CIVIL AND STRUCTURAL ENGINEERING CONFIRMATION

In Support of the Environmental Impact Assessment Application

Proposed Residential Development:

Erf 79/205, Ruygte Valley, Cola Beach, Sedgefield, Garden Route District Municipality, Western Cape

Date:	22 October 2025
Compiled by:	Marius C van Coller Pr.Eng, Registration No. 20060275

Executive Summary:

This report has been prepared by a professionally registered Civil and Structural Engineer (ECSA) in support of the Environmental Impact Assessment (EIA) application for the proposed residential development on Erf 79/205, Ruygte Valley, Cola Beach, Sedgefield, located within the Garden Route District Municipality of the Western Cape Province.

The purpose of this engineering confirmation report is to assess and confirm the suitability of the site for residential construction from a civil and structural engineering perspective and to identify any conditions or mitigation measures necessary to ensure safe, sustainable development in accordance with applicable engineering standards, environmental legislation, and coastal management guidelines.

The subject property is situated on a steep coastal dune system comprising recent wind-blown sands and semi-consolidated fossil dunes, typical of the Sedgefield coastal morphology. The soils are non-expansive, well-draining, but highly erodible, with limited natural bearing capacity. A geotechnical investigation has confirmed the presence of soft, compressible sandy material and a structurally weak zone in part of the site. However, the proposed building footprint (designated "PE") is located outside of this weak zone, approximately 15 metres inland of the 100-year high-risk coastal flooding and erosion line, and outside all current and projected flood or erosion hazard areas.

From an engineering perspective, the site is deemed suitable for the proposed dwelling, subject to adherence to prescribed design and construction controls. These include:

1. Verification of dune stability through specialist assessment;
2. Foundation design to accommodate soft, erodible sand, incorporating a 1.5 m wide compacted zone around all external walls;
3. Implementation of robust stormwater drainage and erosion-protection measures in accordance with SANS 1200 and local municipal standards;

4. Restoration and re-vegetation of disturbed dune areas following construction; and
5. Engineering supervision and certification by a registered professional engineer during construction.

The assessment confirms that, provided these engineering measures are implemented, the proposed residence will not adversely affect dune stability, drainage, or natural coastal processes, and poses no significant geotechnical or structural risk. The development therefore complies with the intent of the National Environmental Management Act (NEMA), the Integrated Coastal Management Act (ICMA), and the National Guidelines for the Establishment of Coastal Management Lines.

Accordingly, it is the professional opinion of the undersigned that Erf 79/205, Ruygte Valley, Cola Beach, is suitable for the proposed residential construction, subject to compliance with the recommendations and conditions contained within this report and detailed foundation design to be prepared and signed off by the appointed ECSA-registered structural engineer.

1. Introduction

This technical report is submitted in support of the Environmental Impact Assessment (EIA) application for the proposed residential development on Erf 79/205, Ruygte Valley, Cola Beach, Sedgefield, situated within the Garden Route District Municipality, Western Cape Province.

Shama Consultants have been appointed to assess and confirm the suitability of the site from a civil and structural engineering perspective, considering the geotechnical and topographical conditions and the proximity of the site to the coastal zone.

The purpose of this report is to:

- Confirm the engineering suitability of the site for residential construction;
- Evaluate relevant geotechnical, slope stability, and drainage aspects;
- Provide professional recommendations to ensure structural integrity, durability, and environmental compatibility; and
- Provide the required engineering confirmation for inclusion within the EIA application, as prescribed under the National Environmental Management Act (NEMA, Act 107 of 1998) and associated EIA Regulations.

2. Site Description and Environmental Context

The subject property is located along the elevated coastal dune ridge of Cola Beach, Sedgefield. The site forms part of a wind-blown sand dune system composed predominantly of fine, well-sorted, non-plastic, quartzitic sands derived from recent aeolian activity. Underlying these deposits are semi-consolidated fossil dunes of calcarenite or weakly cemented sands typical of the coastal geomorphology in this region.

Key physical characteristics of the site are summarised as follows:

- Topography: The property exhibits steeply sloping terrain descending towards the sea. The natural slope gradients vary between approximately 1(V):3(H) to 1(V):5(H), consistent with active dune morphology.

- Soil Conditions: The soils are described as loose to medium dense fine sands with high permeability and excellent drainage characteristics. However, these soils possess high erodibility and limited bearing capacity in the natural state.
- Geotechnical Considerations: The geotechnical report identifies a geologically weak or structurally unstable area within the broader erf, not coinciding with the proposed footprint ("Location PE" as per geotechnical report). Construction must be restricted to the confirmed stable area.
- Hydrological and Coastal Setting: The proposed building position is located not within the current or projected erosion, low-risk, or high-risk coastal flooding areas.
- Environmental Sensitivity: The site forms part of an ecologically sensitive coastal dune system that requires careful construction practices to avoid destabilisation, wind erosion, or interference with natural dune migration processes.

These conditions collectively necessitate a controlled engineering approach to ensure dune stability, erosion mitigation, and structural safety.

3. Legislative and Regulatory Framework

In accordance with the National Environmental Management Act (NEMA, Act 107 of 1998) and the Environmental Impact Assessment Regulations (GN R982 of 2014, as amended), all proposed developments within 100 metres of the high-water mark or within coastal setback zones are subject to an EIA process.

From a civil and structural engineering perspective, professional input is required to:

- Evaluate the geotechnical and topographical suitability of the site;
- Identify engineering risks relating to slope instability, erosion, and drainage;
- Propose mitigation measures consistent with sustainable coastal development principles; and
- Certify that, with the recommended design and construction measures, the proposed development poses no undue environmental or structural risk.

The Integrated Coastal Management Act (ICMA, Act 24 of 2008) further stipulates that all developments within the coastal zone must consider the coastal management line and ensure protection of coastal processes and dune stability.

The National Guideline towards the Establishment of Coastal Management Lines (DEA, 2018) requires that site-specific engineering assessments form part of the environmental submission where steep, erodible or dune-dominated topography is present.

4. Engineering Assessment

1. Site Suitability

Based on the available topographical survey, geotechnical report, and the coastal erosion hazard mapping, the site is deemed suitable for the proposed residential development, provided that construction is confined to the identified stable portion of the erf (location PE) and that appropriate foundation and erosion-control measures are implemented.

The inland position of the proposed footprint provides a sufficient buffer (approximately 15 m) beyond the 100-year high-risk coastal flooding and erosion zone, satisfying the minimum setback considerations recommended under ICMA Section 25 and local coastal management guidelines.

2. Geotechnical and Structural Considerations

- The soils are non-expansive but highly erodible and compressible in the loose state.
- Founding materials comprise uncemented dune sands requiring compaction or replacement to achieve adequate bearing capacity.
- The presence of a semi-consolidated fossil dune below variable depths provides a firmer stratum which may be exploited for deeper foundations where necessary.
- Slope gradients and potential sliding planes within the dune mass necessitate a formal stability analysis by a competent geotechnical or coastal specialist.
- Temporary cuttings and excavations during construction are prone to collapse and must be stabilised immediately upon exposure.

5. Engineering Design and Construction Requirements

The following engineering controls are mandatory for all design and construction activities on this site:

1. Dune Stability Verification

A quantitative dune stability and slope analysis must be undertaken in accordance with SANS 1936-2:2012 ("Engineered Earthworks and Geotechnical Investigations") to confirm the factor of safety against failure under saturated and dry conditions. The assessment shall consider surcharge loads, rainfall infiltration, and potential coastal erosion at the dune toe.

2. Foundation Design

- Foundation systems must be designed and certified by an ECSA-registered structural engineer.
- Foundations must account for the presence of soft, uncompressed sands by means of either raft foundations, deepened strip footings, or piles founded into compacted or semi-consolidated material.
- A minimum compacted stabilised zone of 1.5 m width around all exterior wall foundations is required, compacted to at least 95% Mod AASHTO density.
- Where necessary, ground improvement (densification, geogrid reinforcement, or soil-cement stabilisation) should be undertaken beneath footings to control differential settlement.

3. Stormwater and Surface Drainage

- Stormwater must be managed to prevent concentrated discharge down slope. Surface runoff should be intercepted, dissipated, and directed towards vegetated infiltration areas.
- Subsurface drainage systems should be included where perched water may accumulate in the sandy profile.
- Drainage design must comply with SANS 1200 DA (General Requirements for Earthworks) and local municipal stormwater standards.

4. Erosion and Dune Protection

- Exposed slopes must be protected with erosion-control blankets, geotextile stabilisation mats, or bioengineering systems in accordance with SANS 10386:2007 (Revegetation of Soils and Slopes).
- Indigenous dune vegetation should be reinstated immediately after construction to restore the natural stabilising root network.
- All disturbed areas outside the building footprint must be rehabilitated and re-vegetated in accordance with the Coastal Management Programme of the Garden Route District Municipality.

5. Construction Supervision and Quality Control

- All earthworks and foundation operations shall be supervised by the appointed structural engineer.
- Field density and compaction control tests must be carried out and recorded.
- Regular inspections must be undertaken to verify compliance with the design specifications prior to placement of concrete.

6. Post-Construction Monitoring

- The stability of the dune slope and surface drainage performance must be inspected annually for the first two years following completion.
- Any signs of settlement, erosion, or vegetation loss must be remediated immediately in accordance with the engineer's recommendations.

6. Professional Confirmation

Based on the geotechnical information, coastal hazard mapping, and engineering evaluation undertaken, we hereby confirm that:

1. The proposed development area ("Location PE") on Erf 79/205, Ruygte Valley, Cola Beach, is suitable for residential construction from a civil and structural engineering perspective.
2. The site is not within the current or projected 100-year coastal flooding or erosion risk zones and lies inland of the designated high-risk area.

3. The dune slopes, though steep, are capable of supporting the proposed structure, provided stability and erosion-control measures are implemented as recommended.
4. All foundations and structural systems shall be designed, detailed, and signed off by a registered professional engineer, taking full cognisance of the sandy, erodible and compressible nature of the founding materials.
5. With adherence to the prescribed engineering design and environmental management controls, the proposed development does not pose significant geotechnical or structural risks, nor will it adversely affect coastal stability or natural dune processes.

7. Professional Declaration

I, the undersigned, hereby declare that I am a Professional Engineer registered with the Engineering Council of South Africa (ECSA) in terms of the Engineering Profession Act (Act 46 of 2000), and that this report has been prepared in accordance with accepted engineering standards, codes of practice, and professional ethics as prescribed by ECSA and the South African Institution of Civil Engineering (SAICE).

All findings and recommendations contained herein are based on professional judgement, field data, and referenced technical documentation available at the time of preparation. This report may only be reproduced in full and must be read in conjunction with the accompanying geotechnical and environmental reports.

Prepared by:

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Date: 23 October

Signature: _____

For inclusion in: Environmental Impact Assessment Supporting Documentation

Subject: Engineering Suitability Confirmation – Erf 79/205, Cola Beach, Sedgefield