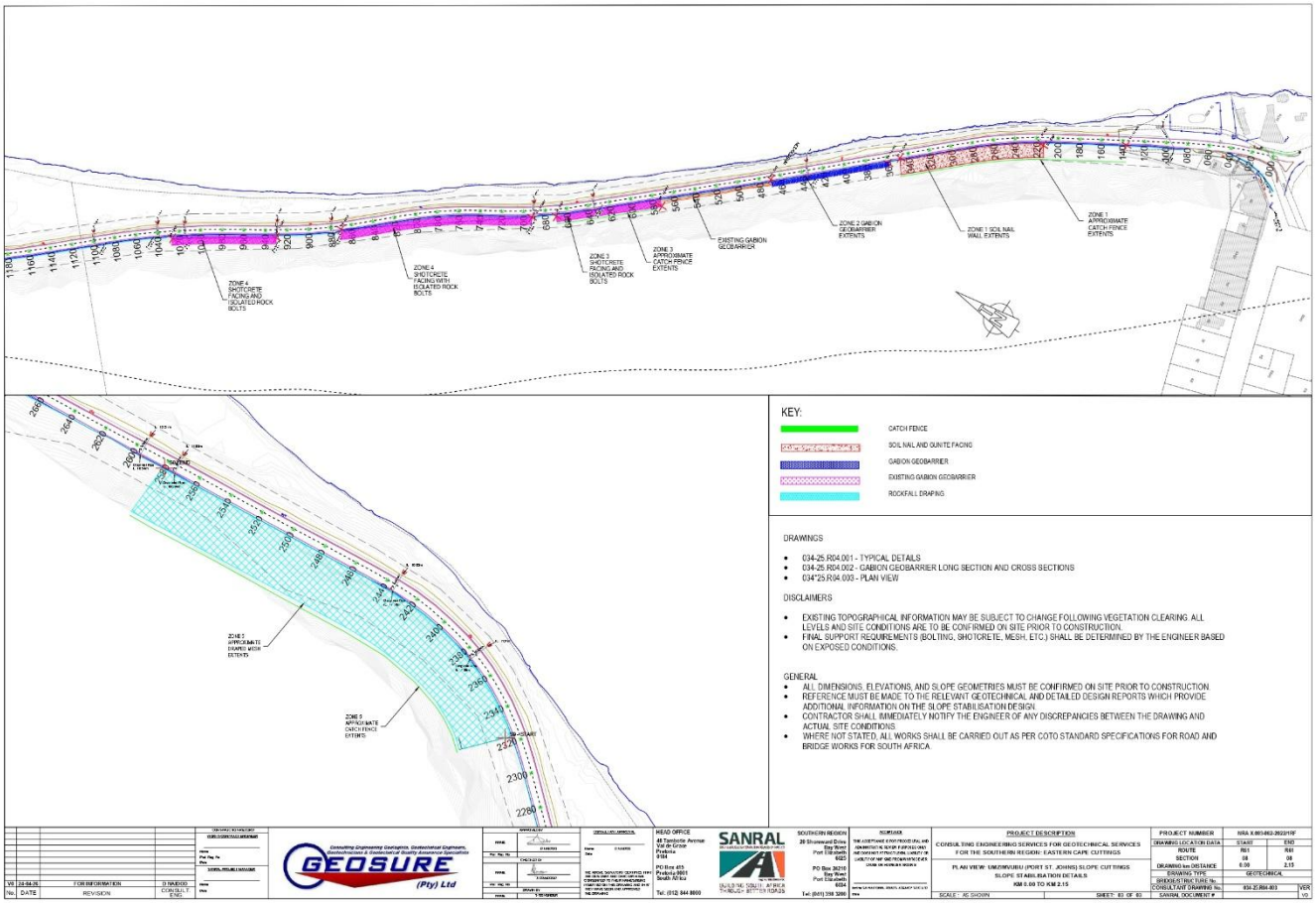

Figure 1.2: Overall layout design

The overall layout design is also attached as **Appendix C1 – Overall Layout Design**

1.3 Specialist Studies

Terrestrial Biodiversity Compliance Statement:

The Terrestrial Assessment was conducted by The Biodiversity Company, dated August 2025. The findings of the assessment are summarised below:

- The project area is characterised by Coastal Forest vegetation.

- It is estimated that the clearance of indigenous vegetation will be between 1-2ha.
- The project area occurs within a Critical Biodiversity Area (CBA) 1.
- Three (3) protected species were found along the route, namely:
    - *Aloidendron barberae*
    - *Dracaena aletriformis*
    - *Sideroxylon inerme*
- No Species of Conservation Concern (SCC) were identified within the project area. In terms of Site Ecological Importance, the vegetation structure and species composition of the singular habitats have been completely altered and as such, has a very low conservation value and ecological sensitivity from a floral perspective. From a faunal perspective, suitable habitats were noted on site however no faunal SCC were identified within the project area.

- Habitats within the study area varied from “Very Low” to “Medium” Site Ecological Importance (SEI).
- **Terrestrial theme:** The project area scored “Very low” to “Medium” sensitivity as it exists in a predominantly modified state with high levels of anthropogenic disturbance that has contributed to an overall loss in ecosystem functionality.
- **Animal Species theme**: The project area scored “Medium” sensitivity due to high levels of anthropogenic disturbance.
- **Plant Species theme:** The project area scored “Low” sensitivity due to high levels of anthropogenic disturbance.
- The study noted that due to the location, state and size of the ecosystem, impacts arising from the proposed activities is unlikely to result in the loss of any functional habitat.
- The specialist is of the opinion that the project is supported provided that mitigation measures are implemented and incorporated into the Environmental Management Programme.

Please refer to **Appendix D6 - Terrestrial Biodiversity Compliance Statement**

Wetland Assessment:

The Wetland Assessment was conducted by The Biodiversity Company, dated July 2025. The findings of the assessment are summarised below:

- Wetland units have been grouped based on the Hydrogeomorphic (HGM) type and ecological condition.
- Seven (7) Hydrogeomorphic HGM units were identified within the 500m delineated regulatory zone. These were classified as;
    - one (1) channelled valley-bottom wetlands,
    - one (1) unchanneled valley-bottom wetlands,
    - two (2) floodplain, and
    - three (3) seep wetlands.
- Due to the location of HGMs 3-7 within the landscape, these systems are not at any perceivable risk from the proposed project and are therefore excluded from any further functional assessments.
- HGM 1 (Umzimvubu Estuary) and 2 (floodplain) were identified as “At Risk” and were assessed further.
- **Ecosystem Services**:

  The delineated wetlands score is “intermediate” in terms of ecosystem services. The following parameters were assessed to determine this score:
    - flood attenuation
    - streamflow regulation
    - sediment trapping
    - phosphate assimilation
    - nitrate assimilation
    - toxicant assimilation
    - erosion control
    - the maintenance of biodiversity
- **Present Ecological State (PES)**: All delineated wetlands scored within the “Moderately Modified” class.
- **Ecological Importance and Sensitivity (EIS):** All delineated wetlands within the project area scored within the “Moderate” class.
- The study indicated that the project will pose a “Low” post-mitigation risk, provided that the mitigation measures outlined in the report are strictly adhered to during the construction phase.
- The specialist is of the opinion that no fatal flaws are evident for the proposed project and the project is supported provided that mitigation measures are implemented and adhered to.

Please refer to **Appendix D3 - Wetland Assessment**

Aquatic Assessment:

The Biodiversity Company conducted an Aquatic Assessment, dated September 2025. The findings are summarised below:

- The project area is adjacent to an NFEPA wetland (i.e., Umzimvubu Estuary).
- The project area occurs within a Critical Biodiversity Area (CBA) and Ecological Support Area (ESA).
- The 500m regulated zone of the project area overlaps with 'Endangered' watercourses indicating that impacts could potentially result in degradation of the downstream system.
- The in-situ water quality results indicated no serious water quality perturbation in the Mzimvubu Estuary, except for sewage effluent observed within the tributary
- The instream habitat of the Umzimvubu Estuary and corresponding tributaries rated "Moderately Modified" indicating a moderate loss of natural habitat, biota, and basic ecosystem function. This can be attributed to anthropogenic activities.
- The riparian habitat integrity of the Umzimvubu Estuary was rated "Largely Modified" due to the encroachment of exotic vegetation and rubbish dumping.
- The combination of impacts has resulted in habitat loss, encroachment of alien vegetation into the riparian habitat, flow modification, deterioration of water quality, and impacts to instream and riparian integrity.
- The Present Ecological State (PES) assessment of the project area is rated as "Moderately Modified".
- The Ecological Importance (EI) and Ecological Sensitivity (ES) is rated as "Moderate".
- Results of the impact assessment indicated that the construction and operation phases of the project poses "Moderate" pre-mitigation risks to the freshwater ecosystems. Adherence to all mitigation measures can result in "Low" post-mitigation risks.
- It is the opinion of the specialist that the project may be considered for authorisation, on condition that all prescribed mitigation measures and recommendations are implemented.

Please refer to **Appendix D4 – Aquatic Assessment**

Heritage Impact Assessment:

The Heritage Assessment was conducted by Umlando Archaeological Surveys and Heritage Management, dated June 2025. The findings of the assessment are summarised below:

- The desktop study noted that it is highly unlikely that archaeological sites or palaeontological deposits will occur within the study area.
- The study indicates that the area is mostly in an area of no to low palaeontological sensitivity with some areas being of moderate sensitivity.
- The specialist recommends a Chance Find Protocol be initiated and form part of the EMPr.
- The specialist is of the opinion that the project is supported provided that the Chance Find Protocol is implemented during the construction phase.

Please refer to **Appendix D5 - Heritage Impact Assessment**

Table 1.3 below makes reference to specialist studies identified in the NEMA Screening Tool (**Appendix J2**). As per the Screening Tool, it is the responsibility of the EAP to confirm the list and to motivate in the assessment report, the reason for not including any of the identified specialist study.

Table 0-3: Specialist Studies from the NEMA Screening Tool

Specialist Study	Motivation

Landscape/Visual Impact Assessment	This assessment was not undertaken as the proposed project is for emergency slope stabilisation for a section of the R61. As such, this assessment is not applicable to the proposed development.
Archaeological and Cultural Heritage Impact Assessment	Please refer to **Appendix D5 – Heritage Impact Assessment**. The desktop study noted that it is highly unlikely that archaeological sites or palaeontological deposits will occur within the study area. The Heritage Impact Assessment concluded that the proposed development is acceptable from a heritage perspective and may be favourably considered for authorisation.
Palaeontology Impact Assessment	Please refer to **Appendix D5 – Heritage Impact Assessment**. The desktop study noted that majority of the project area is of no to low palaeontological sensitivity with some areas being of moderate sensitivity. The Heritage Impact Assessment concluded that the proposed development is acceptable from a heritage perspective and may be favourably considered for authorisation.
Terrestrial Biodiversity Impact Assessment	Please refer to **Appendix D6 – Terrestrial Biodiversity** Compliance Statement. Habitats within the study area varied from "Very Low" to "Medium" Site Ecological Importance and due to the location, state and size of the ecosystem, impacts arising from the proposed activities is unlikely to result in the loss of any functional habitat. The specialist is in support of the proposed project.
Aquatic Biodiversity Impact Assessment	Please refer to **Appendix D4 – Aquatic Assessment**. Results of the impact assessment indicated that the construction and operation phases of the project poses "Moderate" pre-mitigation risks to the freshwater ecosystems. Adherence to all mitigation measures can result in "Low" post-mitigation risks. It is the opinion of the specialist that the project may be considered for authorisation.
Hydrology Assessment	Please refer to **Appendix D3 – Wetland Impact Assessment.** The study indicated that the project will pose a "Low" post-mitigation risks, provided that the mitigation measures outlined in the report are strictly adhered to during the construction phase. The specialist is of the opinion that no fatal flaws are evident for the proposed project.
Socio-Economic Assessment	This assessment was not undertaken as the proposed project is for the emergency slope stabilisation for a section of Umzimvubu Drive. As such this assessment is not applicable to the proposed development.
Plant Species Assessment	Please refer to **Appendix D6 – Terrestrial Biodiversity Compliance** Statement. The study noted that the project area scored "Low" sensitivity for the plant species theme due to high levels of anthropogenic disturbance. Three (3) protected plant species were noted along the route and no SCC's were noted.
Animal Species Assessment	Please refer to **Appendix D6 – Terrestrial Biodiversity Compliance Statement.** The study noted the project area scored "Medium" sensitivity for the animal species theme due to high levels of anthropogenic disturbance. Suitable habitats were noted for faunal SCC's however no faunal SCC's were identified within the project area.

The following themes identified in the NEMA Screening Tool were classified as having a very high to high sensitivity:

- **Agriculture Theme** (**Very High Sensitivity**) – Livestock and subsistence-level farming is common amongst residents in the greater Umzimvubu catchment area.
- **Animal Species Theme (High)** – As per the Terrestrial Biodiversity Compliance Statement compiled by The Biodiversity Company, dated August 2025, the High Animal Species Theme sensitivity is disputed due to high levels of anthropogenic disturbance.
- **Aquatic Biodiversity Theme (Very High Sensitivity)** – As per the Aquatic Assessment compiled by The Biodiversity Company, dated September 2025, the estuarine habitats are utilised by aquatic organism for feeding, breeding and nurturing homes and serves as gateway for migrating biota.

- **Civil Aviation (High Sensitivity)** – The proposed development is 450m from Port St Johns Airfield. The proposed development will not have any impact on civil aviation as it is a slope stabilisation project.
- **Terrestrial Biodiversity Theme** (**Very High Sensitivity**) – As per the Terrestrial Biodiversity Compliance Statement compiled by The Biodiversity Company, dated August 2025, the "Very High" terrestrial theme was disputed and scored "Very low" to "Medium" sensitivity as the site exists in a predominantly modified state with high levels of anthropogenic disturbance that has contributed to an overall loss in ecosystem functionality.

1.4 All Listed and Specific Activities Triggered and Applied for as per Section 3(d) (i)

2014 NEMA EIA Regulations (as amended), Appendix 1- 3(i) all listed and specified activities triggered and being applied for:

Table 0-4: Listed and specified activities triggered and being applied for

GNR	Activity Number	Activity as per legislation	Activity applicability
Listing Notice 1 (Basic Assessment)			
Government Notice Regulation (GNR) No. 327 of the EIA Regulation (2014).	Activity 12 of GNR327	*The development of—* *(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs—* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —* *excluding—* *(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;* *(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;* *(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;* *(dd) where such development occurs within an urban area;* *(ee) where such development occurs within existing roads, road reserves or railway line reserves; or*	**The proposed slope stabilisation infrastructure for Zones 1 – 5 will have a physical footprint of 15 100m^2. The stabilisation infrastructure will occur within 5 - 15m of the Umzimvubu Estuary.**

GNR	Activity Number	Activity as per legislation	Activity applicability
		(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	
	Activity 27 of GNR327	*The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for –* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaking in accordance with a maintenance management plan.*	**As per the Terrestrial Biodiversity Compliance Statement compiled by the Biodiversity Company, dated August 2025, the proposed slope stabilisation will involve the clearance of 1 – 2Ha of indigenous vegetation (e.g. *Trichilia emetica, Erythrina afra, and Trema orientale*).** **A comprehensive list of species to be removed is attached as Appendix D6 – Terrestrial Biodiversity Compliance Statement.**

1.5 Description of Feasible Alternatives as per Section 3(h) (i)

2014 NEMA EIA Regulations (as amended), Appendix 1- 3(H) a full description of the process followed to reach the proposed preferred alternative within the site, including (i), (iv).

***"Alternatives**", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to —*

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

Alternative S1 (Only Site Alternative): Slope Stabilisation along Route 61 Section 8 Umzimvubu Drive, Between Km 0.00 and Km 2.15 located within Port St. Johns Local Municipality, Eastern Cape.

- Portion 0 of Erf 1 and Portion 0 of Erf 645 in Farm Port St. Johns (C10400010000000100000 and C10400010000064500000).
- The land is owned by Port St Johns Local Municipality.
- No site alternative properties/locations are applicable as the project is aimed at stabilising a specific portion of the slope along Umzimvubu Drive.

(b) The type of activity to be undertaken;

The applicant, SANRAL, intends on implementing slope stabilisation measures along Section 8 of the R61 Umzimvubu Drive, within Port St. Johns Local Municipality, OR Tambo District Municipality, Eastern Cape. The slope stabilisation was classified as emergency works and a geotechnical investigation was conducted between the 5th to 8th of November 2024. The Geotechnical Investigation compiled by Geosure (Pty) Ltd, dated March

2025, identified a total of five (5) unstable zones and the stabilisation measures were categorised based on geological and geotechnical characteristics.

Refer to **Appendix D1 – Geotechnical Investigation**

The following stabilisation infrastructure are proposed for each zone:

- Zone 1: The installation of shotcrete facing with a soil nail wall and a catch fence.
- Zone 2: The construction of gabion geo-barriers and the installation of a catch fence.
- Zone 3: The installation of reinforced shotcrete facing with isolated rock dowels.
- Zone 4: The installation of reinforced shotcrete facing with isolated rock dowels.
- Zone 5: The installation of an active mesh system with a catch fence.

The primary cause of slope failures are as follows:

- Boulder/rock fall and debris flow from natural slope;
- Sloughing of weathered rock mass;
- Sloughing of fill material;
- Talus sliding on weathered sandstone;
- Undercutting and scouring of the toe;
- Loose unconsolidated talus soils;
- Tension cracks; and
- Unfavourable discontinuity orientation of the slope.

The overall area of the slope stabilisation works for each zone are outlined in **Table 1.5** below.

Table 0-5: Slope area (m^2) of the proposed stabilisation works for each zone.

Zone	Chainage	Area of the site (m^2):
Zone 1	Km 0.137 – Km 0.348	2800m^2
Zone 2	Km 0.360 – Km 0.469	1100m^2
Zone 3	Km 0.573 – Km 0.670	700m^2
Zone 4	Km 0.693 – Km 1.027	2000m^2
Zone 5	Km 2.324 – Km 2.580	8500m^2

(c) The design or layout of the activity;

Alternative D1 (Only design alternative): The proposed stabilisation design for the five (5) zones is as per Drawing No. 034-25.R04-003 compiled by Geosure (Pty) Ltd, dated April 2026.

No design alternatives are applicable as the project is aimed at stabilising a specific portion of the slope along Umzimvubu Drive. Refer to **Figure 1.3** below and **Appendix C1** illustrating the proposed engineering design for the five (5) stabilisation zones.

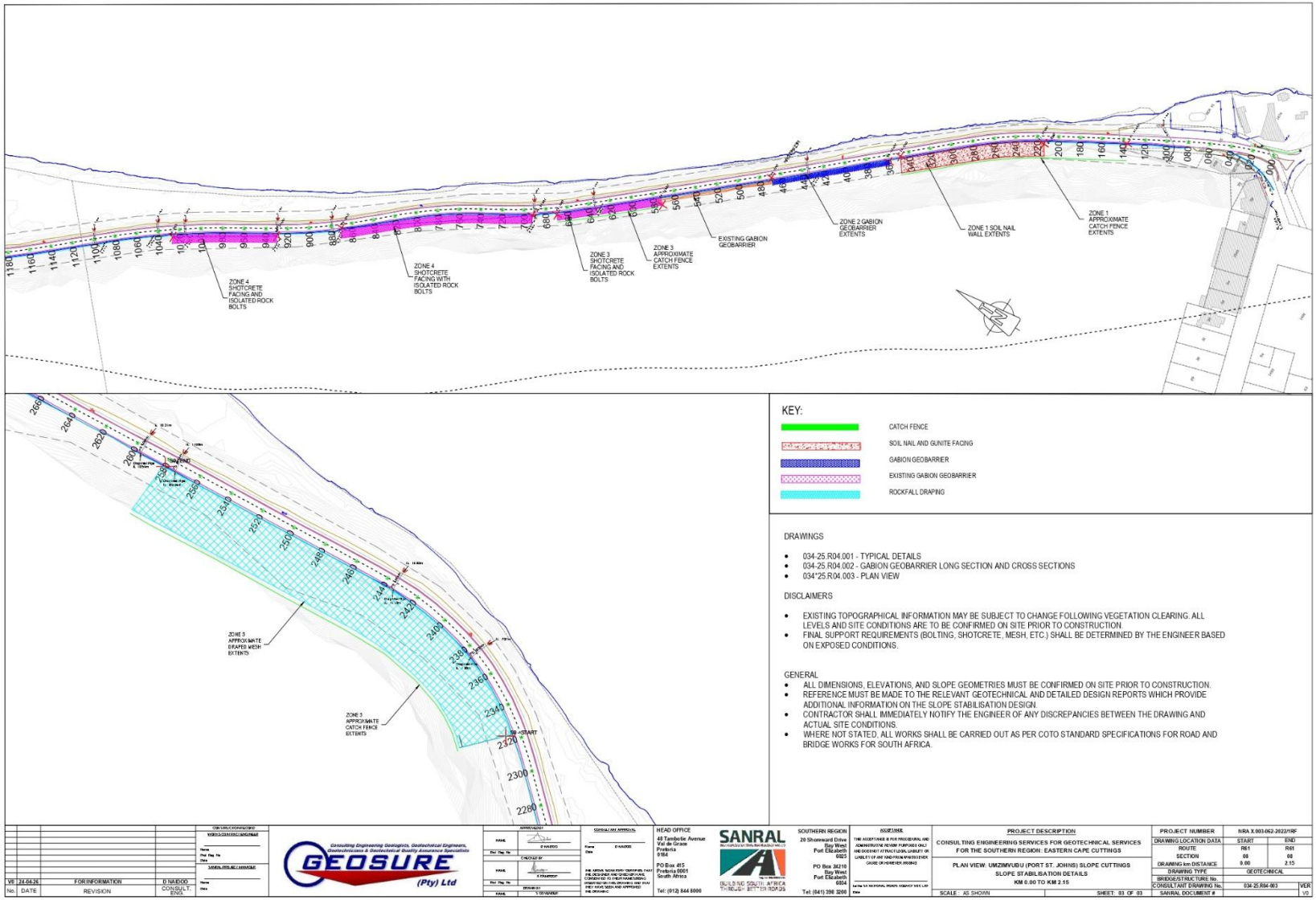

Figure 1.3: Overall layout design

(d) The technology to be used in the activity;

Six (6) technology alternatives were investigated for the Proposed Slope Stabilisation along Umzimvubu Drive, Port St. Johns:

- **Technology Alternative T1 (Preferred) – Scaling and Barring, Shotcrete application with soil Nails/ Rock Dowels and a catch fence**

Zone 1

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised catch fence system will be installed, of approximately 215m in length, 6m in height and a minimum energy absorption capacity of 3000 kJ.
- A permanent 134m soil nail wall will be constructed with a shotcrete facing from Km 0.214 to Km 0.348.
- Soil nails comprising threaded bar anchors with 25mm diameter bars and a minimum yield strength of 500 MPa will be installed within 100mm diameter drill holes and inclined at 15º to the horizontal.
- Soil nails will be installed in accordance with the specified arrangement depending on the slope height, and to the specified nail lengths and spacing indicated in the detailed design drawings (refer to Appendix C2 – Detailed Design Drawings).
- All soil nail elements will be galvanised and soil nail heads will comprise 300mm x 300mm x 15mm thick bearing plates completed with dome washers and nuts.
- Approximately 1100 soil nails will be utilised for Zone 1.
- Shotcrete facing will be applied to the slope with a minimum 28-day compressive strength of 30 MPa in two 50mm layers to achieve a total thickness of 100mm, with a single layer of Ref 245 mesh reinforcement.
- Approximately 2000m2 of shotcrete facing will be utilised for Zone 1.
- Provision will be made for horizontal drainage measures via the shotcrete facing to relieve pore water pressures and prevent hydrostatic pressure build up behind the facing. Drainage will comprise 50mm diameter U-PVC weep holes installed on a 1.5m grid pattern across the slope face.

Zone 3

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised catch fence system, approximately 100m in length, 6m in height, with a minimum energy absorption capacity of 3000 kJ, will be installed.
- 150mm thick reinforced shotcrete facing will be applied with 2 layers of 100mm x 100mm steel mesh with a minimum wire diameter of 6mm.
- 750m^2 of shotcrete will be applied with a minimum 28-day compressive strength of 30MPa.
- Approximately 160 isolated rock dowels will be utilised.
- The rock dowels will comprise 6m long, galvanised hot-rolled, high-tensile steel bars with continuous coarse thread, complying with SANS 920, with a nominal diameter of 25mm and minimum yield strength exceeding 500MPa.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- Horizontal drains will be installed through the shotcrete facing where required, to relieve groundwater pressures, improve drainage performance and prevent hydrostatic pressure build up behind the facing system.
- Provision will be made for ongoing inspection and maintenance of the catch fence system, drainage outlets, and shotcrete facing to ensure the long-term performance of the stabilisation measure.

Zone 4

- 150mm thick reinforced shotcrete facing will be installed with 2 layers of 100mm x 100mm steel mesh with a minimum wire diameter of 6mm.
- The shotcrete must achieve a minimum 28-day compressive strength of 30MPa.

- Approximately 2 156m^2 of shotcrete will be utilised.
- Approximately 920 isolated rock dowels will be utilised in accordance with the detailed design drawings.
- Rock dowels will comprise 6m long, galvanised hot-rolled, high-tensile steel bars with continuous coarse thread, complying with SANS 920, with a nominal diameter of 25mm and minimum yield strength exceeding 500MPa.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- Horizontal drains will be installed through the shotcrete facing to relieve groundwater pressures, improve drainage performance and prevent hydrostatic pressure build up behind the facing system.
- Provision will be made for ongoing inspection and maintenance of the drainage outlets and shotcrete facing to ensure the long-term performance of the stabilisation measure.

❖ **Technology Alternative T2 (Not Supported) – Shotcrete application and a Catch Fence**

Alternative T2 involves the application of shotcrete facing combined with a catch fence, designed to provide surface protection and intercept falling boulders along Umzimvubu Drive. The dimensions for Zones 1, 3 and 4 are outlined below:

- **Zone 1** – 2000 m^2 Shotcrete cover and a 1200 m^2 Catch Fence.
- **Zone 3** – 600 m^2 Shotcrete cover and a 360 m^2 Catch Fence
- **Zone 4** – 2100 m^2 Shotcrete cover and a 720 m^2 Catch Fence

Table 1.6 below outlines the advantages and disadvantages of Technology Alternatives T1 and T2.

Table 0-6: Comparative Analysis of Alternative T1 (Preferred) and Alternative T2 (Not Supported)

Technology Alternative T1 (Preferred)	Technology Alternative T2 (Not Supported)
Includes soil nails / rock dowels.	Does not make provision for soil nails / rock dowels and relies on surface stabilisation methods (i.e., shotcrete facing).
Higher cost implications.	Cost-effective.
The soil nails provide tensile strength to prevent sub-surface soil movement.	Does not make provision for sub-surface slope stabilisation mechanisms.
The rock dowels penetrate deep into stable strata, binding loose, fractured, or jointed rock together and transferring loads away from the unstable face. This provides deep structural reinforcement.	Only mitigates superficial slope failures and does not make provision for sub-surface slope stabilisation mechanisms.
Improves overall global slope stability which enhances the shear strength of the weathered sandstone by resisting both tensile and shear forces.	Only addresses superficial slope failures and does not improve global or structural slope stability.
Provides a long-term slope stabilisation.	The absence of anchorage means the shotcrete is prone to cracking or detachment over time due to ongoing slope movement, making it unsuitable as a long-term solution
Ensuring long-term slope stability improves accessibility and enhances the safety and reliability of the transport corridor as Umzimvubu Drive is a key access route to Port St. Johns and a notable tourism hub along the Wild Coast.	Cracking and/or detachment will require ongoing maintenance and repairs, resulting in future road closures and higher cost implications long-term.

❖ **Technology Alternative T3 (Preferred) – Gabion Geo-barrier with a Catch Fence**

Zone 2

- The slope will be scaled and barred down to remove loose, detached or potentially unstable boulders and reduce immediate risk of rockfall and falling debris during construction activities.
- A founding surface will be established to provide a stable and suitable platform for the installation of the gabion geo-barrier system.
- A gabion geo-barrier system will be implemented using 1m x 1m x 1m Galfan and PVC coated wire mesh baskets (80mm x 100mm mesh aperture) arranged in a stepped pyramidal configuration comprising four baskets in the bottom row, to an overall height of 4m (refer to **Appendix C2 – Detailed Design Drawings**).
- The bottom row of gabion baskets will be embedded to a depth of 0.5m below the existing ground level to improve resistance against sliding and overturning.
- All gabion baskets will be infilled with hard, durable and unweathered sandstone rockfill.
- A fully galvanised catch fence system of approximately 110m in length, 6m in height and a minimum energy absorption capacity of 3000 kJ will be installed above the gabion geo-barrier system.
- Provision will be made for regular inspection and maintenance measures including the periodic removal of accumulated debris behind the barrier system to maintain capacity, limit excessive loading on the structure and ensure the continued long-term performance of the gabion geo-barrier.

❖ **Technology Alternative T4 (Not Supported) – Concrete Retaining Wall**

Alternative T2 involves the construction of a concrete retaining wall to serve as a rigid barrier, effectively preventing boulders from migrating onto Umzimvubu. A 1 200m^3 concrete wall is proposed for **Zone 2**.

Table 1.7 below outlines the advantages and disadvantages of Technology Alternatives T3 and T4.

Table 0-7: Comparative Analysis of Alternative T3 (Preferred) and Alternative T4 (Not Supported)

Technology Alternative T3 (Preferred)	Technology Alternative T4 (Not Supported)
Gabion geo-barriers are a flexible and effective passive rockfall protection system well-suited for the conditions observed in Zone 2.	Concrete structures offer high compressive strength and long-term durability.
The porous and permeable design of gabion geo-barriers encourage natural drainage, eliminating the need for a separate drainage system and prevents water build-up behind the barrier.	The impermeable nature of concrete would necessitate the installation of a dedicated drainage system to manage surface and subsurface water.
The voids within the gabion geo-barriers promote vegetation growth, which in turn contributes to long-term slope stability through the development of natural root systems.	The visual impact of a large concrete structure would significantly alter the natural aesthetics of the area, which is an important consideration in a region that relies heavily on tourism.
The durability and longevity of the gabion system reduces the demand on emergency response services and helps prevent economic losses related to transport disruptions.	While concrete walls can have a lifespan exceeding 50 years, their rigid structure makes them susceptible to damage from ground movement or differential settlement. In the event of structural failure, full replacement may be required, leading to substantial maintenance and reconstruction costs
The installation of gabion geo-barriers is labour-intensive which provides short-term employment opportunities for the local community.	concrete construction typically requires skilled labour, thereby limiting the potential for local employment and skills transfer
Ensuring long-term slope stability improves accessibility and enhances the safety and reliability of the transport corridor as Umzimvubu Drive is a key	Cracking and/or detachment will require ongoing maintenance and repairs, resulting in future road closures and higher cost implications long-term.

access route to Port St. Johns and a notable tourism hub along the Wild Coast.	

- **Technology Alternative T5 (Preferred) – Active Mesh System with isolated Rock Bolts and a Catch Fence.**

Zone 5

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised active mesh system will be installed over the full extent of Zone 5.
- The active mesh system will comprise steel wire with a minimum tensile strength between 380MPa and 550MPa and a minimum wire diameter of 2.7mm. The mesh will consist of a double twist hexagonal weave pattern with a maximum aperture size of 80mm and shall incorporate Class A corrosion protection consisting of a 95% Zinc - 5% Aluminium coating.
- Approximately 7800m^2 of mesh will be utilised.
- 3m long grouted, galvanised 500MPa threaded steel bar dowels will be installed on a 2.5m x 2.5m grid spacing both horizontally and vertically.
- Approximately 1607 rock dowels will be installed in accordance with the detailed design drawings.
- A fully galvanised catch fence system will be installed across the full length of Zone 5, approximately 260m in length, 6m in height, and a minimum energy absorption capacity of 3000kJ.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- 20m long 100mm diameter sub-horizontal drainage holes will be drilled at an inclination of 15º above horizontal.
- Provision will be made for ongoing inspection and maintenance of the catch fence system and drainage outlets.

- **Technology Alternative T6 (Not Supported) – Scaling and Barring and a Catch Fence.**

Alternative T6 involves once-off removal of loose and unstable rock fragments from the slope face and the installation of a catch fence. A 1 800m^2 catch fence is proposed for Zone 5 following the scaling and barring of 10 000 m^2 of the slope.

Table 1.8 below outlines the advantages and disadvantages of Technology Alternatives T5 and T6.

Table 0-8: Comparative Analysis of Alternative T5 (Preferred) and Alternative T6 (Not Supported)

Technology Alternative T1 (Preferred)	Technology Alternative T2 (Not Supported)
Includes rock bolts.	Does not make provision for rock bolts and relies on passive containment methods (i.e., catch fence).
Higher cost implications.	Cost-effective however repeated scaling and barring interventions would be required, resulting in cumulative costs over time.
The rock bolts in combination with the mesh system improves the overall global stability of the slope and helps prevent progressive instability by distributing loads over a wider area.	Does not make provision for sub-surface slope stabilisation mechanisms.
The rock bolts penetrate deep into stable strata, binding loose, fractured, or jointed rock together and transferring loads away from the unstable face. This provides deep structural reinforcement.	Only mitigates superficial slope failures and does not make provision for sub-surface slope stabilisation mechanisms.

Improves overall global slope stability which enhances the shear strength of the weathered rock by resisting both tensile and shear forces.	Only addresses superficial slope failures and does not improve global or structural slope stability.
Low-impact solution which contributes to the long-term performance and safety of the slope.	Frequent scaling and barring would be required, resulting in ongoing ecological disturbance.
Minimal environmental impact as it causes limited disturbance to slope drainage and vegetation, therefore preserving the natural slope ecology.	Frequent scaling and barring results in ongoing ecological disturbance, which negatively impacts on vegetation and the natural slope face.
Provides a long-term slope stabilisation.	Frequent scaling and barring would be required.
Ensuring long-term slope stability improves accessibility and enhances the safety and reliability of the transport corridor as Umzimvubu Drive is a key access route to Port St. Johns and a notable tourism hub along the Wild Coast.	Frequent scaling and barring and removal of rocks accumulated at the toe of the slope will require ongoing maintenance works and therefore ongoing traffic disturbance which impacts the reliability and accessibility of the transport corridor.

(e) The operational aspects of the activity;

This project is aimed at stabilising portions of the slope along Umzimvubu Drive in Port St. Johns. The slope stabilisation will prevent further erosion of the area and prevent the rocks and/or boulders from migrating onto the road. Alternative T1 (preferred) for Zones 1, 3, and 4 would require annual inspections, or inspections following extreme rainfall events. Inspections must include assessing for cracks in occurring on shotcrete facing and checking for rust residue around soil nails and dowels.

Alternative T3 (preferred) for Zone 2 would require annual inspections, whereby the following must be assessed:

- Bulging or deformation of the gabion baskets
- Wire mesh corrosion or breakage
- Stone loss
- Vegetation overgrowth
- Sediment buildup behind or within the gabion structure
- Undermining or erosion at the base of the gabion geo-barriers

Alternative T5 (preferred) for Zone 5 would require annual inspections, whereby the following must be assessed:

- Check for corrosion or breakage of the mesh system
- Ensure tension in the mesh system
- Remove excess rockfall and debris
- Check the integrity of the steel dowels

(f) The option of not implementing the activity;

The no-go alternative implies that the status quo remains, meaning the proposed slope stabilisation along Umzimvubu Drive would not proceed. In the absence of these interventions, the area would remain highly vulnerable to rockfalls, particularly during periods of heavy rainfall, posing a serious safety risk to road users. This includes the potential for severe injury, loss of life, and significant damage to infrastructure. Frequent road closures may also disrupt access to critical services such as healthcare, education, and emergency response, thereby compromising well-being of the Port St. Johns community. Additionally, unreliable road access could negatively affect the local tourism sector which is a key contributor to the region's economy.

From an environmental standpoint, implementing the stabilisation project would reduce erosion, mitigate rockfalls onto Umzimvubu Drive, and limit migratory sedimentation into the Umzimvubu Estuary. Furthermore, the rehabilitation phase of the project includes the reintroduction of diverse indigenous plant species and the removal of alien invasive species, contributing to ecological restoration.

From a socio-economic perspective, failure to implement the project would forfeit opportunities for temporary employment, local skills development, and broader community upliftment. As such, the no-go alternative would not only perpetuate physical risks but also hinder economic and social development in the Port St Johns area.

The main conclusion from the aforementioned is that the no-go alternative is likely to result in adverse environmental and socio-economic impacts. The need for slope stabilisation should therefore be assessed in accordance with the principles of the National Environmental Management Act (NEMA). Considering the environmental risks of inaction and the associated socio-economic benefits of the proposed intervention, the no-go alternative is not supported from a sustainability and safety perspective.

1.6 Project Locality as per Section 3(b) (i) – (iii)

2014 EIA Regulations, Appendix 1- 3(b) the location of the activity, including: (i) the 21 Surveyor General code of each cadastral land parcel.

Table 0-9: Location of the Proposed Activity

District Municipality	OR Tambo District Municipality
Local Municipality	Port St. Johns Local Municipality
Ward	6
Area / Town / Village	Port St. Johns
Property Description	Portion 0 of Erf 1 in Farm Port St. Johns
	Portion 0 of Erf 645 in Farm Port St. Johns
SG Codes	C10400010000000100000
	C10400010000064500000

Table 0-10: Geographical co-ordinates of the Proposed Activity

Zone:	Co-ordinates	
Zone 1	31°37'5.06"S	29°32'39.14"E
Zone 2	31°37'1.29"S	29°32'35.42"E
Zone 3	31°36'57.54"S	29°32'31.39"E
Zone 4	31°36'50.50"S	29°32'24.88"E
Zone 5	31°36'5.18"S	29°31'52.96"E

Physical Size of the Activity

Design or Layout Alternative

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Table 0-11: Size of the preferred and alternative stabilisation infrastructure

Size of the technology alternative	
Preferred Alternative	**Not Supported**
Alternative T1 **Zone 1** • 1800 m² scaling and barring • 1800 m² Shotcrete facing • 215m long, 6m high catch fence **Zone 3** • 700 m² scaling and barring • 700 m² Shotcrete facing	**Alternative T2** **Zone 1** ❖ 2000 m² Shotcrete cover ❖ 1200 m² Catch Fence **Zone 3** • 600 m² Shotcrete cover • 360 m² Catch Fence

• 100m long, 6m high catch fence **Zone 4** • 2000 m² scaling and barring • 2000 m² Shotcrete facing	 **Zone 4** • 2100 m² Shotcrete cover • 720 m² Catch Fence
Alternative T3 **Zone 2** • 1100 m² scaling and barring • 1100 m³ gabion baskets • 110m long, 6m high catch fence	**Alternative T4** **Zone 2** • 1200 m³ Construction of concrete wall
Alternative T5 **Zone 5** • 8450 m² scaling and barring • 8450 m² Active Mesh System • 260m long, 6m high catch fence	**Alternative T6** **Zone 5** • 10 000 m² scaling and barring • 1800 m² Catch Fence

1.7 Site Access

Does access to the site exist?	YES	[redacted]
If NO, what is the distance over which a new access road will be built	N/A	
Describe the type of access road planned: The proposed site is located along Umzimvubu Drive which is an existing road. A Traffic Assessment was conducted by Mothilal Consulting Engineers, dated April 2026, to assess the impact of a single lane closure on Umzimvubu Drive and determine the estimate queue lengths and duration for the Stop-Go such that the traffic volume clears timeously with minimal delays. The key considerations from the traffic count data were the peak hour volumes. The northbound (exiting PSJ) peak hour contains 265 vehicles per hour whilst the southbound (entering PSJ) was recorded as 349 vehicles per hour over the count period. It is recommended that during the peak hours maximum cycle times of 6-minutes green phase & 6-minutes red phase (12-minute total cycle time) are utilised to minimise queue lengths and impact of the surrounding community. During off-peak times the cycle times can be reduced to clear traffic queue lengths based current traffic conditions. Refer to **Appendix D8 – Traffic Assessment**		

1.8 Zoning and Land Use Rights

What is the land currently zoned for?	Undetermined – as per the zoning certificates attached as **Appendix J3.**	
Will any person's rights be negatively affected by the proposed activity/ies?	[redacted]	NO
Will the activity be in line with the following?		
The Provincial and Local Spatial Development Framework	YES	[redacted]
The Provincial and Local Integrated Development Framework	YES	[redacted]

OR Tambo District Municipality Integrated Development Plan (IDP) – 2025/2026

As per the Constitution of the Republic of South Africa (1996 Section 152(1) (a)–(e) included as part of the OR Tambo District Municipality's IDP, the following objectives applicable to this project should be achieved at municipal level:

- to promote social and economic development

- to promote a safe and healthy environment

The project at hand will create temporary employment opportunities during the construction and rehabilitation phases of the project, empowering the local community and contributing to general economic development within the Municipality. Additionally, the project will enhance the safety of the environment by reducing the risk of rockfall along the R61 Umzimvubu Drive as well as stabilisation of eroding slopes and implementing preventative measures for soil erosion.

OR Tambo District Municipality Draft Spatial Development Framework (SDF) – 2020/21

Port St. Johns is prone to flooding, landslides and stormwater issues, particularly after heavy rainfall events. The proposed slope stabilisation aligns with the goal of the OR Tambo SDF which states "*Plan for cumulative impacts and knock-on effects",* as the stabilisation infrastructure provides long-term security and erosion prevention, allowing for a planned proactive approach to cumulative impacts of storms and heavy rainfall.

Construction and rehabilitation activities in the project area includes the removal of AIP's which aligns with the SDF's goal to *"minimise the spread of non-native species".* Additionally, the SDF states that "*with the high levels of unemployment, interventions are needed for job creation".* The proposed slope stabilisation will provide temporary job opportunities for the local community, resulting in a positive socio-economic impact for the Umzimvubu area.

Tourism is a large source of income for the area, however safety hazards such as rockfall, road blockages, or loss of aesthetic appeal could deter tourists. The proposed slope stabilisation directly aligns with the SDF which states *"Infrastructure to support Tourism Development"* as the project will prevent the aesthetic deterioration of the area as well as enhance overall safety.

Port St. Johns Local Municipality Integrated Development Plan (IDP) - 2025/26

The proposed slope stabilisation aligns with Port St. Johns IDP as it states "*Slope protection to be provided, in the form of gabions, on the mountain side and river bank".* This directly aligns with Alternative T3 for Zone 2, and indirectly with all preferred alternatives for Zones 1, 3, 4, and 5, as these slopes will be protected by alternate mechanisms. The proposed slope stabilisation aligns with goals of the IDP such as *"maintain basic infrastructure," "ensure safety," "service provision,"* and "*reducing disaster risk*", such as storm damage and erosion, which may otherwise damage infrastructure such as roads.

Port St. Johns Local Municipality Spatial Development Framework (SDF) - 2010 (Currently under review)

Porst St. John SDF has 7 main objectives, of which Objective 5 states *"to support and promote infrastructure to serve the community and the tourism industry".* Safety hazards such as rockfall, road blockages, or loss of aesthetic appeal could deter tourists. The proposed slope stabilisation will prevent the aesthetic deterioration of the area as well as enhance overall safety. The SDF further states that an objective of the Port St. Johns Master Layout Plan is to *"Promote sustained protection of the environment"* which directly aligns with the need and desirability of the proposed slope stabilisation.

1.9 Water Use and Bulk Service Availability

Please indicate the source(s) of water that will be used for the activity.

Municipal – The appointed contractor will get confirmation from the Port St. Johns Local municipality prior to construction.

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month.

N/A

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water & Sanitation? Please provide proof that the application has been submitted to the Department of Water & Sanitation.

Water Use Authorisation will not be required as there is a formalised asphalt road which separates the working area from the adjacent Umzimvubu Estuary and as such, the proposed stabilisation activities will not have any impact on the estuary.

Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as an Appendix).

Water services will be required from the Port St. Johns Municipality during the construction phase. The appointed contractor will get confirmation from the municipality prior to construction.

1.10 Energy Efficiency

Describe the design measures, if any, which have been undertaken to ensure that the activity is energy efficient.

In terms of energy efficiency, the proposed slope stabilisation should be conducted during regular working hours to reduce the use of artificial lighting, if need be. Additionally, the contractor will be advised to transport all construction materials on-site at the same time wherever possible; the collection of waste material must be conducted simultaneously with other activities to reduce the amount of fuel usage for such transportation. Waste management methods (i.e., recycling and reusing), as well as water conservation measures are recommended and included in the EMPr (see **Appendix G**).

Describe how alternative energy sources have been considered or been built into the design of the activity if any.

N/A

SECTION 2: SITE DESCRIPTION OF SURROUNDING LAND USE AS PER SECTION 3(H) (IV) AND (K)

2014 NEMA EIA Regulations (as amended), Appendix 1- 3(H) a full description of the process followed to reach the proposed preferred alternative within the site, including (iv) and 3 (K) a summary of findings and impact management measures identified in any specialist report complying with Appendix 6 to these regulations and an indication as to how these findings and recommendations have been included in this report.

2.1. Climate

The Umzimvubu area has a humid subtropical climate with high rainfalls. Average annual precipitation is approximately 1000mm to 1500mm mostly during summer with extreme summer rainfall of up to 150mm in a single event. Heavy rainfalls subsequently contribute to erosion, landslides and slope failures. Figure 2.1 below illustrates the average monthly temperature and precipitation.

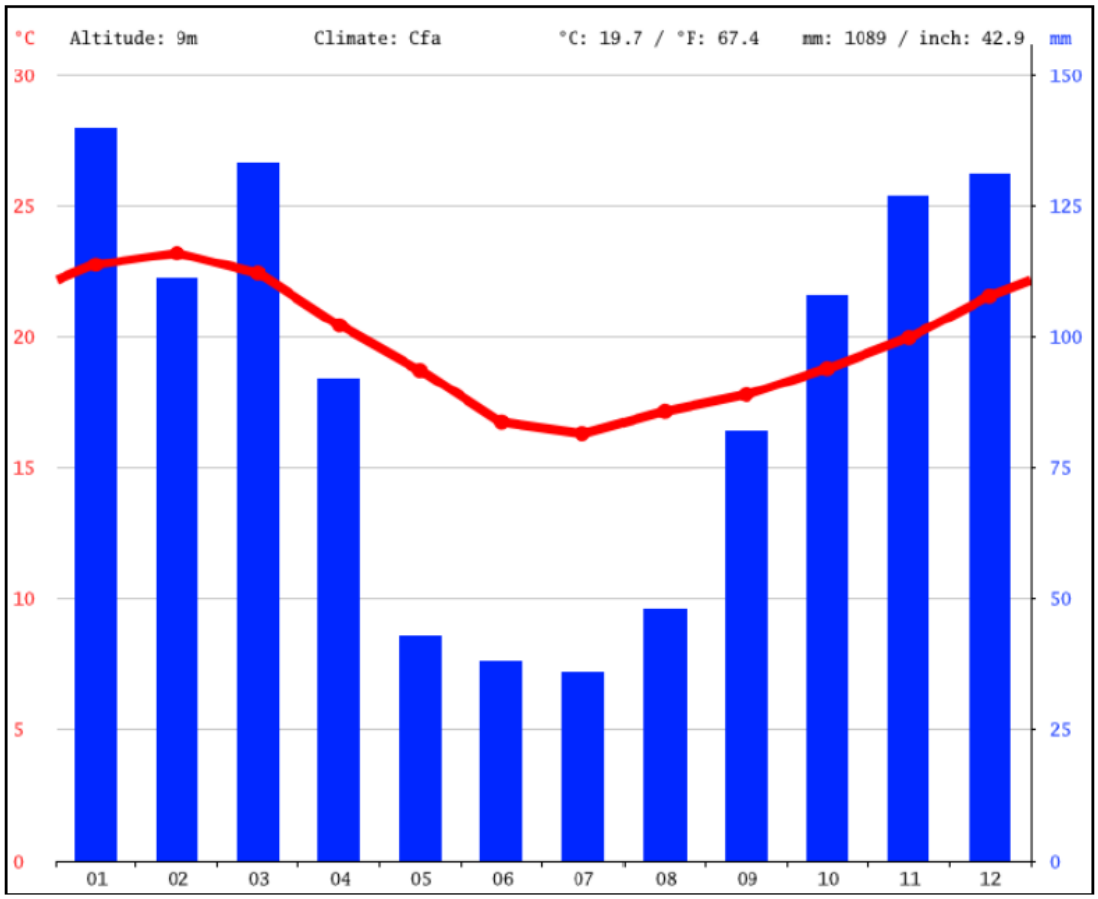

Figure 2.1: Average monthly temperature (red) and precipitation (blue)

2.2. Geology and Soils

The area mostly consists of weathered sedimentary rocks from the Karoo-aged Dwyka Group and the older Natal Group, dating back to the Ordovician period. This region is characterised by rugged terrain and significant structural deformation whereby geological block faulting has uplifted the older Natal Group sediments against the younger Dwyka Group deposits. The Natal Group formation has also been subject to anticlinal folding. The site was characterised by the following:

- Limited fill materials: *The fill material varies from moist to very moist and is dark greyish/ brown and/or olive brown in colour. It is soft and varies from gravelly fine sandy silt/sandy clay to loose clayey sand.*

- Slip debris: *The slip debris varies from dry to slightly moist and is greyish brown/ yellowish brown in colour. It is loose to medium dense and varies from gravelly fine/medium sand, to soft sandy clay/ clayey silt.*
- Talus soils: *The talus soils are slightly moist to moist and greyish brown, blotched light grey and/or yellowish brown in colour. It is loose to medium dense, and varies from fine to medium gravelly sand to slightly gravelly sandy clay.*
- Residual sandstone: *Residual soils are orange brown/ light grey/ light brown and medium dense. It varies from clayey find sand to firm, slightly sandy clayey silt.*
- Weathered sandstone: *Weathered sandstone is light grey/ light brown/ olive grey/ and/or orange brown high weathered fine to medium grained sediment. It varies from highly to moderately fractured.*

2.3. Topography and Biophysical Environment

The topography within the Umzimvubu area varies with steep cliffs and slopes, and the Umzimvubu Estuary with associated low lying, flood prone areas along the riverine plains. The western side of Umzimvubu Drive comprises high cut slopes that are densely vegetated and near-vertical rock slopes approximately 8 to 12m in height. The Umzimvubu Estuary runs adjacent to Umzimvubu Drive, east of the project area. The project area falls within CBA with a Disturbed Transkei Coastal Belt habitat comprising Coastal Forests. These habitats are characterised by hilly coastal countries that range from grasslands, bushvelds and small forests (which could fall within the Scarp Forest vegetation types), (Mucina and Rutherford, 2006).

2.4. Terrestrial Biodiversity Compliance Statement

The Terrestrial Assessment was conducted by The Biodiversity Company, dated August 2025. The findings of the assessment are summarised below:

- The project area is characterised by Coastal Forest vegetation.
- It is estimated that the clearance of indigenous vegetation will be between 1-2ha.
- The project area occurs within a Critical Biodiversity Area (CBA) 1 (refer to Figure 2.2 below).
- Three (3) protected species were found along the survey route, namely:
    - *Aloidendron barberae* (Nationally Protected)
    - *Dracaena aletriformis* (Provincially Protected)
    - *Sideroxylon inerme* (Provincially Protected)
- No Species of Conservation Concern (SCC) were identified within the project area. In terms of Site Ecological Importance, the vegetation structure and species composition of the singular habitats have been completely altered and as such, has a very low conservation value and ecological sensitivity from a floral perspective. From a faunal perspective, suitable habitats were noted on site however no faunal SCC were identified within the project area.
- Three (3) habitat types were identified within the project area (refer to Figure 2.3 below), namely:
    - Modified (urban)
    - Water Resources
    - Disturbed Transkei Coastal Belt (Coastal Forest)
- Habitats within the study area varied from “Very Low” to “Medium” Site Ecological Importance (SEI).
- According to the Screening Tool Report generated the following sensitivity classifications were from the National Web-based Environmental Screening Tool:
    - Terrestrial Biodiversity Theme is Very High for the proposed project.
    - Animal Species Theme is High for the proposed project with several sensitive species being said to occur.
    - Plant Species Theme is Medium for the project with several sensitive species predicted to be present.

- **Terrestrial theme:** The “Very High” terrestrial theme was disputed and scored “Very low” to “Medium” sensitivity as it exists in a predominantly modified state with high levels of anthropogenic disturbance that has contributed to an overall loss in ecosystem functionality.
- **Animal Species theme**: The “High” animal species theme was disputed and scored “Medium” sensitivity due to high levels of anthropogenic disturbance.
- **Plant Species theme:** The “Medium” plant species theme was disputed and scored “Low” sensitivity due to high levels of anthropogenic disturbance and high numbers of alien and invasive plants.
- Results of the terrestrial assessment indicated that due to the location, state and size of the ecosystem, impacts arising from the proposed activities is unlikely to result in the loss of any functional habitat.
- The specialist is of the opinion that the project is supported provided that mitigation measures are implemented and incorporated into the Environmental Management Programme.

Figure 2.2 illustrates the CBA in relation to the project area, and **Figure 2.3** illustrates the Habitat types.

Please refer to **Appendix D6 - Terrestrial Biodiversity Compliance Statement**

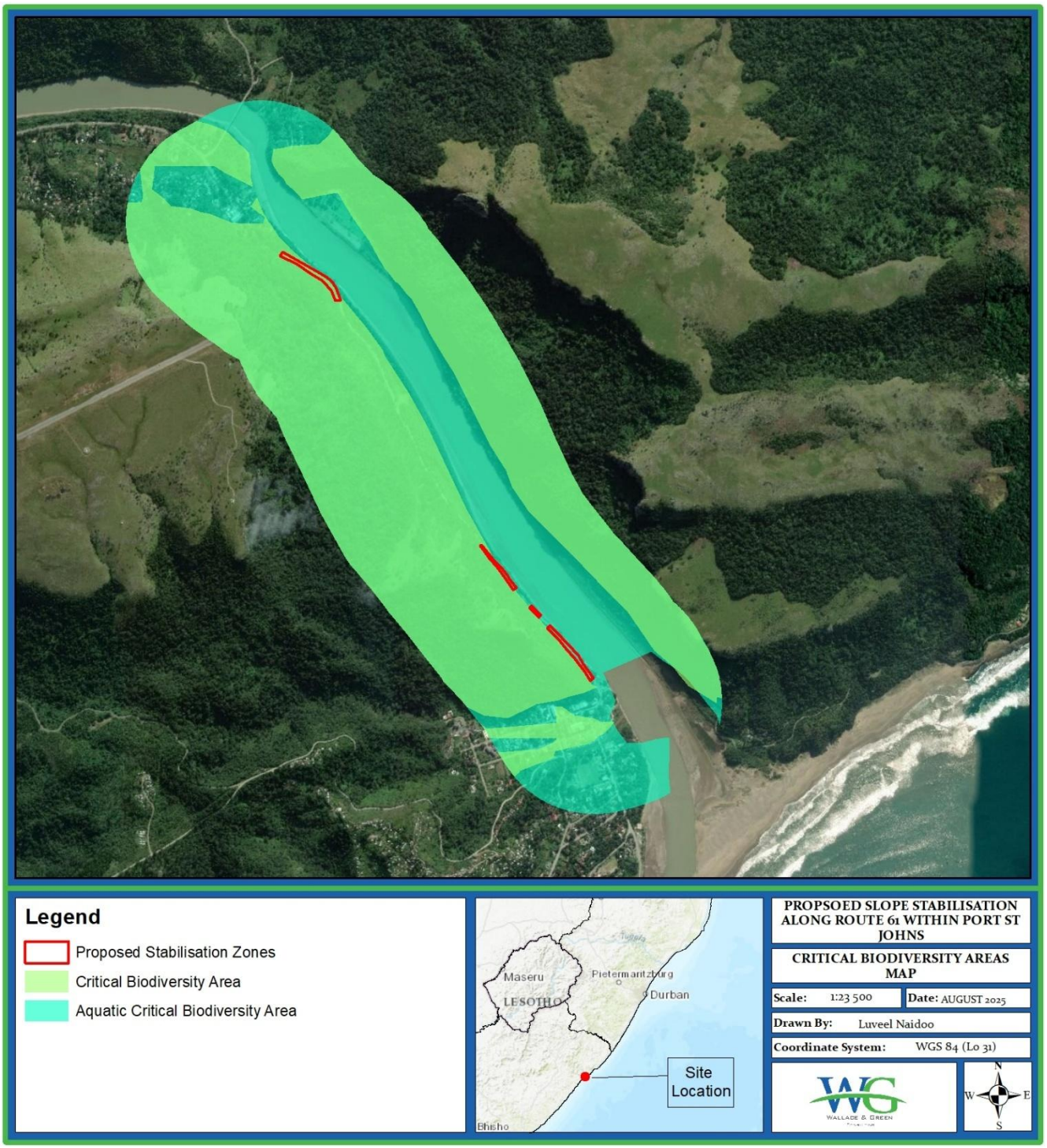

Figure 2.2: Critical Biodiversity Areas in relation to the site

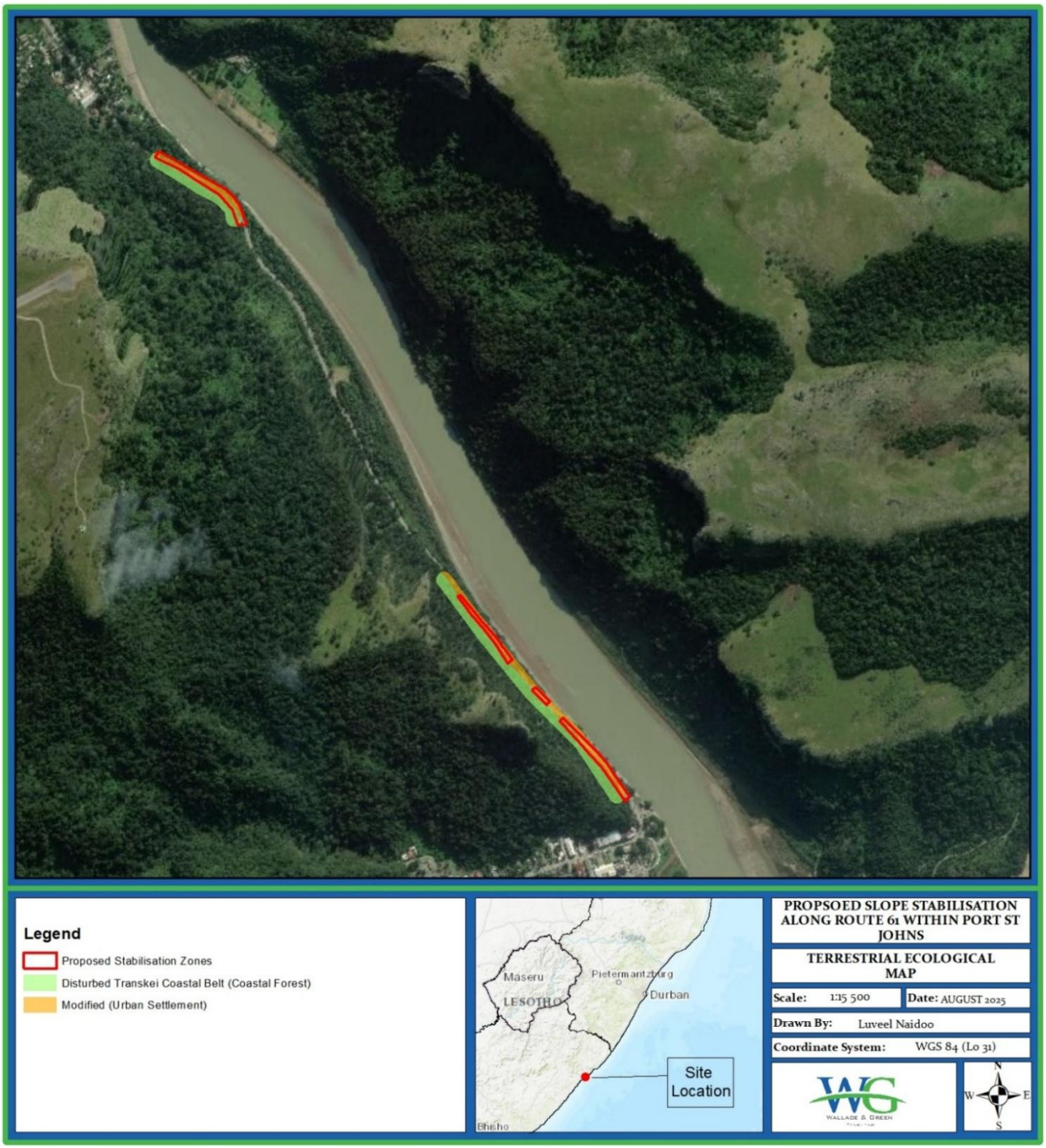

Figure 2.3: Habitat types

2.6. Aquatic Assessment

The Biodiversity Company conducted an Aquatic Assessment, dated September 2025. The findings are summarised below:

- The project area is adjacent to an NFEPA wetland, i.e. Umzimvubu Estuary (refer to Figure 2.4 below)
- The 500m regulated zone of the project area overlaps with 'Endangered' watercourses indicating that impacts could potentially result in degradation of the downstream system.
- The in-situ water quality results indicated no serious water quality perturbation in the Umzimvubu Estuary, except for sewage effluent observed within the tributary

- The instream habitat of the Umzimvubu Estuary and corresponding tributaries rated “Moderately Modified” indicating a moderate loss of natural habitat, biota, and basic ecosystem function. This can be attributed to anthropogenic activities.
- The riparian habitat integrity of the Umzimvubu Estuary was rated “Largely Modified” due to the encroachment of exotic vegetation and rubbish dumping.
- The combination of impacts has resulted in habitat loss, encroachment of alien vegetation into the riparian habitat, flow modification, deterioration of water quality, and impacts to instream and riparian integrity.
- The Present Ecological State (PES) assessment of the project area is rated as “Moderately Modified”.
- The Ecological Importance (EI) and Ecological Sensitivity (ES) is rated as “Moderate”.
- Results of the impact assessment indicated that the construction and operation phases of the project poses “Moderate” pre-mitigation risks to the freshwater ecosystems. Adherence to all mitigation measures can result in “Low” post-mitigation risks. It is further anticipated that the cumulative impact of the proposed project in relation to freshwater resources will be “Low” and no irreplaceable loss of resources is anticipated to occur.

Figure 2.4 below illustrates the NFEPA wetland and associated drainage lines adjacent to the proposed slope stabilisation.

Please refer to **Appendix D4 – Aquatic Assessment**

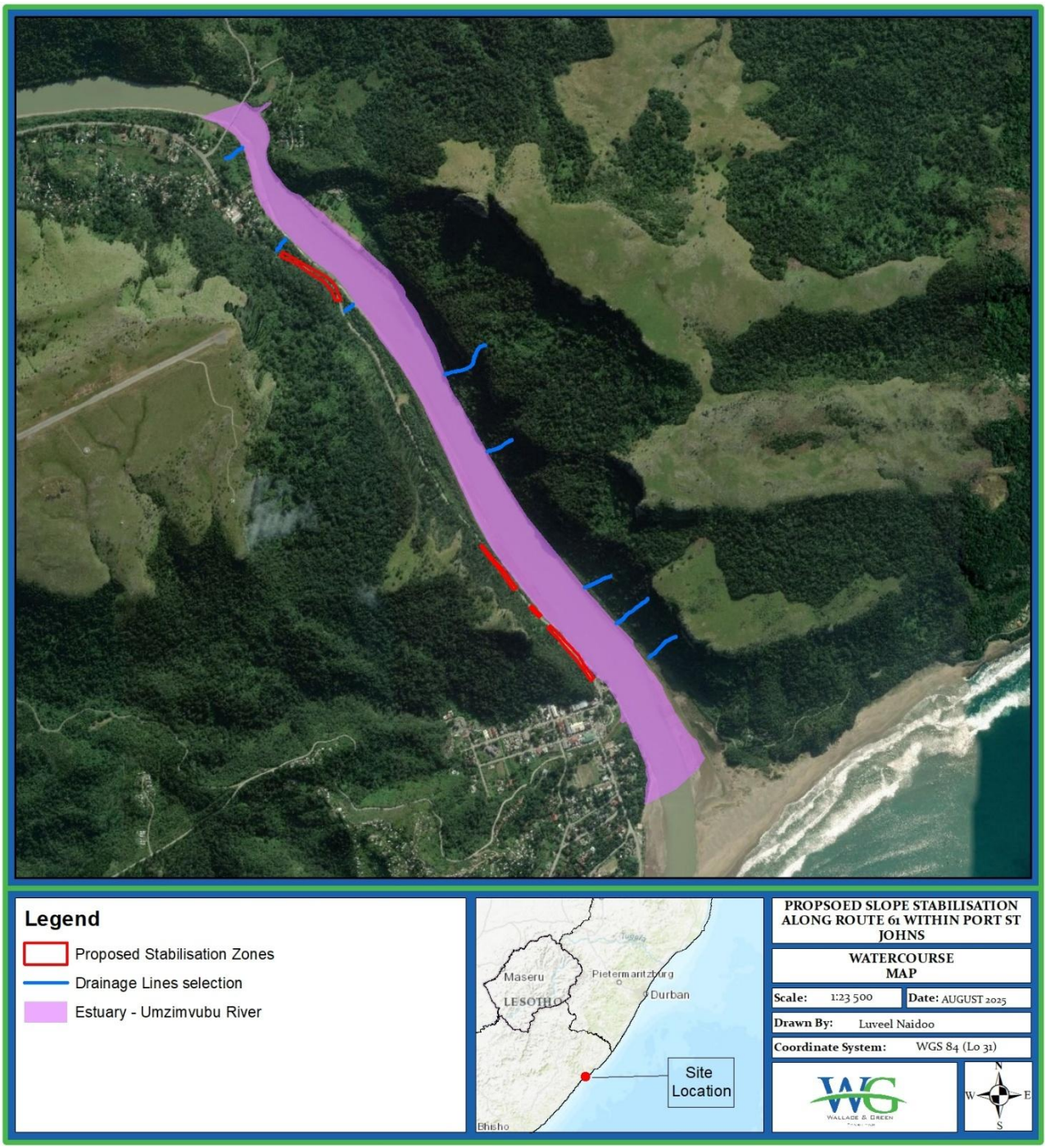

Figure 2.4: NFEPA Wetland (in purple) and associated drainage lines

2.7. Wetland Assessment

The Wetland Assessment was conducted by The Biodiversity Company, dated July 2025. The findings of the assessment are summarised below:

- The project area is adjacent to an NFEPA wetland, i.e., Umzimvubu Estuary and associated floodplain (refer to Figure 2.4 above).
- Wetland units have been grouped based on the Hydrogeomorphic (HGM) type and ecological condition (refer to Figure 2.5 below).
- Seven (7) Hydrogeomorphic HGM units were identified within the encompassing 500m delineated regulatory zone. These were classified as;

  - one (1) channelled valley-bottom wetlands,
  - one (1) unchanneled valley-bottom wetlands,
  - two (2) floodplain, and
  - three (3) seep wetlands.
- Due to the location of HGMs 3-7 within the landscape, these systems are not at any perceivable risk from the proposed project and are therefore excluded from any further functional assessments.
- HGM 1 (Umzimvubu Estuary) and 2 (floodplain) were identified as “At Risk” and were assessed further.
- **Ecosystem Services**:
  The delineated wetlands score is “intermediate” in terms of ecosystem services. The following parameters were assessed to determine this score:
  - flood attenuation
  - streamflow regulation
  - sediment trapping
  - phosphate assimilation
  - nitrate assimilation
  - toxicant assimilation
  - erosion control
  - the maintenance of biodiversity
- **Present Ecological State (PES)**:
  The wetlands have exhibited a degree of modification resulting from natural physical changes as well as anthropogenically induced impacts at both the local and catchment level. As a result, the PES score is within the “Moderately Modified” range”.
- **Ecological Importance and Sensitivity (EIS)**:
  The following components were considered pertaining to the protection status of a wetland:
  - Strategic Water Source Areas (SWSA)
  - NFEPA wet veg protection status
  - The protection status of the wetland itself (considering the NBA wetland dataset)
  - All delineated wetlands within the project area scored within the “Moderate” class.
- The post-mitigation buffers for the wetlands were calculated to be 18m.
- The study indicated that the project will pose a “Low” post-mitigation risks, provided that the mitigation measures outlined in the report are strictly adhered to during the construction phase. It is further anticipated that the cumulative impact of the proposed project in relation to freshwater resources will be “Low” and no irreplaceable loss of resources is anticipated to occur.
- The specialist is of the opinion that no fatal flaws are evident for the proposed project and the project is supported provided that mitigation measures are implemented and adhered to.

Figure 2.5 below illustrates an overview of the wetland delineation.

Please refer to **Appendix D3 – Wetland Assessment**

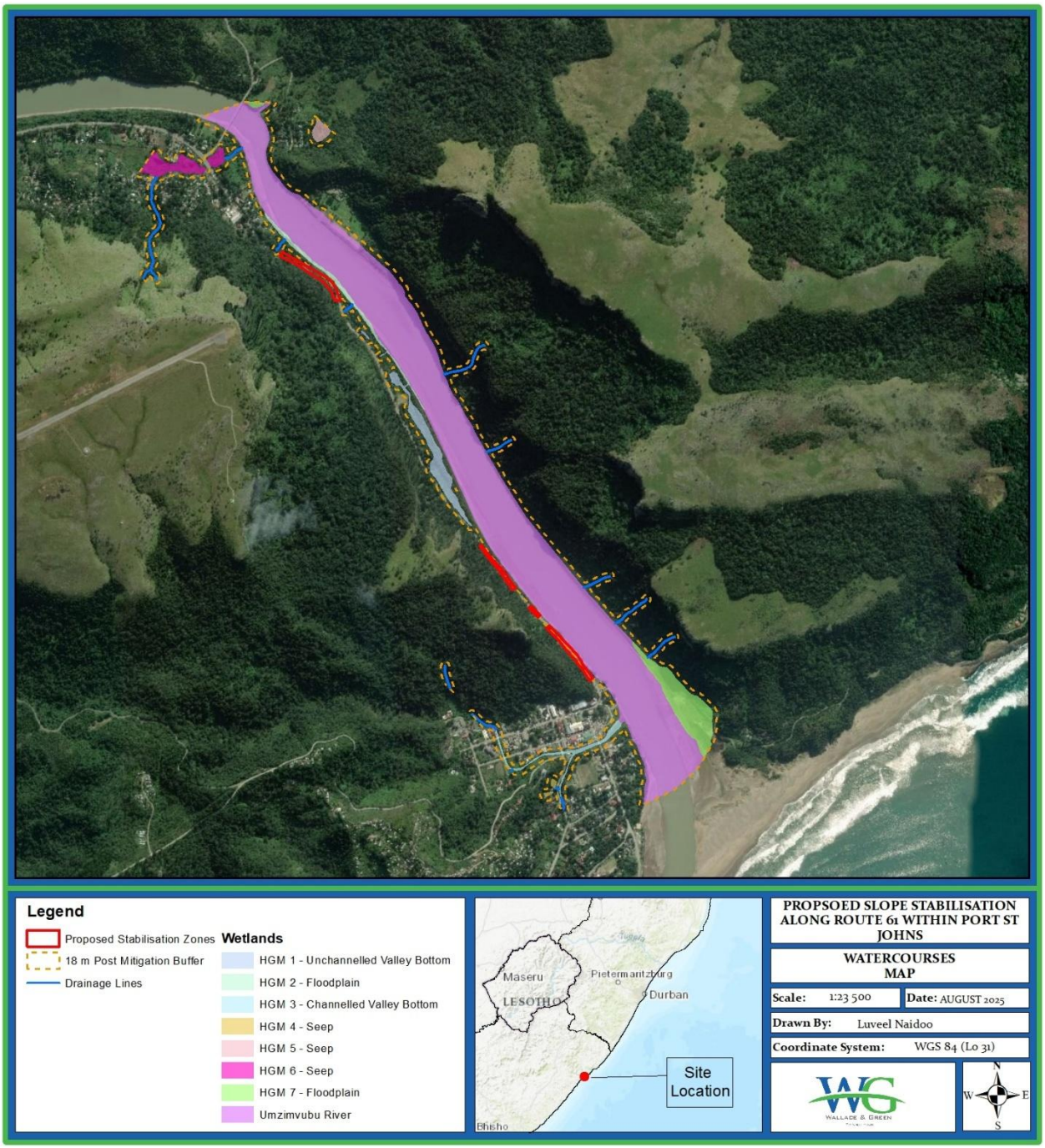

Figure 2.5: Wetland Delineation Overview

2.8. Heritage Impact Assessment

The Heritage Assessment was conducted by Umlando Archaeological Surveys and Heritage Management, dated June 2025. The findings of the assessment are summarised below:

- The desktop study noted that it is highly unlikely that archaeological sites or palaeontological deposits will occur within the study area.
- The study indicates that the area is mostly in an area of no to low palaeontological sensitivity with some areas being of moderate sensitivity.
- The specialist recommends a Chance Find Protocol be initiated and form part of the EMPr.
- The specialist is of the opinion that the project is supported provided that the Chance Find Protocol is implemented during the construction phase.

Please refer to Appendix D5 – Heritage Impact Assessment

2.7. Geotechnical Considerations

The Geotechnical Investigation was conducted by Geosure (Pty) Ltd, dated June 2025. The findings of the assessment are summarised below:

- The site is underlain by limited uncontrolled fill, slip debris, and talus soils overlying weathered sandstone rock.
- Kinetic analysis indicates that Zones 1 - 4 have a moderate risk of failing by means of wedge failure and planar sliding.
- Additionally, due to the height, steep daylighting discontinuities, insufficient lateral support, weathering of joint surfaces, and water infiltration, there is an increased risk of progressive toppling failure, which subsequently compromises the long-term stability of the slopes.
- Soft excavation in terms of SANS1200 is anticipated within fill materials, slip debris, talus soils and residual soils. Boulder excavation classes are anticipated within slip debris and talus soils containing abundant boulder inclusions. Intermediate to hard excavations are anticipated within soft to medium hard sandstone rock.
- Five inspection pits were excavated along Zone 2 to determine founding conditions for the proposed gabion geo-barrier.
- The firm to stiff/medium dense residual soils are considered a suitable founding horizon and is recommended for the proposed gabion geo-barrier in Zone 2.

Please refer to Appendix D1: Geotechnical Investigation

2.8. Climate Change

Climate change is already a measurable reality and along with other developing countries, South Africa is especially vulnerable to its impacts. The National Climate Change Response Plan White Paper (2011) presents the South African Government's vision for an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society. South Africa's response to climate change has the following two objectives:

- Effectively manage inevitable climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity.
- Make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

This response is guided by the Draft Guideline for Consideration of Climate Change Implications in applications for Environmental Authorisations, Waste Management Licenses and Atmospheric Emission Licenses (2021).

It must be noted that the proposed development activity will most likely be impacted upon by climate change due to the following reasons:

- Extreme weather conditions.
- Release of emissions from the construction vehicles.

However, the impacts of climate change on the activity may be avoided by means of the following measures:

- Once construction is complete, rehabilitation and landscaping will be undertaken with indigenous vegetation.
- The impacts associated with the construction vehicles will be mitigated in the site-specific EMPr (refer to Appendix G – Environmental Management Programme).

2.9. Cultural / Historical Features

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or paleontological sites, on or within 20m of the site?	[redacted]	NO
If YES, contact a specialist recommended by AMAFA to conduct a heritage impact assessment. The heritage impact assessment must be attached as an appendix to this report. Please refer to **Appendix D5 – Heritage Impact Assessment**		
Briefly explain the recommendations of the specialist:	The desktop study noted that it is highly unlikely that archaeological sites will occur within the study area. The same scenario is envisaged for the palaeontological deposits. The proposed project will not impact on any of these heritage sites.	
Will any building or structure older than 60 years be affected in any way?	[redacted]	NO
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	[redacted]	NO
If YES, please submit the necessary application to AMAFA and attach proof thereof to this report. N/A		

2.10. Socio-economic Environment

Anticipated CAPEX value of the project on completion	**R147 199 481.74**
Expected annual turnover to be generated by or as a result of the project	**N/A**
New skilled employment opportunities created in the **construction** phase of the project	**R7 272 055.08**
New skilled employment opportunities created in the **operational** phase of the project	**N/A**
New un-skilled employment opportunities created in the **construction** phase of the project	**R11 775 958.54**
New un-skilled employment opportunities created in the **operational** phase of the project	**92**
Expected value of the employment opportunities during the operational and construction phase	**R19 048 013.62**

2.11. Surrounding Environment and Land Uses

Cross the land uses and/or prominent features that currently occur within a 500m radius of the site and give a description of how this influences the application or may be impacted upon by the application:

The study area for this project includes the area which will be directly impacted by the project footprint of the proposed repair and stabilisation of the five(5) zones.

Land use character	YES or NO		Description
Natural area	YES	[redacted]	The area encompasses natural riparian vegetation mixed with alien invasive plant species that have disturbed the area.
Low-density residential	YES	[redacted]	Low-density residential are situated within 350m south of the southern end and 200m north of the Zone 5 of the proposed slope stabilisation.

Land use character	YES or NO		Description
Medium-density residential	[redacted]	NO	Medium-density residential are situated outside the 500m radius (northerly) of the proposed bank remediation.
High density residential	[redacted]	NO	
Informal residential	[redacted]	NO	
Retail commercial & warehousing	YES	[redacted]	Port St. Johns CBD is situated 100m south of Zone 1 of the proposed slope stabilisation.
High Impact Industrial	[redacted]	NO	
Power station	[redacted]	NO	
Office/consulting room	YES	[redacted]	Port St. Johns CBD is situated 100m south of Zone 1 of the proposed slope stabilisation.
Military or police base/station/compound	[redacted]	NO	The Port St. Johns police station is situated outside the 500m radius, north of the proposed slope stabilisation.
Spoil heap or slimes dam	[redacted]	NO	
Quarry, sand or borrow pit	[redacted]	NO	
Dam or reservoir	[redacted]	NO	
Hospital/Medical Centre	YES	[redacted]	Private doctor consulting room is situated within 200m south of the proposed slope stabilisation. The following facilities are situated outside the 500m radius: Community Health Centre Clinic, Qandu Clinic, and Majola Clinic.
School/ crèche	[redacted]	NO	All schools in Port St. Johns are situated outside the 500m radius of the proposed slope stabilisation.
Tertiary education facility	[redacted]	NO	
Church	[redacted]	NO	
Old age home	[redacted]	NO	
Sewage treatment plant	[redacted]	NO	
Train station or shunting yard	[redacted]	NO	
Railway line	[redacted]	NO	
Major road (4 lanes or more)	[redacted]	NO	
Airport	YES	[redacted]	Port St Johns airfield is located approximately 450m southwest of Zone 5.
Harbour	[redacted]	NO	
Sport facilities	[redacted]	NO	Port St. Johns Sports field is location approximately 350m south of Zone 1.

Land use character	YES or NO		Description
Golf course		NO	
Polo fields		NO	
Filling station		NO	A Shell Garage (Mzimvubu Motors) is located 290m northwest of Zone 5.
Landfill or waste treatment site		NO	
Plantation		NO	
Agriculture		NO	
River, stream, or wetland	YES		The project area is located along Umzimvubu Drive (R61) which is adjacent to the Umzimvubu Estuary.
Nature conservation area		NO	Zones 1 – 5 are located within a CBA.
Mountain, hill, or ridge	YES		The topography within the Umzimvubu area varies with steep cliffs and slopes
Museum		NO	
Historical building		NO	
Protected Area		NO	Pondoland Marine Protected Area occurs 1km from Zone 1. This is a non-terrestrial protected area.
Graveyard		NO	
Archaeological site		NO	
Other land uses (describe)		NO	

2.12. Nuisance Considerations

Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	**YES**	
If yes, what estimated quantity will be produced per month?	**Approximately 5m^3**	
How will the construction solid waste be disposed of? (describe)		

- **Waste hierarchy would be applied when managing construction waste. The first objective will be to reuse and recycle as much waste as possible and whatever cannot be reused or recycled will be disposed of at one of the registered licensed landfills.**

- **Waste skips/bins will be provided throughout the working servitude with separate skips/bins made available for construction debris and solid waste. The waste will be recycled or reused whenever possible, and the rest disposed to the registered waste. Small amounts of hazardous waste such as discarded oil or grease may be generated on-site. Hazardous waste will be disposed of at an appropriately licensed and registered hazardous waste disposal facility. Waste management will be dealt with more extensively within the EMPr for the relevant phases of the project. Refer to Appendix G – Environmental Management Programme**

Where will the construction solid waste be disposed of? (Provide details of landfill site) ❖ **Solid Waste will be disposed of at a registered licensed landfill site. In the unlikely event that hazardous waste is produced it will be collected by a competent waste handling contractor and disposed of at the nearest licensed general waste disposal facility which is the closest to the site.**		
Will the activity produce solid waste during its operational phase?	[redacted]	**NO**
If yes, what estimated quantity would be produced per month?	**N/A**	
How will the solid waste be disposed of in the operational phase? (Provide details of landfill site)	**N/A**	
If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine the further requirements of the application.		
Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?	[redacted]	**NO**
If yes, contact the competent authority to obtain clarity regarding the process requirements for your application.		
Is the activity that is being applied for a solid waste handling or treatment facility?	[redacted]	**NO**
If yes, contact the competent authority to obtain clarity regarding the process requirements for your application.		

Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?		[redacted]	**NO**
If yes, what estimated quantity will be produced per month?		**N/A**	
Will the activity produce any effluent that will be treated and/or disposed of on-site?		[redacted]	**NO**
If yes, contact the competent authority to obtain clarity regarding the process requirements for your application.			
Will the activity produce effluent that will be treated and/or disposed of at another facility?		[redacted]	**NO**
If yes, provide the particulars of the facility: -		**N/A**	
Facility name:	**N/A**		
Contact person:	**N/A**		
Postal address:	**N/A**		
Postal code:	**N/A**		
Telephone:	**N/A**	Cell:	**N/A**
E-mail:	**N/A**	Fax:	**N/A**
Describe the measures that will be taken to ensure the optimal reuse or recycling of wastewater, if any:			
N/A			

Emissions into the atmosphere

Will the activity release emissions into the atmosphere?	[redacted]	**NO**
If yes, is it controlled by any legislation of any sphere of government?	[redacted]	**NO**
If yes, contact the competent authority to obtain clarity regarding the process requirements for your application.	**N/A**	
If no, describe the emissions in terms of type and concentration:		

❖ **Limited dust liberation and emissions during the construction phase due to the off-loading of construction materials, movement of construction vehicles and clearing. Emissions generated will be in the form of dust, carbon dioxide and other vehicle emissions generated by diesel-powered machinery and trucks during the construction process, i.e., tip trucks, TLBs and dust from the movement of the construction vehicles. These emissions will be composed primarily of CO_2 and will be of a low concentration. Also, proper maintenance of vehicles will mitigate high concentrated vehicle emissions. Dust generation can be mitigated by either water spraying and/or dust suppressants or by minimising the area that is cleared and re-vegetating exposed areas as quickly as possible. The speed of construction vehicles and other vehicles should be strictly controlled to avoid excessive dust generation and adhere to the speed limits as per the site-specific EMPr. Refer to Appendix G – Environmental Management Programme**

Generation of noise

Will the activity generate noise?	[redacted]	**NO**
If yes, is it controlled by any legislation of any sphere of government?	[redacted]	**NO**
If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.	**N/A**	
If no, describe the noise in terms of type and level:		
❖ **During the construction phase noise associated with normal construction activities, i.e., vehicles, generators and plant equipment will be used on the site.** ❖ **Noise levels are to be kept within the legislated limits for the area, following the requirements of the relevant national and local noise control statutes.** ❖ **Other noise disruptions could potentially be experienced during the construction phase through activities such as drilling. This will be a temporary disturbance.** ❖ **Measures to minimise noise generation during construction are contained in the EMPr.**		

SECTION 3: POLICY AND LEGISLATIVE FRAMEWORK

2014 NEMA EIA Regulations (as amended), appendix 1- 3(e) a description of the policy and legislative context within which the development is proposed including – (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report (ii)

3.1. Identification of All Legislation, Policies, Plans, Guidelines, Spatial Tools, Municipal Development Planning Frameworks and Instruments as per Section 3(e)(i) and Compliance of Proposed Activity with Legislation and Policy 3(e)(ii)

Legislation	Section	Relates to
The Constitution (No 108 of 1996)	Chapter 2	Bill of Rights.
	Section 24	Environmental rights.
National Environmental Management Act (No 107 of 1998 [as amended])	Section 2	Defines the strategic environmental management goals and objectives of the government. Applies throughout the Republic to the actions of all organs of state that may significantly affect the environment.
	Section 24	Provides for the prohibition, restriction and control of activities that are likely to have a detrimental effect on the environment.
	Section 28	The developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
	Section 30	Deals with the control of emergency incidents, including the different types of incidents, persons responsible for the incidents and reporting procedures to the relevant authority.
National Environmental Management: Waste Act (No 59 of 2008)		Provides specific waste management measures and the remediation of contaminated land.
		Regulations for waste management licensee activities.
National Environmental Management: Biodiversity Act (No 10 of 2004) **Threatened or protected species (GN 388)** **Lists of species that are threatened or protected (GN 389)** **Alien and invasive species regulations (GNR 506)** **Publication of exempted alien species (GNR 509)** **Publication of National list of invasive species (GNR 507)** **Publication of prohibited alien species (GNR 508)**		Provides for the management and conservation of biodiversity, protection of species and ecosystems, and sustainable use of indigenous biological resources.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)		The objects of this Act are to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by combating and preventing of erosion and weakening or

Legislation	Section	Relates to
		destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants. Section 5 details measures for the prohibition of the spreading of weeds.
National Environmental Management: Air Quality Act (No 39 of 2004)	Section 32	Control of dust
	Section 34	Control of noise
	Section 35	Control of offensive odours
National Heritage Resources Act (No 25 of 1999) and regulations	Section 34	No person may alter or demolish any structure or part of a structure that is older than 60 years without a permit issued by the relevant provincial heritage resources authority.
	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface, or otherwise disturb any archaeological or paleontological site.
	Section 36	No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone, or other markers of such a place, and any other structure on or associated with such place.
	Section 38	This section provides for Heritage Impact Assessments (HIAs), which are not already covered under the ECA. Where they are covered under the ECA, the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The Heritage Impact Assessment (HIA) will be approved by the authorising body of the provincial directorate of environmental affairs, which is required to take the provincial heritage resources authorities' comments into account prior to making a decision on the HIA.
Occupational Health and Safety Act (No 85 of 1993)	Section 8	General duties of employers to their employees
	Section 9	General duties of employers and self-employed persons to persons other than their employees
National Water Act (No 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution
	Section 20	Control of emergency incidents
	Section 21	Licenses for water use
Hazardous Substances Act (No 15 of 1973) and regulations		Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances
National Veld & Forest Fire Act		Provides for a variety of institutions, methods, and practices to prevent and combat veld, forest, and mountain fires.
National Road Traffic Act (No 93 of 1996)		Provides for controlling transport of dangerous goods, hazardous substances, and general road safety
Spatial Planning and Land Use Management Act (No. 16 of 2013).		Provides the framework for spatial planning and land use management in South Africa at the different spheres of government and for the establishment, functions, and operations of Municipal Planning Tribunals.
Occupational Health and Safety Act (No 85 of 1993) and regulations		Addresses occupational health and safety aspects

Legislation	Section	Relates to
SANS 10103 (Noise Regulations)		The measurement and rating of environmental noise with respect to annoyance and to speech communication
OR Tambo District Municipality		OR Tambo District Municipality Integrated Development Plan (IDP) – 2025/2026
		OR Tambo District Municipality Draft Spatial Development Framework (SDF) – 2020/21
Port St. Johns Local Municipality		Port St. Johns Local Municipality Integrated Development Plan 2025 – 2026, dated June 2025.
		Port St. Johns Local Municipality Spatial Development Framework (SDF) - 2010 (Currently under review)
National Climate Change Response Plan White Paper (2011)		The White Paper presents the South African Government's vision for an effective climate change response and the long-term, just transition to a climate-resilient and lower carbon economy and society.

Table 8: Current Environmental Legislation

Regulations and Guidelines
Environmental Impact Assessment Regulations, 2014 (as amended).
Internal Guideline: Generic Water Use Authorisation Application Process, August 2007 by DWA.
The General Policy on Environmental Conservation (January 1994).
DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa.
Department of Environmental Affairs (2017), Public Participation guideline in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa.
Disaster Management Act (57/2002): Directions Regarding Measures to Address, Prevent and Combat the Spread of COVID-19 Relating to National Environmental Management Permits and Licences

Table 9: Current Municipal By-Laws

By-Laws
OR Tambo District Municipality – Water and Sanitation By-laws (2022)

SECTION 4: MOTIVATION, NEED AND DESIRABILITY

4.1. Need and Desirability as per Section 3(f)

The project area exhibits severe slope erosion and ongoing rockfall, which contributes to an increased sediment load in the Umzimvubu Estuary. This degradation poses a direct threat to the ecological integrity of the riverine zone and adjacent infrastructure as the erosion adversely affects water quality, aquatic ecosystems, and downstream habitats. Continued slope failure without intervention could result in irreversible environmental damage, including vegetation loss and disruption of natural drainage lines and ecological function. The proposed slope stabilisation will prevent further degradation and support the restoration of indigenous vegetation by means of rehabilitation. The proposed stabilisation measures are durable and resilient and as such, the development will enhance long-term ecological integrity of the slopes.

From a socio-economic perspective, Port St. Johns is a tourist-dependent hub, forming part of the Wild Coast tourism corridor. The ongoing erosion will result in increased public safety risks and road closures which disrupts local livelihoods and limits access to tourist attractions such as Second Beach, Silaka Nature Reserve as well as various accommodation facilities located north of Zone 5. This negatively impacts both the tourists experience and tourism revenue. The proposed zones are currently at risk of rockfalls and collapsing slopes, both of which endangers residents, pedestrians and tourists. This could potentially deter tourists due to visible environmental degradation and road blockages, thereby negatively impacting the local economy. If Port St. Johns remains a tourist attraction, local livelihoods benefit, such as; small businesses, accommodation providers, transport services, and informal traders. Stabilising the slope would therefore not only safeguard public safety, but also secure tourism-dependent livelihoods and enhance economic potential.

Umzimvubu Drive is a strategic municipal road which provides critical access between the town centre and key residential, institutional, and tourism nodes. Recurrent damage, closures, and maintenance of Umzimvubu drive and the associated slopes, places a financial and operational burden on the municipality. The OR Tambo District SDF and the Port St Johns Local SDF highlight the need to plan for cumulative impacts and knock-on effects. The road falls within a high risk area as noted in the municipal Climate Risk Profile Report, dated September 2023, and failure to act contravenes the municipality's obligations under the SPLUMA and the Disaster Management Act (Act 57 of 2002). Proactive slope stabilisation is therefore essential for resilience, cost-effective maintenance, and alignment with municipal planning directives.

The proposed slope stabilisation aligns with the principles of sustainable development as outlined in Section 2 of NEMA as it avoids degradation of the environment by reducing sedimentation and uncontrolled erosion, protects people's health and safety through physical risk mitigation and promotes socio-economic development by safeguarding tourism and community access. Additionally, the proposed works will be designed to incorporate environmentally sensitive stabilisation methods to minimise disturbance to the environment and will contribute to climate change adaptation by addressing increased rainfall and storm intensity.

The proposed slope stabilisation required and supported from an environmental, socio-economic, and municipal planning perspectives as it will protect sensitive ecosystems, safeguard public safety and critical road infrastructure, support economic resilience through tourism preservation, and align with spatial and disaster risk management priorities.

4.2. Motivation for the Preferred Site, Activity and Technology as per Section 3(g)

SANRAL has been actively identifying and assessing vulnerable slopes across the Eastern Cape as part of its ongoing commitment to road safety and infrastructure maintenance. With the region's varied and mountainous terrain, slope instability poses a serious hazard to road users, particularly during periods of heavy rainfall or where vegetation has been lost. SANRAL employs a systematic approach to slope risk management, starting with extensive visual inspections carried out by trained field teams. The slopes along Umzimvubu Drive showed visible signs of slope failure, including rockfalls and ongoing erosion, prompting concern for both public safety and the longevity of the road infrastructure.

The slope assessments were carried out by Geosure (Pty) Ltd from the 5th to the 8th of November, 2024, in accordance with the TMH21 Manual, as published by SANRAL. TMH21 recommends using a Slope Management System to identify and assess slope stability hazards or risks along the transportation corridor and rank them in terms of priority.

Based on this visual assessment, the overall condition index (OCI) is calculated which indicates the priority of the slope. Slopes with an OCI score between 50-100 are considered to be in a fair to good condition. Slopes with an OCI score between 0-50 are considered to be in a poor condition or problems are anticipated. The OCI of each slope identified on the site was calculated and geographic data such as topography, slope angles, and historical records of rockfalls and landslides are used alongside the inspections to identify high-risk zones. Nine potentially unstable slopes were identified along the route between km 0.00 to km 2.15, 7 of which urgently require stabilisation. Based on the site conditions and visual assessments of each identified slope, the 7 slopes have been grouped into 5 zones according to similar geological and geotechnical characteristics and similar potential failure mechanisms. As such, no site alternative properties/locations are applicable as the project is aimed at stabilising a specific portion of the slope along the R61 Umzimvubu Drive.

The following Preferred Technology alternatives were carried through the assessment:

- **Technology Alternative T1 (Preferred) – Scaling and Barring, Shotcrete application with soil Nails/ Rock Dowels and a catch fence**

Zone 1

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised catch fence system will be installed, of approximately 215m in length, 6m in height and a minimum energy absorption capacity of 3000 kJ.
- A permanent 134m soil nail wall will be constructed with a shotcrete facing from Km 0.214 to Km 0.348.
- Soil nails comprising threaded bar anchors with 25mm diameter bars and a minimum yield strength of 500 MPa will be installed within 100mm diameter drill holes and inclined at 15º to the horizontal.
- Soil nails will be installed in accordance with the specified arrangement depending on the slope height, and to the specified nail lengths and spacing indicated in the detailed design drawings (refer to Appendix C2 – Detailed Design Drawings).
- All soil nail elements will be galvanised and soil nail heads will comprise 300mm x 300mm x 15mm thick bearing plates completed with dome washers and nuts.
- Approximately 1100 soil nails will be utilised for Zone 1.
- Shotcrete facing will be applied to the slope with a minimum 28-day compressive strength of 30 MPa in two 50mm layers to achieve a total thickness of 100mm, with a single layer of Ref 245 mesh reinforcement.
- Approximately 2000m2 of shotcrete facing will be utilised for Zone 1.
- Provision will be made for horizontal drainage measures via the shotcrete facing to relieve pore water pressures and prevent hydrostatic pressure build up behind the facing. Drainage will comprise 50mm diameter U-PVC weep holes installed on a 1.5m grid pattern across the slope face.

Zone 3

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised catch fence system, approximately 100m in length, 6m in height, with a minimum energy absorption capacity of 3000 kJ, will be installed.
- 150mm thick reinforced shotcrete facing will be applied with 2 layers of 100mm x 100mm steel mesh with a minimum wire diameter of 6mm.
- 750m^2 of shotcrete will be applied with a minimum 28-day compressive strength of 30MPa.
- Approximately 160 isolated rock dowels will be utilised.
- The rock dowels will comprise 6m long, galvanised hot-rolled, high-tensile steel bars with continuous coarse thread, complying with SANS 920, with a nominal diameter of 25mm and minimum yield strength exceeding 500MPa.

- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- Horizontal drains will be installed through the shotcrete facing where required, to relieve groundwater pressures, improve drainage performance and prevent hydrostatic pressure build up behind the facing system.
- Provision will be made for ongoing inspection and maintenance of the catch fence system, drainage outlets, and shotcrete facing to ensure the long-term performance of the stabilisation measure.

Zone 4

- 150mm thick reinforced shotcrete facing will be installed with 2 layers of 100mm x 100mm steel mesh with a minimum wire diameter of 6mm.
- The shotcrete must achieve a minimum 28-day compressive strength of 30MPa.
- Approximately 2 156m^2 of shotcrete will be utilised.
- Approximately 920 isolated rock dowels will be utilised in accordance with the detailed design drawings.
- Rock dowels will comprise 6m long, galvanised hot-rolled, high-tensile steel bars with continuous coarse thread, complying with SANS 920, with a nominal diameter of 25mm and minimum yield strength exceeding 500MPa.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- Horizontal drains will be installed through the shotcrete facing to relieve groundwater pressures, improve drainage performance and prevent hydrostatic pressure build up behind the facing system.
- Provision will be made for ongoing inspection and maintenance of the drainage outlets and shotcrete facing to ensure the long-term performance of the stabilisation measure.

❖ **Technology Alternative T3 (Preferred) – Gabion Geo-barrier with a Catch Fence**

Zone 2

- The slope will be scaled and barred down to remove loose, detached or potentially unstable boulders and reduce immediate risk of rockfall and falling debris during construction activities.
- A founding surface will be established to provide a stable and suitable platform for the installation of the gabion geo-barrier system.
- A gabion geo-barrier system will be implemented using 1m x 1m x 1m Galfan and PVC coated wire mesh baskets (80mm x 100mm mesh aperture) arranged in a stepped pyramidal configuration comprising four baskets in the bottom row, to an overall height of 4m (refer to **Appendix C2 – Detailed Design Drawings**).
- The bottom row of gabion baskets will be embedded to a depth of 0.5m below the existing ground level to improve resistance against sliding and overturning.
- All gabion baskets will be infilled with hard, durable and unweathered sandstone rockfill.
- A fully galvanised catch fence system of approximately 110m in length, 6m in height and a minimum energy absorption capacity of 3000 kJ will be installed above the gabion geo-barrier system.
- Provision will be made for regular inspection and maintenance measures including the periodic removal of accumulated debris behind the barrier system to maintain capacity, limit excessive loading on the structure and ensure the continued long-term performance of the gabion geo-barrier.

❖ **Technology Alternative T5 (Preferred) – Active Mesh System with isolated Rock Bolts and a Catch Fence.**

Zone 5

- The slope will be scaled and barred down of loose, detached and potentially unstable material.
- A fully galvanised active mesh system will be installed over the full extent of Zone 5.

- The active mesh system will comprise steel wire with a minimum tensile strength between 380MPa and 550MPa and a minimum wire diameter of 2.7mm. The mesh will consist of a double twist hexagonal weave pattern with a maximum aperture size of 80mm and shall incorporate Class A corrosion protection consisting of a 95% Zinc - 5% Aluminium coating.
- Approximately 7800m^2 of mesh will be utilised.
- 3m long grouted, galvanised 500MPa threaded steel bar dowels will be installed on a 2.5m x 2.5m grid spacing both horizontally and vertically.
- Approximately 1607 rock dowels will be installed in accordance with the detailed design drawings.
- A fully galvanised catch fence system will be installed across the full length of Zone 5, approximately 260m in length, 6m in height, and a minimum energy absorption capacity of 3000kJ.
- The grout for the rock dowels will comprise non-shrink cementitious grout with a minimum compressive strength of 30MPa.
- 20m long 100mm diameter sub-horizontal drainage holes will be drilled at an inclination of 15º above horizontal.
- Provision will be made for ongoing inspection and maintenance of the catch fence system and drainage outlets.

SECTION 5: PUBLIC PARTICIPATION

5.1. Notification of Interested and Affected Parties (I&APs)

(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of—

(i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and

(ii) any alternative site.

Three (3) site notices were placed on the 9th of September 2025 strategically placed at the following locations:

1. **Start: 31°37'7.70"S; 29°32'41.73"E**
2. **Middle: 31°36'46.80"S; 29°32'21.80"E**
3. **End: 31°36'2.14"S; 29°31'46.91"E**

The site notice detailed the proposed activity and invited stakeholders and I&APs to register. Refer to Appendix E2 for a copy of the site notice Appendix E3 for proof of placement of the site notice boards.

(b) giving written notice, in any of the manners provided for in section 47D of the Act, to—

(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;

(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;

(iii) the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;

(iv) the municipality which has jurisdiction in the area;

(v) any organ of state having jurisdiction in respect of any aspect of the activity; and

(vi) any other party as required by the competent authority;

Stakeholders and I&APs were notified about the Environmental Process, through the distribution of the Background Information Document (BID) via email on the 5th of September 2025. With regards to authority communications, all relevant authorities have been notified of the application.

Refer to Appendix E5 – Background Information Document.

(c) placing an advertisement in—

(i) one local newspaper; or

(ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;

(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in paragraph (c)(ii);

An advertisement was placed in the Pondoland Times on the 5th of September 2025 which provides information on the project dates and requested for potential I&APs to register themselves in order to get further information on the project and the Basic Assessment process.

Refer to Appendix E4 - Proof of the Advert.

I&AP Public Feedback Meeting

Stakeholder engagement will continue throughout the Basic Assessment process.

5.2. Authority Notification

A Pre-application meeting request form was submitted to the DFFE on the 26th of August 2025. DFFE confirmed that a Pre-application meeting would not be required for this project.

Refer to **Appendix J2** for a copy of the acknowledgment of receipt from the DFFE.

5.3. Registered Interested and Affected Parties

A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of—

(a) all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
(b) all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
(c) all organs of state which have jurisdiction in respect of the activity to which the application relates.

Refer to **Appendix E6** – I&AP database

5.4. Comments and Responses Report

(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in sub-regulation due to -
   (a) a lack of skills to read or write;
   (b) disability; or
   (c) any other disadvantage;
   (d) reasonable alternative methods of recording comments must be provided for.

No comments or concerns were received following the distribution of the BID and the erection of site notices.

SECTION 6: IMPACT ASSESSMENT

6.1. Methodology to Determine and Rank Significance and Consequences of Impacts Associated with all Alternative as per Section 3(h)(vi)

2014 NEMA EIA Regulations (As Amended), Appendix 1- 3(H) (vi) the methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks associated with the alternatives, (v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed and mitigated. Appendix 1- 3 (I) A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity- (i)- (ii). Appendix 1- 3 (J) an assessment of each identified potentially significant impact and risk (i)- (vii)

Scoring of Impacts	
Consequence	
Severity	1 – Insignificant / Non-harmful 2 – Small / Potentially harmful 3 – Significant / Slightly harmful 4 – Great / Harmful 5 – Disastrous / Extremely harmful
Duration	1 – Up to 1 month 2 – 1 month to 3 months 3 – 3 months to 1 year 4 – 1 to 10 years 5 – Beyond 10 years / Permanent
Spatial Scale	1 – Immediate, fully contained area 2 – Surrounding area 3 – Within business unit area or responsibility 4 – Within mining boundary area / Beyond BU boundary 5 – Regional, National, International
Overall Consequence = (Severity + Duration + Extent) / 3	
Likelihood	
Frequency of the Activity	1 – Once a year or once / more during operation / LOM 2 – Once / more in 6 months 3 – Once / more a month 4 – Once / more a week 5 – Daily / hourly
Probability of the Incident / Impact	1 – Almost never / almost impossible 2 – Very seldom / highly unlikely 3 – Infrequent / unlikely / seldom 4 – Often / regularly / likely / possible 5 – Daily / highly likely / definitely
Overall Likelihood = (Frequency + Probability) / 2	
Overall Environmental Significance = Overall Consequence * Overall Likelihood	
Overall Environmental Significance	
0 - 2.9	Very Low
3 - 4.9	Low
5 - 6.9	Medium - Low
7 - 8.9	Medium
9 - 10.9	Medium - High

6.2. Impacts that may result from the Planning and Design, Construction, Operational, Decommissioning and Closure Phases as well as Proposed Management of Identified Impacts and Proposed Mitigation Measures

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase,

decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities.

Refer to Appendix F – Impact Assessment

6.3. Environmental Impact Statement as per Section 3(1)

Alternative S1 (Only site alternative) – Slope Stabilisation along Route 61 Section 8 Between Km 0.00 and Km 2.15 and Alternative D1 (Only design alternative) - The proposed stabilisation design for the five (5) zones is as per Drawing No. 034-25.R04-003 compiled by Geosure (Pty) Ltd, dated April 2026.

The Basic Assessment considered relevant environmental aspects and impacts from the proposed development and proposed mitigation during the planning, construction and operational phases. The proposed site (S1 – only site Alternative) and Design Alternative (D1) is recommended based on the following:

Alternative S1 (Only Site Alternative): Slope Stabilisation along Route 61 Section 8 Umzimvubu Drive, Between Km 0.00 and Km 2.15 located within Port St. Johns Local Municipality, Eastern Cape.

- Portion 0 of Erf 1 and Portion 0 of Erf 645 in Farm Port St. Johns (C10400010000000100000 and C10400010000064500000).
- No site alternative properties/locations are applicable as the project is aimed at stabilising a specific portion of the slope along Umzimvubu Drive.

Alternative D1 (Only design alternative): The proposed stabilisation design for the five (5) zones is as per Drawing No. 034-25.R04-003 compiled by Geosure (Pty) Ltd, dated April 2026.

- No design alternatives are applicable as the project is aimed at stabilising a specific portion of the slope along Umzimvubu Drive.

South African Roads Agency Limited (SANRAL) intends to implement stabilisation infrastructure on the bank slopes located along Route 61 (R61) Section 8, Umzimvubu Drive within Ward 6 of Port St. Johns Local Municipality, OR Tambo District Municipality, Eastern Cape. As per the Geotechnical Investigation conducted by Gesoure (Pty) Ltd, March 2025 the slope stabilisation was classified as emergency works. The assessment identified a total of five (5) unstable zones and the stabilisation measures were categorised based on geological and geotechnical characteristics.

A summary of the impacts associated with the alternatives are outlined below:

❖ ***Planning Phase – Short Term Duration***

- ***Potential environmental impacts were identified and addressed during the Basic Assessment process.***
- ***The EMPr incorporates the layout and Specialist recommendations to ensure that positive impacts be maximised, and negative impacts are prevented or minimised.***
- ***The potential for Environmental Impacts can be mitigated from a High to Low impact with technical input from Specialists***
- ***Loss of indigenous vegetation can be mitigated from a Medium to Medium - Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
- ***The creation of Temporary and Permanent Employment opportunities for the local community is considered a High-Positive impact.***
- ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
- ***Potential optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***
- ***Environmental Impacts on the Umzimvubu Estuary can be mitigated from a High to Low impact with technical input from Specialists such as implementing buffer zones.***

- ***Potential ecological disturbance to fauna is considered Low as the slope stabilisation will occur along an existing main road with pre-existing disturbance to fauna.***
- ***The clearance or loss of protected species can be mitigated from Medium – Low to Low with adherence to the Rehabilitation Plan.***

❖ ***Construction Phase – Short Term Duration***

- ***The potential for Environmental Impacts can be mitigated from a High to Low impact with technical input from Specialists***
- ***Loss of indigenous vegetation can be mitigated from a Medium to Medium - Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
- ***The creation of Temporary and Permanent Employment opportunities for the local community is considered a High-Positive impact.***
- ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
- ***Structural stability, reduced erosion and decrease in sedimentation within the Umzimvubu Estuary are considered High-Positive impacts.***
- ***Optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***
- ***Encroachment into the Umzimvubu Estuary is considered Very Low as there is a road separating the slope stabilisation works and the watercourse, and due to the implementation of an 18m buffer as per the Wetland Specialist's recommendation.***
- ***Contamination of the Umzimvubu Estuary is considered Low with technical input from specialists.***
- ***Potential ecological disturbance to fauna is considered Very Low as the slope stabilisation will occur along an existing main road with pre-existing disturbance to fauna.***
- ***The clearance or loss of indigenous or protected species can be mitigated from Medium to Medium – Low with adherence to the Rehabilitation Plan.***

❖ ***Operation Phase – Long Term Duration***

- ***Improved resistance and increase in the number of Indigenous Vegetation occurring onsite is considered a High Positive Impact.***
- ***Re-establishment of AIP's can be mitigated from High to Low with ongoing AIP management as per the Rehabilitation Plan.***

Alternative S2 (Not Applicable) - An alternative site is NOT APPLICABLE

Alternative D2 (Not Applicable) - An alternative design is NOT APPLICABLE

Alternative T1 (Preferred): Scaling and Barring, Shotcrete application with Soil Nails/ Rock Dowels and a catch fence

The Basic Assessment considered relevant environmental aspects and impacts from the proposed development and proposed mitigation during the planning, construction and operational phases.

Alternative T1 improves global slope stability through the internal reinforcement provided by soil nails, which enhance the shear strength of the weathered sandstone by resisting both tensile and shear forces. This stabilisation method effectively addresses the risk of deep-seated failures. The application of shotcrete provides surface-level protection by controlling erosion and limiting water infiltration into the slope face, thereby reducing the potential for progressive deterioration. Additionally, the installation of a catch fence upslope will intercept dislodged boulders and prevent them from reaching Umzimvubu Drive, thereby mitigating rockfall hazards. Collectively, these engineering measures directly address the identified failure mechanisms within the slope chainage and contribute to long-term slope stability.

From a socio-economic perspective, the implementation of Alternative T1 will require labour for slope preparation, material handling, and installation activities. This presents an opportunity for temporary employment and skills development within the local community. Furthermore, Umzimvubu Drive is a key access route to Port St. Johns and a notable tourism hub along the Wild Coast, known for attractions such as The Gates of St. John, Silaka Nature Reserve, and its distinctive coastal landscape. Unstable slopes and associated road closures could negatively impact tourism and the local economy. By ensuring long-term slope stability, Alternative T1 improves accessibility and enhances the safety and reliability of the transport corridor, supporting nearby businesses such as Port St. Johns River Resort, The Spotted Grunter Resort, and Ntaba River Lodge.

The durability and longevity of the proposed stabilisation measures also reduce the reliance on emergency response interventions and prevent economic losses arising from road closures or transport disruptions. As such, Alternative T1 is considered the preferred alternative.

A summary of the impacts associated with the alternatives are outlined below:

❖ ***Planning Phase – Short Term Duration***

- ***Potential environmental impacts were identified and addressed during the Basic Assessment process.***
- ***The EMPr incorporates the layout and Specialist recommendations to ensure that positive impacts be maximised, and negative impacts are prevented or minimised.***
- ***The potential for Environmental Impacts can be mitigated from a High to Low impact with technical input from Specialists***
- ***Loss of indigenous vegetation can be mitigated from a Medium to Medium – Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
- ***The creation of Temporary and Permanent Employment opportunities for the local community is considered a High-Positive impact.***
- ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
- ***Potential optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***
- ***Environmental Impacts on the Umzimvubu Estuary can be mitigated from a High to Low impact with technical input from Specialists such as implementing buffer zones.***
- ***Potential ecological disturbance to fauna is considered Very Low as the slope stabilisation will occur along an existing main road with pre-existing disturbance to fauna.***
- ***The clearance or loss of protected species can be mitigated from Medium to Medium – Low with adherence to the Rehabilitation Plan.***

❖ ***Construction Phase – Short Term Duration***

- ***The potential for Environmental Impacts can be mitigated from a High to Low impact with technical input from Specialists***
- ***Loss of indigenous vegetation can be mitigated from a Medium to Medium - Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
- ***The creation of Temporary and Permanent Employment opportunities for the local community is considered a High-Positive impact.***
- ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
- ***Structural stability, reduced erosion and decrease in sedimentation within the Umzimvubu Estuary are considered High-Positive impacts.***
- ***Optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***

- ***Encroachment into the Umzimvubu Estuary is considered Very Low as there is a road separating the slope stabilisation works and the watercourse, and due to the implementation of an 18m buffer as per the Wetland Specialist's recommendation.***
- ***Contamination of the Umzimvubu Estuary is considered Low with technical input from specialists.***
- ***Potential spillages of hazardous materials is considered Low with the implementation of the conditions incorporated into the EMPr.***
- ***Potential ecological disturbance to fauna is considered Very Low as the slope stabilisation will occur along an existing main road with pre-existing disturbance to fauna.***
- ***The clearance or loss of indigenous or protected species can be mitigated from Medium to Medium – Low with adherence to the Rehabilitation Plan.***
- ***The risk to human H&S due to open excavations and the moving of construction machinery can be mitigated from a Medium – High Impact to Low by implementing guidelines and regulations of the OHSA Acts/regulations for construction and EMPr commitments.***

❖ ***Operation Phase – Long Term Duration***

- ***Improved resistance and increase in the number of Indigenous Vegetation occurring onsite is considered a High Positive Impact.***
- ***Re-establishment of AIP's can be mitigated from High to Low with ongoing AIP management as per the Rehabilitation Plan.***

Alternative T2 (Not Supported): Shotcrete application and a Catch Fence

The Basic Assessment considered relevant environmental aspects and impacts from the proposed development and proposed mitigation during the planning, construction, and operational phases.

❖ ***Planning Phase – Short Term Duration***

- ***Potential environmental impacts were identified and addressed during the Basic Assessment process.***
- ***Loss of indigenous vegetation can be mitigated from a Medium to Medium – Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
- ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
- ***Optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***
- ***The clearance or loss of protected species can be mitigated from Medium to Medium – Low with adherence to the Rehabilitation Plan.***

Alternative T2 comprises a shotcrete facing combined with a catch fence, designed to provide surface protection and intercept falling boulders along Umzimvubu Drive. Although this option is cost-effective, it only addresses superficial slope failures and does not improve global or structural slope stability. The absence of anchorage means the shotcrete is prone to cracking or detachment over time due to ongoing slope movement, making it unsuitable as a long-term solution. Additionally, while the catch fence can prevent debris from reaching the roadway, it does not contribute to stabilising the slope or mitigating deep-seated failures.

The catch fence prevents falling boulders from migrating onto Umzimvubu Drive, however it does not remediate or provide active stabilisation to prevent slope failure. As such, Alternative T2 was not considered beyond the planning phase.

Alternative T3 (Preferred): Gabion geo-barrier and a catch fence

The Basic Assessment considered relevant environmental aspects and impacts from the proposed development and proposed mitigation during the planning, construction and operational phases.

Gabion geo-barriers are a flexible and effective passive rockfall protection system. Their design allows them to absorb and dissipate the kinetic energy of falling rocks, while also adapting to minor ground movements, making them particularly effective on unstable or shifting slopes.

From an environmental perspective, Alternative T3 is a sustainable and low-carbon solution. The use of locally sourced stone, such as sandstone, reduces transportation-related emissions. The porous and permeable design of the gabion structures encourages natural drainage, eliminating the need for a separate drainage system and helps prevent water build-up behind the barrier. Additionally, the voids within the gabions promote vegetation growth, which in turn contributes to long-term slope stability through the development of natural root systems.

From a socio-economic perspective, the construction of gabion geo-barriers is labour-intensive, providing short-term employment opportunities for the local community and contributing to skills development in the region. Given that Port St. Johns is a well-known stop along the Wild Coast featuring attractions such as The Gates of St. John, Silaka Nature Reserve, and its distinctive coastal character, it is essential to maintain road safety and accessibility. Slope failures can deter tourism through road closures and safety concerns. By ensuring long-term slope stability, Alternative T3 supports continued access to the area, sustaining the local economy, including businesses such as Port St. Johns River Resort, The Spotted Grunter Resort, and Ntaba River Lodge located to the north of the project area.

Given the prominence of tourism in Port St. Johns, the visual impact is also a key consideration. Over time, gabion barriers naturally blend into the surrounding landscape through natural revegetation or seeding, offering a balance of functionality and aesthetics.

The durability and longevity of the gabion system reduces the demand on emergency response services and helps prevent economic losses related to transport disruptions. In terms of maintenance, damaged mesh sections can be repaired independently, without dismantling the entire structure which further enhances the cost-effectiveness and long-term viability.

Considering the environmental compatibility, structural effectiveness, socio-economic benefits, and aesthetic suitability of the proposed gabion geo-barrier system, Alternative T3 is the preferred alternative.

A summary of the impacts associated with the alternatives are outlined below:

- ***Planning Phase – Short Term Duration***
  - ***Potential environmental impacts were identified and addressed during the Basic Assessment process.***
  - ***The EMPr incorporates the layout and Specialist recommendations to ensure that positive impacts be maximised, and negative impacts are prevented or minimised.***
  - ***The potential for Environmental Impacts can be mitigated from a High to Low impact with technical input from Specialists.***
  - ***The Build-up of debris can be mitigated from a High impact to Medium – Low impact with regular monitoring of gabion baskets as per the EMPr, especially after high rainfall events.***
  - ***Aesthetic impairment can be mitigated from Medium – High to Low with the consideration of bio-blankets in the planning phase.***

- ***Loss of indigenous vegetation can be mitigated from a Medium to Medium – Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
- ***The creation of Temporary and Permanent Employment opportunities for the local community is considered a High-Positive impact.***
- ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
- ***Potential optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***
- ***Environmental Impacts on the Umzimvubu Estuary can be mitigated from a High to Low impact with technical input from Specialists such as implementing buffer zones.***
- ***Potential ecological disturbance to fauna is considered Very Low as the slope stabilisation will occur along an existing main road with pre-existing disturbance to fauna.***
- ***The clearance or loss of protected species can be mitigated from Medium to Medium – Low with adherence to the Rehabilitation Plan.***

❖ ***Construction Phase – Short Term Duration***

- ***The potential for Environmental Impacts can be mitigated from a High to Low impact with technical input from Specialists***
- ***Loss of indigenous vegetation can be mitigated from a Medium to Medium – Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
- ***The creation of Temporary and Permanent Employment opportunities for the local community is considered a High-Positive impact.***
- ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
- ***Structural stability, reduced erosion and decrease in sedimentation within the Umzimvubu Estuary are considered High-Positive impacts.***
- ***Optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***
- ***Encroachment into the Umzimvubu Estuary is considered Very Low as there is a road separating the slope stabilisation works and the watercourse, and due to the implementation of an 18m buffer as per the Wetland Specialist's recommendation.***
- ***Contamination of the Umzimvubu Estuary is considered Low with technical input from specialists.***
- ***Potential spillages of hazardous materials is considered Low with the implementation of the conditions incorporated into the EMPr.***
- ***Potential ecological disturbance to fauna is considered Very Low as the slope stabilisation will occur along an existing main road with pre-existing disturbance to fauna.***
- ***The clearance or loss of indigenous or protected species can be mitigated from Medium to Medium – Low with adherence to the Rehabilitation Plan.***
- ***The risk to human H&S due to open excavations and the moving of construction machinery can be mitigated from a Medium – High Impact to Low by implementing guidelines and regulations of the OHSA Acts/regulations for construction and EMPr commitments.***

❖ ***Operation Phase – Long Term Duration***

- ***Improved resistance and increase in the number of Indigenous Vegetation occurring onsite is considered a High Positive Impact.***
- ***Re-establishment of AIP's can be mitigated from High to Low with ongoing AIP management as per the Rehabilitation Plan.***

Alternative T4 (Not Supported): Concrete retaining wall

The Basic Assessment considered relevant environmental aspects and impacts from the proposed development and proposed mitigation during the planning, construction, and operational phases.

Planning Phase – Short Term Duration

- ***Potential environmental impacts were identified and addressed during the Basic Assessment process.***
- ***Loss of indigenous vegetation can be mitigated from a Medium to Medium – Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
- ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
- ***Optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***
- ***The clearance or loss of protected species can be mitigated from Medium to Medium – Low with adherence to the Rehabilitation Plan.***
- ***Potential impacts on the flow regime can be mitigated from High to Medium – Low by designing the wall to mirror natural bank curvature, aligning parallel to flow to reduce potential turbulence.***
- ***The impact climate change is Medium – High due to the carbon footprint of concrete manufacturing.***

Alternative T4 proposes the construction of a concrete retaining wall to serve as a rigid barrier, effectively preventing boulders from migrating onto Umzimvubu Drive. Concrete structures offer high compressive strength and long-term durability, and are capable of withstanding substantial static and dynamic loads over extended periods. However, due to the impermeable nature of concrete, the implementation of this alternative would necessitate the installation of a dedicated drainage system to manage surface and subsurface water. Furthermore, concrete construction is associated with a high environmental impact due to its significant carbon content, making it a less sustainable option compared to more flexible, low-carbon alternatives.

While concrete walls can have a lifespan exceeding 50 years, their rigid structure makes them susceptible to damage from ground movement or differential settlement. In the event of structural failure, full replacement may be required, leading to substantial maintenance and reconstruction costs.

Alternative T4 requires a longer construction timeline and higher capital investment in comparison to Alternative T4 and the visual impact of a large concrete structure would significantly alter the natural aesthetics of the area, which is an important consideration in a region that relies heavily on tourism for economic activity. From a socio-economic perspective, concrete construction typically requires skilled labour, thereby limiting the potential for local employment and skills transfer.

Given its higher cost, environmental impact, reduced flexibility, and limited socio-economic benefits, Alternative T4 was not considered beyond the planning phase.

Alternative T5 (Preferred): Active Mesh System with isolated Rock Bolts and a Catch Fence

The Basic Assessment considered relevant environmental aspects and impacts from the proposed development and proposed mitigation during the planning, construction and operational phases.

Alternative T5 is an effective slope stabilisation measure that enhances the stability of rock slopes by applying continuous confinement to the slope surface through the tensioned wire mesh anchored to the slope. The system restrains the movement of loose and potentially unstable rock blocks, reducing the risk of rockfall and surface deterioration caused by weathering processes. By distributing loads over a wider area and working in conjunction with steel dowels, the mesh improves

the overall stability of the slope and helps prevent the progressive instability. Active mesh systems are particularly advantageous on highly fractured and irregular slopes, as they can conform closely to the slope geometry while maintaining effective restraint. This stabilisation method offers a low-impact solution which contributes to the long-term performance and safety of the slope. Furthermore, the catch fence will intercept large boulders, preventing their migration onto Umzimvubu Drive, thereby enhancing road safety.

Alternative T5 has minimal environmental impact, as it causes limited disturbance to slope drainage and vegetation, therefore preserving the natural slope ecology. This alternative requires a high capital investment however, the active mesh system is a durable solution that requires minimal maintenance, resulting in greater cost-effectiveness over time.

From a socio-economic perspective, the stabilisation works will provide temporary employment opportunities for local labourers involved in scaling and barring, material handling, and installation, thereby supporting community skills development. Port St. Johns is a popular tourist destination along the Wild Coast and is known for attractions such as The Gates of St. John and Silaka Nature Reserve, therefore the municipality relies heavily on safe and reliable road access. Slope failures and resulting road closures could deter visitors, thereby negatively impacting the local economy, including guesthouses and lodges such as Port St. Johns River Resort, The Spotted Grunter Resort, and Ntaba River Lodge.

The durability of the active mesh system provides continuous protection against future rockfall events, reducing emergency response costs and minimising transport disruptions. Therefore, Alternative T5 is the preferred alternative, delivering long-term slope stability and economic benefits.

A summary of the impacts associated with the alternatives are outlined below:

- ***Planning Phase – Short Term Duration***
  - ***Potential environmental impacts were identified and addressed during the Basic Assessment process.***
  - ***The EMPr incorporates the layout and Specialist recommendations to ensure that positive impacts be maximised, and negative impacts are prevented or minimised.***
  - ***The potential for Environmental Impacts can be mitigated from a High to Low impact with technical input from Specialists***
  - ***Loss of indigenous vegetation can be mitigated from a Medium to Medium – Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
  - ***The creation of Temporary and Permanent Employment opportunities for the local community is considered a High-Positive impact.***
  - ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
  - ***Potential optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***
  - ***Environmental Impacts on the Umzimvubu Estuary can be mitigated from a High to Low impact with technical input from Specialists such as implementing buffer zones.***
  - ***Potential ecological disturbance to fauna is considered Very Low as the slope stabilisation will occur along an existing main road with pre-existing disturbance to fauna.***
  - ***The clearance or loss of indigenous or protected species can be mitigated from Medium to Medium – Low with adherence to the Rehabilitation Plan.***

- ***Construction Phase – Short Term Duration***
  - ***The potential for Environmental Impacts can be mitigated from a High to Low impact with technical input from Specialists***

- ***Loss of indigenous vegetation can be mitigated from a Medium to Medium – Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
- ***The creation of Temporary and Permanent Employment opportunities for the local community is considered a High-Positive impact.***
- ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
- ***Structural stability, reduced erosion and decrease in sedimentation within the Umzimvubu Estuary are considered High-Positive impacts.***
- ***Optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***
- ***Encroachment into the Umzimvubu Estuary is considered Very Low as there is a road separating the slope stabilisation works and the watercourse, and due to the implementation of an 18m buffer as per the Wetland Specialist's recommendation.***
- ***Contamination of the Umzimvubu Estuary is considered Low with technical input from specialists.***
- ***Potential spillages of hazardous materials is considered Low with the implementation of the conditions incorporated into the EMPr.***
- ***Potential ecological disturbance to fauna is considered Very Low as the slope stabilisation will occur along an existing main road with pre-existing disturbance to fauna.***
- ***The clearance or loss of indigenous or protected species can be mitigated from Medium to Medium – Low with adherence to the Rehabilitation Plan.***
- ***The risk to human H&S due to open excavations and the moving of construction machinery can be mitigated from a Medium – High Impact to Low by implementing guidelines and regulations of the OHSA Acts/regulations for construction and EMPr commitments.***

❖ ***Operation Phase – Long Term Duration***

- ***Improved resistance and increase in the number of Indigenous Vegetation occurring onsite is considered a High Positive Impact.***
- ***Re-establishment of AIP's can be mitigated from High to Low with ongoing AIP management as per the Rehabilitation Plan.***

Alternative T6 (Not Supported): Scaling and Barring and a Catch Fence

The Basic Assessment considered relevant environmental aspects and impacts from the proposed development and proposed mitigation during the planning, construction, and operational phases.

Planning Phase – Short Term Duration

- ***Potential environmental impacts were identified and addressed during the Basic Assessment process.***
- ***Loss of indigenous vegetation can be mitigated from a Medium to Medium – Low impact with technical input from Specialists and adherence to the Rehabilitation Plan.***
- ***Removal of Alien Invasive Plants (AIPs) through proper identification and recommendations is considered a High-Positive impact.***
- ***Optimisation of Socio-Economic integration and benefits associated with the Slope Stabilisation is considered a High-Positive impact.***
- ***The clearance or loss of protected species can be mitigated from Medium to Medium – Low with adherence to the Rehabilitation Plan.***

Alternative T6 involves the once-off removal of loose and unstable rock fragments from the slope face. While this provides an immediate reduction in rockfall risk, it is a short-term solution that only addresses visibly loose boulders and does not mitigate ongoing rock degradation. Consequently, repeated scaling and barring interventions would be required, resulting in cumulative costs over time.

Frequent scaling and barring also results in ongoing environmental disturbance, which negatively impacts on vegetation and the natural slope face. Although effective as an emergency response measure, this approach is insufficient for slopes with unfavourable jointing where the risk of continued rockfall and progressive weathering persists.

Due to its limited effectiveness in remediating or stabilising the underlying slope failure, Alternative T6 was not considered beyond the planning phase.

No-go Alternative (compulsory)

The no-go alternative implies that the status quo remains, meaning the proposed slope stabilisation along Umzimvubu Drive would not proceed. In the absence of these interventions, the area would remain highly vulnerable to rockfalls, particularly during periods of heavy rainfall, posing a serious safety risk to road users. This includes the potential for severe injury, loss of life, and significant damage to infrastructure. Frequent road closures may also disrupt access to critical services such as healthcare, education, and emergency response, thereby compromising well-being of the Port St. Johns community. Additionally, unreliable road access could negatively affect the local tourism sector, a key contributor to the region's economy.

From an environmental standpoint, implementing the stabilisation project would reduce erosion, mitigate rockfalls onto Umzimvubu Drive, and limit sedimentation into the Umzimvubu Estuary. The rehabilitation phase includes the reintroduction of diverse indigenous plant species and the removal of alien invasive species, contributing to ecological restoration.

From a socio-economic perspective, failure to implement the project would forfeit opportunities for temporary employment, local skills development, and broader community upliftment. As such, the no-go alternative would not only perpetuate physical risks but also hinder economic and social development in the Port St Johns area.

The main conclusion from the aforementioned is that the no-development option is likely to result in adverse environmental and socio-economic impacts. The need for slope stabilisation should therefore be assessed in accordance with the principles of the National Environmental Management Act (NEMA). Considering the environmental risks of inaction and the associated socio-economic benefits of the proposed intervention, the no-go alternative is not supported from a sustainability perspective.

6.4. Impact Management Measures from Specialist Reports for the Development for Inclusion in the EMPr as per Section 3(m)

2014 NEMA EIA Regulations (as amended), Appendix 1- 3(M) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr.

The following outcomes must be considered as per the Terrestrial Impact Assessment:

- Permits must be obtained from the Department of Foresty, Fisheries and the Environment (DFFE) and KZN Ezemvelo Wildlife prior to the commencement of construction activities, should the following Nationally protected species be trimmed, cut, removed, destroyed and/or translocated:
  - Aloidendron barberae
  - Sideroxylon inerme
  - *Dracaena aletriformis*
- Restrict all activities to authorised footprint areas only.
- Implement a stormwater management plan.
- Conduct follow-up rehabilitation and re-vegetation of any bare areas with local indigenous grasses, shrubs, and trees.

- Conduct regular checks for alien invasive plant encroachment during the operational phase to prevent alien invasion issues due to disturbances. Monitoring should occur every three months for the first two years and every six months thereafter for the project's duration.
- Implement an AIP management plan
- Implementation of a fire management plan.
- Limit construction vehicle speeds to 40 km/h to prevent accidents and install appropriate speed control measures and signage. Especially during active development adject the main road Umzimvubu Drive, as fauna may be spooked and run into traffic.
- No new access roads may be constructed.
- Do not clear areas of indigenous vegetation outside of the direct project footprint.

Refer to **Appendix D6 – Terrestrial Biodiversity Compliance Statement**

The following outcomes must be considered as per the Wetland Impact Assessment:

- Restrict unauthorised and unnecessary activities within the wetlands and their respective buffers.
- Minimise the disturbance footprint of the development or the proposed infrastructure areas and avoid land clearing outside of these areas to prevent indirect impact to the wetlands.
- Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area.
- Educate staff and relevant contractors on the location and importance of the identified wetlands through toolbox talks and by including them in site inductions as well as the making them aware of the overall site plan which should indicate sensitive areas, waste disposal areas and any other relevant project specifics.
- Promptly control the spread of alien vegetation.
- Landscape and re-vegetate all denuded areas as soon as possible.
- Avoid the creation of concentrated flow paths wherever possible.
- Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.
- Devise and implement a suitable stormwater management plan for the construction and operation phases.
- Signs of erosion must be addressed immediately to prevent further erosion of the area and to prevent head cut and gully erosion from forming. This can be addressed as it occurs by bulldozing, filling, re-contouring to gentler gradients and re-vegetating.
- Temporary and permanent erosion control methods may include retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats, and mulching.
- Any exposed earth or cleared sites (includes the areas adjacent to the proposed infrastructure) should be rehabilitated promptly by relandscaping to gentler gradients and planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil. Sandbags and geotextiles should be used to assist until vegetation has established in these reworked areas.
- Compacted soils should be lightly tilled without the use of heavy machinery to promote vegetation reestablishment and reduce the potential for preferential flow paths and subsequent erosion and sedimentation from occurring.
- Where required, the rehabilitation of watercourse banks must take place following construction. Key areas where erosion has occurred should be rehabilitated through bank reprofiling to gentler gradients and the revegetation of the wetland periphery areas.
- Avoid working in areas with alien vegetation as dispersal into unaffected areas may be aided through vehicular movement.
- Should alien vegetation infestation be considered a contributing factor to ecosystem degradation on the site, the implementation of an alien invasive management plan should be considered.
- Minimise disturbance in proximity to wetlands and drainage lines, especially if fauna have been observed in these areas.
- All chemicals and toxicants to be used for the construction must be stored outside the watercourse areas and their respective buffers, preferably on flat terrain and in a bunded area.

- All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site in a designated area.
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".
- Adequate sanitary facilities and ablutions must be provided for all personnel within the project area. These facilities should be placed outside of sensitive environmental areas (wetlands and buffers included) and their use thereof must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).
- Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems.
- The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly.
- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.
- Where possible minimise the use herbicides to control on the road's verges and the servitudes. If herbicides must be used do so well prior to any significant predicted rainfall events.
- Design and implement an effective stormwater management system.
- Promote water infiltration into the ground by revegetating disturbed or compacted areas.
- Minimise the extent of ground compaction or hardened surfaces by designating routes for the vehicles and machinery used on site.
- Regularly clear drains to prevent uncalled for accumulation of surface water and the establishment of concentrated flow paths out of the accumulation areas.
- Laydown yards, camps and storage areas must be located beyond the wetland and drainage line areas;
- Where excavations are undertaken, topsoil must be stockpiled separately from subsoil, to be reintroduced into the affected areas during the rehabilitative stages in a last-out first-in manner.
- Prevent uncontrolled access of vehicles through the watercourses and their respective buffers that can cause a significant adverse impact on the hydrology and soil structure of these areas.
- Should mixing of concrete occur, it must under no circumstances take place within the drainage or wetland systems. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished and prevent rain-wash of residual materials into the downstream watercourses.
- No dumping of construction material on-site may take place.
- Appropriately rehabilitate the project area by ripping, landscaping and re-vegetating with locally indigenous species.

Refer to **Appendix D3 – Wetland Assessment**

The following outcomes must be considered as per the Aquatic Impact Assessment:

- To ensure rehabilitation efforts/mitigation for the slope stabilisation structure are assigned the best environmental protection, the specialist strongly recommends that the gabion structure and catch fence incorporate vegetation in the structure (Green 'living' gabions – image below) as this option provides several ecological benefits over the standard non-living gabion structure.
- The wire mesh is expected to rust due to its location within a watercourse. Therefore, the mesh must be PVC coated to prevent rust and failure of the structure in the long-term.
- The structure must incorporate strategically placed tiebacks to protect against the edges flanking out and the centre from bulging out and failure of the structure which commonly occurs in South Africa.
- The base layer of gabions must be placed below the expected maximum scour depth.
- The flanks of the gabion walls must not be exposed and must be angled at 45 degrees and be deeply set into the embankment to beyond the expected maximum erosion depth.
- All areas surrounding the gabion structure must be vegetated (hydroseeded and watered) towards the end of the construction phase to prevent the loss of the soils holding the structure in place.

- Ideally a gentler angle of the slope is preferred as the gentler gradient offers greater vegetation establishment potential over steeper angles.
- This green method can also be used for the stepped/terraced gabion baskets (where implemented).
- All construction activities must be undertaken during the low flow (dry season) period as much as possible to limit surface flow transporting contaminants to the surrounding watercourse habitat.
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good “housekeeping”.
- During construction contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly.
- Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the freshwater systems.
- Where feasible, as much material must be prefabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site.
- No vehicle or machinery is allowed to be washed within a watercourse or its buffer area, and should preferably take place off site.
- All chemicals and toxicants during construction must be stored in bunded areas.
- All machinery and equipment should be inspected regularly for faults and possible leaks; these should be serviced off-site.
- No dumping of construction material on-site may take place.
- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.
- Quarterly vegetation rehabilitation surveys need to be conducted of the vegetation within the project footprint.
- An alien invasive plant management plan needs to be compiled and implemented prior to construction to control and prevent the spread of invasive aliens.
- Operating heavy machinery in riparian areas require careful consideration to minimise environmental impact.
- Due to the scope of work, heavy machinery should only be operated in authorised water resource areas and under supervision of an ECO.
- Implement seasonal restrictions on operations to avoid sensitive periods such as breeding seasons for wildlife or periods of high water levels.
- All construction vehicles required for the proposed activities should only be allowed to use existing roads (including dirt roads).
- The route for vehicles (including heavy machinery) must be planned to avoid sensitive habitats, wetland/riparian vegetation, buffer areas and other water bodies as far as feasibly possible.
- Operators must be trained in operating machinery in wetland/sensitive environments and aware of the sensitivity of the area.
- Sensitive areas must be demarcated so as to guide operators, labourers and contractors.
- Use machinery with low ground pressure to minimise soil compaction and damage to wetland/riparian vegetation. Tracked vehicles or specialised low-ground-pressure tyres can be used if feasible/available.
- Machinery can be equipped with attachments like swamp mats or bog mats to distribute weight and minimise disturbance to the watercourse areas.
- Implement sediment and erosion control measures such as silt fences, erosion control blankets, or sediment traps to prevent soil runoff into water bodies associated with vehicular movements and disturbed/hardened surfaces.
- Develop a restoration and rehabilitation plan to mitigate any long-term impacts of operating heavy machinery in wetlands and/or riparian areas.
- Implement measures such as revegetation of disturbed areas or habitat enhancement to restore the ecological functions of the water resource(s).

Refer to **Appendix D4 – Aquatic Assessment**

The following outcomes must be considered as per the Heritage Impact Assessment:

- The specialist recommends a Chance Find Protocol be initiated and form part of the EMPr.

Refer to **Appendix D5 – Heritage Impact Assessment**

6.5. Assumptions, Uncertainties and Gaps in Knowledge relating to the Assessment and Mitigation Measures Proposed as per Section 3(o)

The information in this report is based on the findings of several specialists' studies. The layouts and engineering drawings of the proposed slope stabilisation have been provided to the EAP by the Geosure (Pty) Ltd. The following assumptions and limitations relating to this assessment were identified by specialists:

Terrestrial Ecological Compliance Statement:

- Whilst every effort was made to cover as much of the project area as possible, representative sampling was completed.
- This assessment has not assessed any temporal trends for the project.

Wetland Impact Assessment

- This assessment has not assessed any temporal trends for the project.

Heritage Impact Assessment

- The survey cannot locate subsurface features that do not leave visible marks observable from aerial photographs

6.6. Period for which Authorisation is required, Proposed Monitoring and Auditing and Post Construction Requirements as per Section 3(q)

2014 NEMA EIA Regulations (As Amended), Appendix 1- 3(Q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post-construction monitoring requirements finalised.

Based on the time required for the applicant to undertake all necessary planning processes governing the establishment of the proposed slope stabilisation; an estimated construction period of 12 months, and rehabilitation and post-construction monitoring period of one month, it is recommended that the environmental authorisation is granted for a period of five (5) years, which will also take into account any unexpected events.

Given the nature of this project, external environmental audits of the activity and implementation of the EMPr will be undertaken by the independent ECO. The findings and outcomes of these audits will be recorded in the ECO Reports and filed in the Environmental file. The environmental audits and associated reports must be conducted and submitted to the CA at intervals as indicated in the EA.

The EMPr (Appendix G) details the post-construction, rehabilitation, and closure, which will be monitored by the ECO and compliance authorities. One post-construction audit should be conducted once construction is complete. Thereafter an annual audit should be conducted for two years in order to ensure that the post-construction and rehabilitation outcomes have been achieved.

6.7. Financial Provisions as per Section 3(s)

2014 NEMA EIA Regulations (as amended), Appendix 1- 3(S) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.

N/A

6.8. EAP's Opinion on whether or not to Authorise the Activity and Recommendations & Conditions for Authorisation as per Section 3(n) and (p)

2014 NEMA EIA Regulations (as amended), Appendix 1- 3(N) any aspects which were conditional to the findings of the assessment either by EAP or specialist which are to be included as conditions of authorisation and (P) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.

It is the opinion of the EAP, that the proposed development be approved as:

- The impact assessment conducted for this site shows that all identified impacts associated with the proposed slope stabilisation can be mitigated to acceptable levels provided that the site specific EMPr and specialist recommendations are strictly adhered to. These measures have been incorporated into the EMPr, which also makes provision for the monitoring and auditing thereof, as well as environmental awareness training for all persons who will be conducting the activity.
- Once construction is complete, rehabilitation and landscaping must be undertaken with indigenous vegetation.

It is thus the EAP's opinion that the activity for which environmental authorisation is being sought, is authorised provided that it is undertaken in accordance with Technology Alternatives T1, T3 and T5, on the Preferred site (Alternative S1).

Properties and Infrastructure:

- Signage must be placed prior to the commencement of construction to make the community aware of the upcoming activities.
- The engineer must identify any existing infrastructure services that may be affected prior to commencement of construction.
- Any structures that are required to be removed must be replaced, and any damage incurred must be repaired.

Waste Management, Storage Areas:

- The Contractor must ensure that all litter is collected from the work and camp areas daily.
- All hazardous substances must be stored within a secured storage area, with impervious lining and bunding.
- Drip trays must be used where suitable.
- The mixing of concrete must be done on plastic sheeting, mortar boards or similar structures to prevent the risk of run-off.
- Chemical toilets must be used as ablution facilities during the construction period by all contractors.

Traffic and Construction Vehicles:

- Appropriate safety signage must be used to cordon off construction areas.
- Construction vehicles must adhere to speed limits.
- Access to the site for site establishment and construction activities must be planned from the existing access routes.

Dust and Erosion Control:

- The liberation of dust into the surrounding environment must be effectively controlled by the use of water sprays, water carts, fabric containment or curtains, where required.
- Suitable erosion control measures must be implemented in areas sensitive to erosion, i.e., stormwater discharge points, exposed areas and embankments.
- All exposed surfaces must be re-vegetated and stabilised as soon as is practically possible.

Monitoring and Auditing:

- The EMPr (Appendix G) and conditions thereto must be adhered to.
- An ECO must be appointed and all contractor staff to be trained on the EMPr and Environmental Authorisation requirements prior to commencement of activities.
- Environmental monitoring and auditing shall be undertaken by the Independent ECO on a frequency as to be determined by the competent authority.