



The Tinley Manor South Banks Coastal Development: Coastal Impact Assessment

A project for Tongaat Hulett Developments

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1 INTRODUCTION

In early 2010, the Coastal Unit of Royal HaskoningDHV (then operating as SSI Engineers & Environmental Consultants) prepared a coastal assessment report for the Tinley Manor and Tugela landholdings of Tongaat Hulett to evaluate the environmental opportunities and constraints of these areas from a coastal development feasibility perspective. This study was assessment-driven and had little conceptual application; however, it represents a detailed and thorough study that covers a wide range of topics and issues that are pertinent to development in general within the coastal zone. This study is attached for ease of reference.

Subsequently, a follow-up development planning exercise for the Tinley Manor landholdings was undertaken. This report is described in more detail in 6.1 below, and was informed by the aforementioned coastal assessment report. Royal HaskoningDHV then initiated the required environmental impact assessment process for the proposed Tinley Manor Southbanks Coastal Development in early 2012. Various specialist reports informed this on-going process, including an Estuarine Impact Assessment for the uMhlali Estuary. As requested by Tongaat Hulett Developments, these reports are reviewed in more detail in Section 6 of this document.

It should be noted that during the assessment process, Tongaat Hulett Developments have relied on the coastal team to identify any shortfalls or fatal flaws and on identification and subsequent discussion, numerous amendments have been made. All effort will be made to effectively reflect this process of review in this specialist report.

2 DETAILS OF THE PROJECT TEAM

This assessment was undertaken collectively by Tandi Breetzke and Luke Moore.



Tandi has more 20 years of general and 13 years of specialised coastal management, governance and environmental experience. She is a member of IAIA-SA and EAPASA, as well as a member of the WESSA affiliated coastal NGO, Coast Watch and a long-standing member of the South African Blue Flag Jury. Tandi's experience mirrors the South African coastal experience. Initially developing governmental policies, practices and procedures and now, as a consultant, in implementing integrated coastal management principles. As a government official, Tandi set international best-practice and now continues that trend by building on partnerships developed in government and winning top awards both internally and within the profession as a whole. Tandi jointly prepared a user-friendly guide to the ICM Act in public/private partnership with the

National Department Environmental Affairs, won the IAIA 2010 Premier Award and was a finalist in the KZN Business Woman's Association Business Achievers Awards. She has since been recognised as a leading professional by Royal HaskoningDHV.



Luke Moore is a senior environmental consultant specialised in coastal management and spatial planning. Luke's work experience encompasses a wide range of environmental planning and sustainability projects including coastal management programmes, development concept planning, coastal sensitivity and development feasibility assessments as well as coastal specialist comments. Luke is a registered member of the Society of South African Geographers (SSAG) and the IAIA. Luke holds a Bachelor of Arts degree in Geography and Environmental Science from Rhodes University as well as an Honours degree (*cum laude*) in Geography and Environmental Management from the University of KwaZulu-Natal.

3 SCOPE AND PURPOSE OF THE SPECIALIST REPORT

One of the outstanding specialist reports required for the application process and as detailed in the approved scoping report, is a coastal management impact assessment, which deals with issues relating to *inter alia* integrated coastal management, risk in relation to coastal erosion, sea-level rise (SLR), potentially unstable coastal geology, coastal access and development feasibilities.

Given the detailed nature of the coastal development feasibility study undertaken in 2010, an addendum to this original report, which assesses the potential impacts of the proposed development, is deemed to satisfy the requirements of the coastal impact assessment component of the application for environmental authorisation (reference DC29/0019/2011).

4 DESCRIPTION OF THE METHODOLOGY

The objective of this addendum report is to incorporate a coastal specific assessment of the impacts of the proposed development identified as part of the subsequent development planning process. This includes:

- Evaluation of various other specialist reports undertaken including the conceptual development proposal and block plan and review of recommendations made;
- Evaluation of the potential impacts (direct, indirect, cumulative, positive and negative) associated with the proposed development concepts that constitute the development planning report for the Tinley Manor South Banks Coastal Development; and
- Recommendations and mitigation measures with respect to the impacts identified above.

5 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The Tinley Manor South Banks Coastal Development (hereafter referred to as 'the development') consists of a proposal by Tongaat Hulett Development to develop a currently commercially farmed 437 ha site, located within the KwaDukuza Municipality, into a mixed-use coastal development, which includes large residential and resort components.

The proposed development is centred upon the site's exceptional natural and physical attributes which includes, *inter alia*, 3.5 km of river frontage on the uMhlali Estuary (Figure 1). The 437 ha site also includes approximately 2.5km of shoreline, which abuts the Indian Ocean. This section also includes segments of coastal dune forest. Special tourist, resort, leisure and recreational opportunities, together with upmarket and mixed densities of residential and limited commercial opportunities, are envisaged for this portion of the existing sugar plantation. The proposed development, which will require new road and service infrastructure including electricity, sewer reticulation and water supply, is proposed as follows:

Table 1: Breakdown of proposed land use zones

| Land Use Zone | Area/ Ha | % of Total |
|--|---------------|---------------|
| Open Space System | 277.7 | 63.5% |
| Residential 1: High Density Residential @ 75units/ha | 46.2 | 10.6% |
| Residential 2: Low-Medium Residential @ 35units/ha | 12 | 2.7% |
| Residential 3: Low Residential @ 10units/ha | 44.6 | 10.2 |
| Low Impact Mixed Use 1: 60% residential @75 units/ha | 3.1 | 0.7% |
| Low Impact Mixed Use 2: Entertainment | 3.7 | .8% |
| Medium Impact Mixed Use: 40% res @75 units/ha | 17.8 | 4.1% |
| Resort: @55m ² /room | 31.3 | 7.2% |
| Service Area and Nursery | 0.60 | .1% |
| TOTAL DEVELOPABLE | 159.30 | 36.32% |

The proposed development capitalises on the undulating landscape, wetland areas and coastal vegetation as part of an eco-centric design concept, which includes both direct and indirect interactions with the uMhlali Estuary, through the numerous drainage lines, wetland areas, estuary and the shoreline.

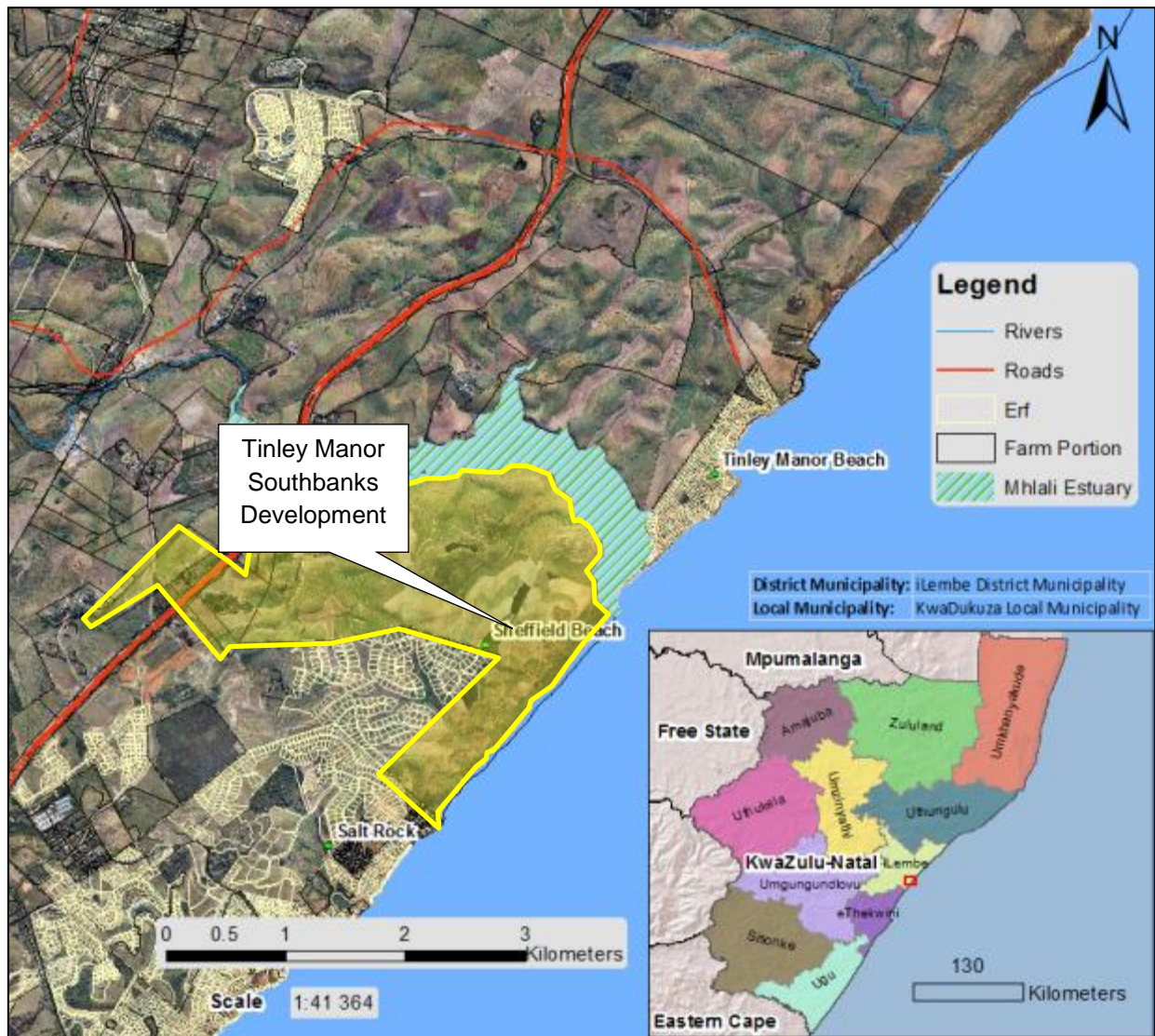


Figure 1. Location of the Tinley Manor Southbanks Development site and the uMhlali Estuary

6 REVIEW OF OTHER REPORTS PRODUCED

6.1 Conceptual Development Proposal, Block Plan Layout, and Landscape Development Plan

Royal HaskoningDHV's Urban Planning Unit were appointed to prepare a Conceptual Development Proposal and corresponding Block Plan Layout, including a Landscape Development Plan, for the proposed development. This plan includes a description of the policy environment, details precedent and best practice, describes the regional context and undertakes a site assessment before proposing a development vision and landscape strategy. The development concept proposes a vision, various development concepts, site structure and land use framework taking cognisance of the environment context and including detail on both the proposed access and circulation network. The landscape strategy details objectives, landscape zones and elements, and concludes with overall landscaping treatment guidelines. As noted earlier, this report was largely informed by the aforementioned coastal development feasibility assessment report and was amended based on comments made during the development process. Specific reference is made to amendments made in respect to coastal access and storm water management.

The description of the policy environment identifies key policy implications for the proposed development, which include:

- The consolidation/ enhancement of the coastal tourism corridor;
- The protection of the fragile/ vulnerable coastal assets;
- Responsiveness to coastal erosion managed through the coastal set-back (now management) line;
- The protection of high potential agricultural land; and
- An integrated development response to recreation and residential needs.

The report then considers the current local residential and resort market as well as international trends and best practice. The situational analysis initially considers the regional context of the proposed development, the first phase of the longer term development of Tongaat Hulett Development's Tinley Manor land holdings, 'within one of the fastest growing real estate regions along the South African coast'. Sub-regional and local accessibility constraints (access from the N2 and access restrictions due to established development patterns) are then discussed following which regional development patterns and then environmental systems are detailed. This section concludes with a detailed site assessment which includes environmental factors (as detailed in the initial coastal report referred to in Section 1), the ecological role of the site, landscape character and visual assessment, access and linkage as well as a services and infrastructure assessment. The site assessment concludes with identified implications, which are extracted as:

- Unstable soils and very steep slopes must inform access, development blocks and open space functions and should preferably be stabilised with endemic grassland species;
- Set development well back from the coastal set back line, the limited development line, sensitive hydrological systems and protected vegetation;
- Rehabilitate wetlands;
- The critical ecological role of the site must be recognised and it should be rehabilitated and its functioning improved;
- Coastal access should be assessed on a sub-regional, district and local level; and
- The access, block layout and land uses should be aligned with the attributes of the site (sense of openness/ enclosure, vast panoramas/ framed views and vistas).

The vision for this proposed development (phase 1) should be seen in relation to the development vision for the whole Tinley Manor area as detailed in the Tinley Manor Draft Concept Plan below (Figure 2: Tinley Manor Draft Concept Plan (Figure 2)).

The resort centred, lifestyle and mixed use village theme supported by a range of commercial and social facilities proposed for the development responds to the environmental sustainability and resilience

requirements and provides an integrated “living, working and playing” environment. Overarching development objectives underpinning the development concept are summarised as:

- Regenerate, rehabilitate and enhance the ecological functioning of the site to provide a supportive and robust base for settlement and development;
- Create a diversity of land use and settlement forms and intensities integrated into a cohesive, efficient and productive whole;
- Integrate, as far as is possible, the proposed new development with the existing and emerging regional ecological, spatial development and transportation systems;
- Encourage and promote, as far as is possible, the increased use of, and integration of, non-motorised and “public” transportation with existing conventional transportation systems;
- Accommodate demand for exclusive forms of development, but provide opportunities for integration to the coast through well designed public spaces and places; and
- Optimise the use of beach assets for both tourists and local utilisation and facilitate appropriate beach access at the local scale.

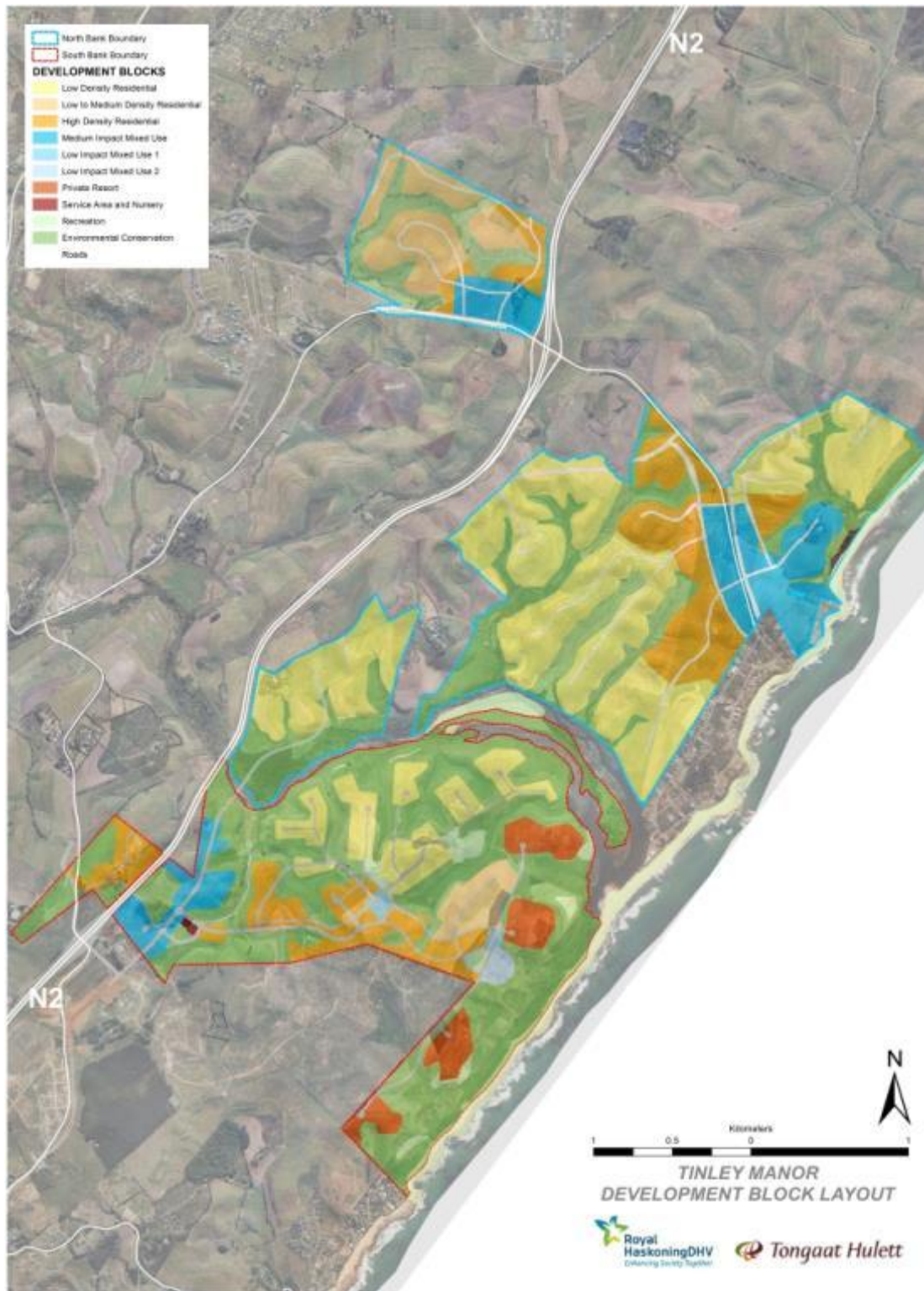


Figure 2: Tinley Manor Draft Concept Plan

The report then defines development characteristics as well as the proposed site structure and block layout, which are predominantly pre-determined by the geophysical elements of the site. An environmental framework is then unpacked which includes objectives and elements of the system, the latter relating to:

- Coastal dune system (the plan recognises the value and fragility of this natural system and proposes protection, expansion and improved ecological functioning);
- Riverine and estuary system (the plan recognises the need to consolidate, rehabilitate, protect and enhance these systems);

- Regenerated and enhanced wetland systems associated with major and minor wetlands (The plan proposes the rehabilitation of the majority of wetland areas and includes a buffer);
- Remnant coastal forests (These areas are excluded from any development and are proposed to be both expanded and protected);
- Agricultural areas associated with buffer areas and development blocks (While these are still included in this portion of the block plan, it is noted that the agricultural element of the initial proposal is no longer central to the development concept);
- Recreational areas;
- Additional linkages corridors (the plan includes an connected open space system); and
- Water bodies.

It should be noted that this environmental framework (Figure 3) was created taking cognisance of the original coastal feasibility assessment as well as the incremental versions of this coastal specialist impact assessment.

The plan then describes the access and circulation network, again including objectives and elements and takes due cognisance of all specialist reports produced. It is noted that this component was significantly influenced by a previous iteration of this specialist report as well as a separate stand-alone coastal access report prepared which highlighted the substantial constraints associated with the originally proposed restricted access / gated estate concept.

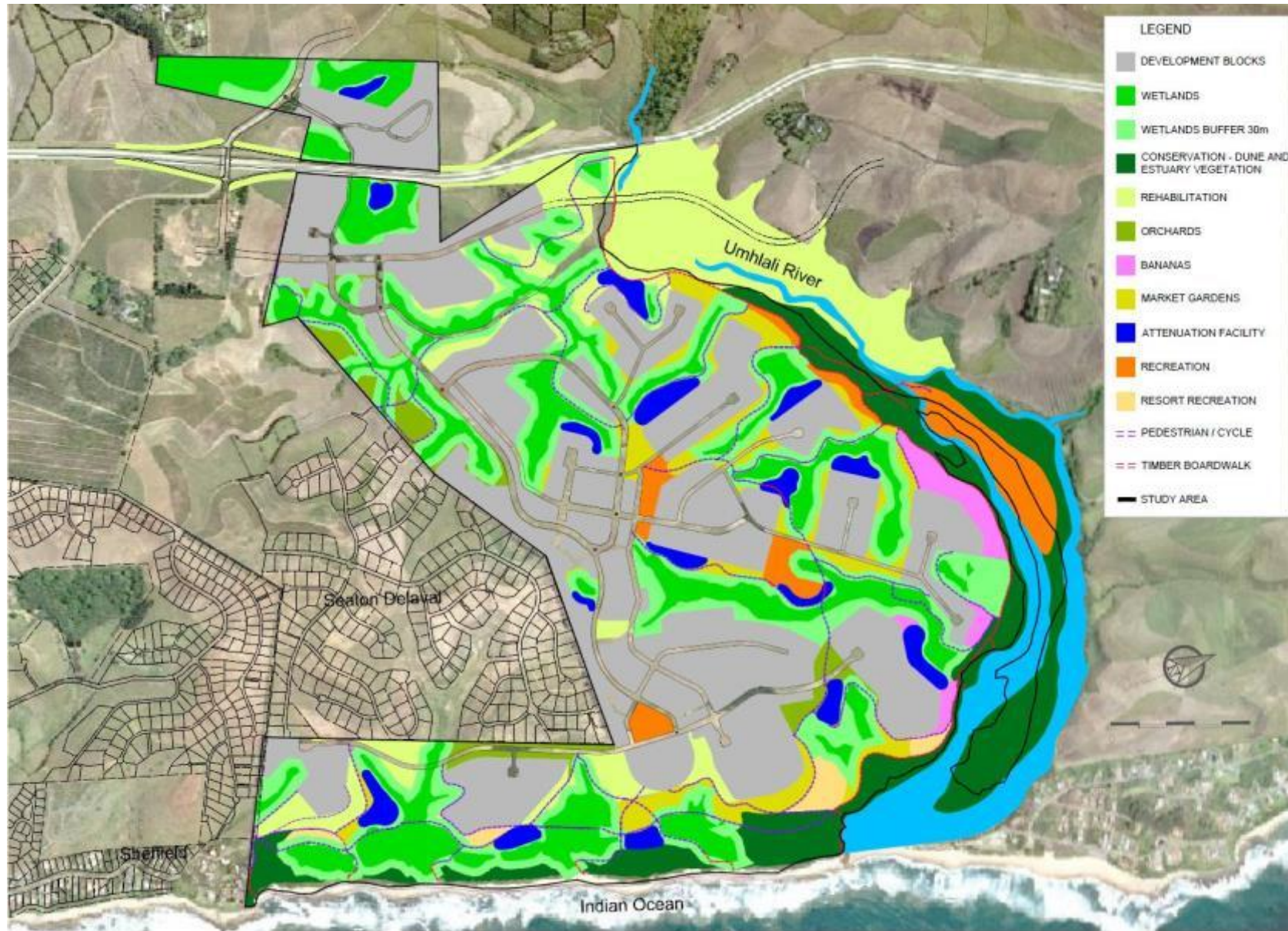


Figure 3 Environmental Framework

The land use framework that follows, and which includes objectives and elements, details the different/mixed uses proposed. This section has taken due cognisance of the initial feasibility study undertaken and subsequent investigation. Development guidelines and a landscape strategy are then included which, amongst others, detail the protected spaces and the need to protect, enhance, expand and 'showcase' such areas (Figure 4).



Figure 4: Protected Spaces

The report concludes with proposed landscape elements (Figure 5) (mixed-use nodes, residential districts, gateways and landmarks and boulevards and streets) concluding with overall landscaping treatment guidelines. The use of elevated boardwalks in ecologically sensitive areas as part of the pedestrian system is noted.

As detailed earlier, it is noted that the various iterations of this block plan with accompanying landscape guidelines was fully informed by the original coastal feasibility study undertaken as well as subsequent versions of this coastal impact assessment.

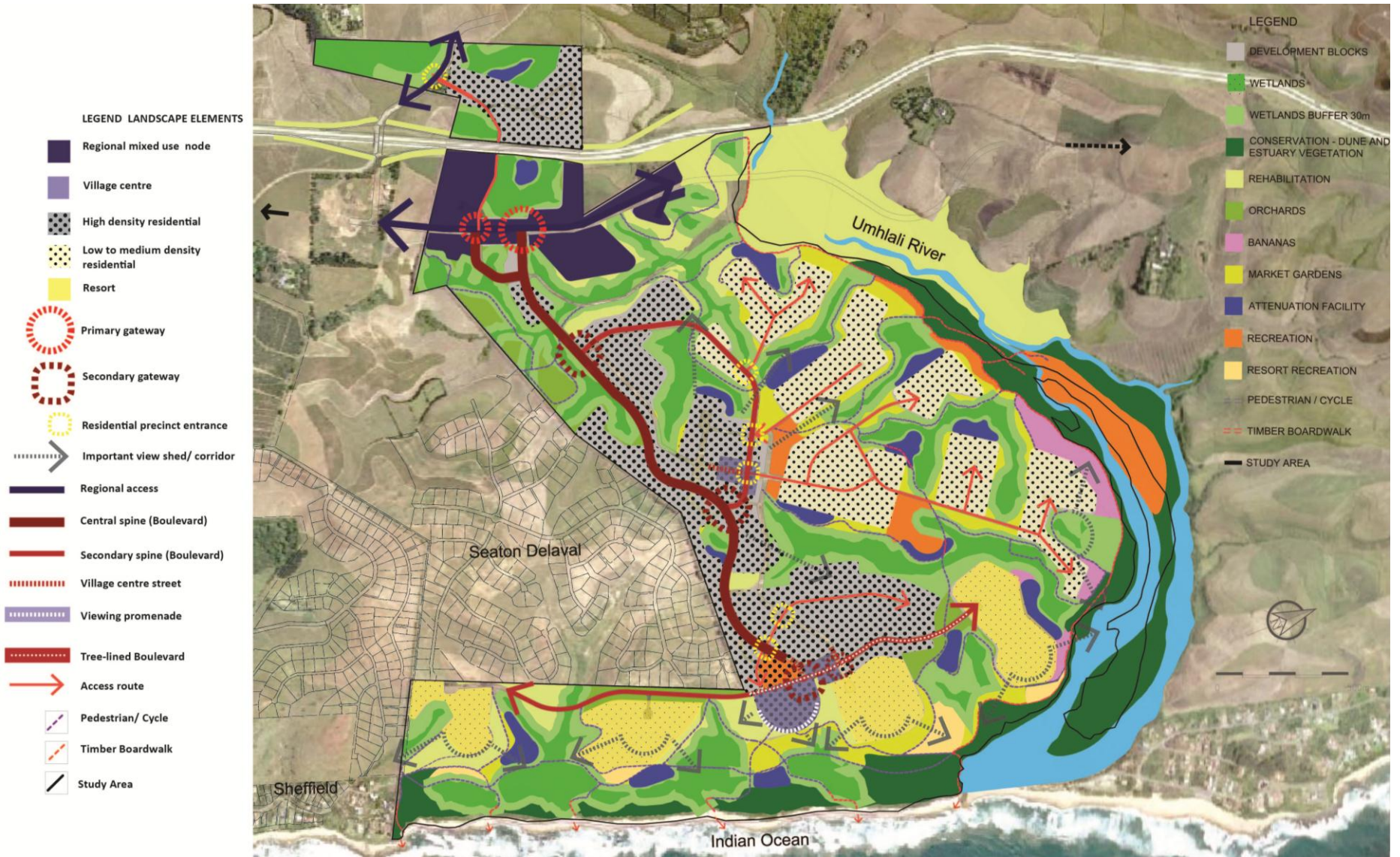


Figure 5: Landscape Strategy

6.2 Engineering Services Report

SMEC were appointed to investigate and report on the available municipal services and upgrades required to service the proposed development. Bulk water, wastewater, road access and telecommunications were assessed and recommendations made.

In respect to bulk water they note that this will be supplied by a proposed reservoir within the Seaton Delaval development, fed by the Taffeni reservoir in the short term, but ultimately directly off the Umgeni Water Honolulu pipeline via Sembcorp Siza Water (SSW) infrastructure. Required upgrades to the existing infrastructure will be implemented in a phased approach in line with the market take-up of the project.

Wastewater generated by the development will be processed at the existing Sheffield WWTW located within the development.

Access is proposed via an upgraded dual carriageway road with 30m road reserve to be constructed in phases in line with the development take-up to allow for possible future widening. Issues requiring further investigation include a potential arterial route, a potential interchange adjacent to the development and the potential upgrading the P228 Bridge over the N2 freeway.

SMEC note that Telkom will provide the necessary telecommunication infrastructure based on demand. No detail is provided in respect to electricity supply, which is of concern.

6.3 Stormwater Management Plan

SMEC were also appointed to review stormwater considerations of the proposed development as part of the above civil engineering input. This included the provision of a Stormwater Management Plan.

Potential impacts identified, which SMEC believe are required to be mitigated, include the increase in hardened areas and resultant reduced infiltration; loss of vegetation; reduced evapo-transpiration potential; overall increase in surface runoff; and increase in the speed of runoff and peak flow rates in the watercourses.

Recommendations made by various specialists have been taken into consideration, particularly in response to potential erosion; wetland functionality; prevention of pollution; on-site rainfall and flood attenuation and the rehabilitation of open spaces. A sustainable stormwater management philosophy is adopted and a set of particularly applicable rules are proposed which are required to be implemented by the developer, the professional team, contractors and sub-contractors. These rules relate to building and site design and detailed plans; the removal of vegetation and prevention of erosion; and on-site proposed sustainable urban drainage control systems. Critical aspects are emphasised following which valid general guidelines for stormwater control from buildings, roofs, driveways, paths and roads are proposed. Guidelines are also provided for storage facilities, sub-surface disposal, channels, energy dissipaters and flow retarders.

The plan concludes by noting that the key negative impact is the substantial increase in the peak stormwater runoff flows for both the 1 in 10 and 1 in 50 year return periods which are proposed to be mitigated by the introduction of attenuation dams/dry attenuation ponds. A total of seventeen ponds with varying areas and an indicative depth of 2 m with a combined attenuation volume of approximately 41 500 m³ are proposed.

While the sustainability principles contained in the stormwater management plan, which are in line with ICM principles included and recommendations made, are commended, the exclusion of the free ecosystem flood attenuation service provided by the extensive rehabilitated wetland system as part of an attenuation system was queried. The use of a 'dry' attenuation pond was also found to be problematic and it was recommended that these be vegetated and incorporated into a wetland system.

The above comment was noted by both SMEC as well as the Royal HaskoningDHV planning team and after discussion, it was agreed to exclude all attenuation ponds from wetlands but that such systems should be vegetated. The Block plan was amended in light of this discussion as well as recent developments and decisions taken by the KZN Department of Economic Development, Tourism and Environmental Affairs as well as the National Department of Water Affairs.



Figure 6: Proposed ponds layout

6.4 Geotechnical Assessment

Drennan, Maud and Partners undertook both a desktop and a more detailed geotechnical investigation. The underlying geology of the site as well as potentially ‘problem’ soils overlying the weathered bedrock were identified (Figure 7).

They recommended that these be taken into consideration during the initial planning phases of the proposed development. They provided general recommendations with regard to cutting and filling which should be restricted to a maximum slope batter of 1:2 (26°) and 1: 1,5 (33°) where favourably dipping strata is intersected. They identified that areas of seepage are likely across the development area, especially at the base and head of drainage valleys, and that these should also be taken into consideration.

Due to these challenges, planning and construction of the proposed development must strictly adhere to recommendations made with site-specific geotechnical investigation required.

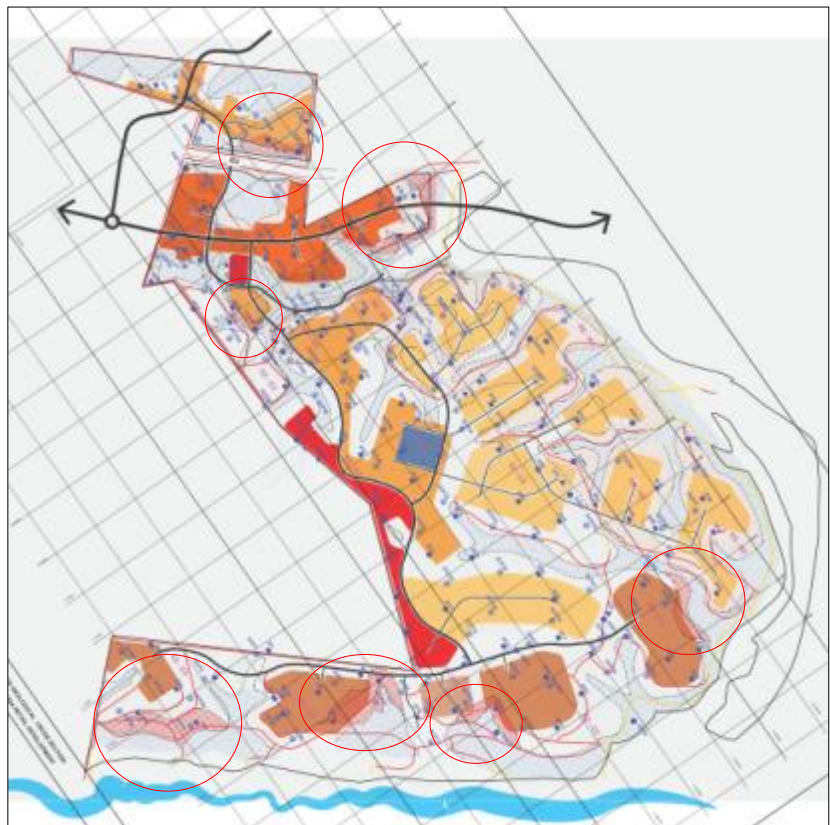


Figure 7: Areas of Instability Identified

6.5 Estuary Impact Assessment

In 2013, the Royal HaskoningDHV Coastal Unit completed an estuarine impact assessment for the Mhlali Estuary. The assessment described the affected environment and then highlighted the various aspects and activities of the proposed development which could potentially impact on the estuarine environment. The report concluded that, despite the high significance of some of the predicated impacts resulting from the proposed Tinley Manor South Banks Development, all of the potential impacts could either be reduced to low disturbance and/or avoided, if the mitigation measures detailed were implemented. The following are key recommendations:

- Establish estuarine and riparian buffers;
- Sustain water quality;
- Maintain water quantity and flow;
- Ensure efficient wastewater treatment;
- Retain natural riparian systems;
- Implement sustainable urban drainage principles;
- Implement monitoring programmes;
- Development and implement an Estuary Breaching Plan;
- Develop and implement an Estuary Management Plan; and
- Implement an operational Environmental Management Programme.

6.6 Wetland Assessment Report

A wetland assessment for the proposed development was undertaken by Sivest. This assessment included wetland delineation, an assessment of present ecological state, functionality, ecological importance and services provided, and concluded by providing appropriate mitigation measures and specific recommendations.

Twenty nine hydrogeomorphic units (six channelled valley bottom wetlands; seven unchannelled valley bottom wetlands; fifteen hillslope seep wetlands; and one floodplain wetland) were identified and the extent of such wetlands and their catchment areas determined. Sivest advise that the wetlands falling within the study area are generally quite small (10 ha in size with localised and limited catchment areas) with the exception of the Umhlali floodplain wetland. They identify their present ecological states as:

- Channelled valley bottom wetlands were found to be largely (Category D) to greatly modified (Category E);
- Unchannelled valley bottom wetlands were found to be moderately (Category C) to greatly modified (Category E);
- Hillslope seep wetlands were found to range between a Category A (Unmodified/natural) to a Category E (Greatly modified); and
- The floodplain wetland was found to have a general present ecological state of Category C (Moderately modified).

Ecosystem services (including the sediment trapping ability of wetlands) were identified, assessed and grouped according to hydrogeomorphic units. Wetland ecological importance and sensitivity was also determined for each. Specific reference is thereafter made to the proposed development and its related infrastructure requirements. Potential impacts were also identified and appropriate mitigation measures proposed.

Sivest propose a 30 m buffer around all wetlands with a 50 m /100 m buffer around the Umhlali floodplain wetland. In their assessment, they found the proposed layout and infrastructure to follow best practice by avoiding sensitive environments as well as being aware of environmental constraints and impacts and believe the implementation of the proposed project to have a significant positive impact on wetlands. Sivest's final recommendations include avoiding all wetlands and their associated buffers, rehabilitating them and maintaining them as conservation areas.

Sivest conclude by noting a potential impact resulting of sedimentation from erosion and storm water run-off which could destabilise the natural hydrological dynamics and the associated ecological processes of wetlands often leading to negative impacts. They state that deposited sediments can smother vegetation and change wetland flow paths and dynamics, making affected areas susceptible to alien plant invasion leading to further negative impacts. They are therefore fully in agreement with the proposed location of all stormwater attenuation ponds as well as all stormwater discharge points, outside of wetlands. All stormwater discharge points should also be armoured against erosion with vegetated Reno mattresses.

6.7 Geoff Nicholls Assessment

Geoff Nicholls undertook a site inspection and made various observations, listed identified fauna and flora, including alien vegetation, and made practical recommendations. These included:

- Not developing the highly erodible steep sided sandy valleys;
- Diversify the assemblage of plants;
- Plant and manage the N2 road reserve/servitude as a wildlife refuge, noise barrier and screen;
- Retaining the existing road network;
- Retain wetland seepage lines and block drainage channels;
- Rehabilitate wetlands and retain estuary in its current state;
- Access points to the beach should be pedestrian with boardwalks through the vegetation with any parking areas been located behind the dunes;
- Retain buffer of natural vegetation and plant wind breaks; and
- Retain agricultural activity in lower lying areas.

Most of these recommendations are incorporated into the block layout plan and landscaping guidelines.

7 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

7.1 Legal Requirements

7.1.1 *National Environmental Management Act*

According to the National Environmental Management Act (Act 107 Of 1998) (as amended) (NEMA), environmental authorisation must be obtained from the relevant competent authority, in this case the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA), for the proposed development and associated listed activities¹ through an Environmental Impact Assessment (EIA) process. The purpose of an EIA is to determine whether there are any fundamental negative impacts which may result from the proposed development activity and which cannot be effectively mitigated. The report is then submitted to the competent authority to inform their decision to grant/not grant approval for the project, as well as specific conditions to mitigate negative impacts, should authorisation be granted.

7.1.2 *Integrated Coastal Management Act*

The Integrated Coastal Management Act of 2008 (Act No. 24 of 2008) and Integrated Coastal Management Amendment Act of 2014 (Act No. 36 of 2014) (ICM Act) emanate from the White Paper for Sustainable Coastal Development in South Africa and propose to inter alia, establish a system of integrated coastal and estuarine management. The enactment and subsequent enforcement of this landmark legislation firmly establishes integrated coastal management as the preferred vehicle for the promotion of sustainable coastal

¹ Listing Notice 1 Activities (GNR. 544 of 2010), Listing Notice 2 Activities (GNR. 545 of 2010) and Listing Notice 3 Activities (GNR 546 of 2010)

development in South Africa. This is promoted through directives in terms of the conservation and maintenance of the natural attributes of the coastal environment concomitant with development that is sustainable as well as socially and economically justifiable. It defines the rights and responsibilities of all coastal stakeholders, including those of organs of State, and gives effect to South Africa's international responsibilities in respect to coastal pollution. The ICM Act aims to facilitate the implementation of the principles and guidelines presented by the White Paper and has a number of objectives including:

- The provision of a legal and administrative framework to promote cooperative, coordinated and integrated coastal management;
- The protection of the natural coastal environment as a national heritage;
- The management of coastal resources in the interests of the whole community;
- The promotion of equitable access to the resources and benefits provided by the coast; and
- The fulfilment of South Africa's obligations under international law.

The ICM Act requires that activities that are potentially harmful to the coastal zone are considered as part of the NEMA EIA processes including potential cumulative impacts.

7.2 Current Impacts

Whilst the area under study is currently undeveloped, historical land use and practices have resulted in a number of negative environmental impacts and almost complete land transformation (Table 2). The Impact Assessment section must be viewed against the backdrop of these pre-existing impacts.

Table 2. Human-induced threats to the proposed development area

| THREATS | DESCRIPTION |
|---|--|
| 1. Habitat loss | Extensive commercial sugarcane plantations with only fragmented natural habitat remnants. |
| 2. Sense of place | Natural coastal grassland and forest largely replaced by commercial sugarcane. |
| 3. Loss of wetlands | Wetlands particularly affected through agricultural practices ('herringbone' drains). |
| 4. Eutrophication & chemical contamination | Increased nutrient loading to terrestrial and aquatic resources from agricultural activities has long-term negative impacts. |
| 5. Introduced species | Disturbance of natural areas via sugarcane agriculture increases the probability of the occurrence of invasive alien species (IAPs). |
| 6. Coastal access | Limited incursions onto sensitive beach and estuary environment for pedestrian access. |

7.3 Assessment Methodology

An impact can be described as the consequence of a particular action or activity on the environment, generally identified by a change in a specific feature or characteristic of the environment concerned. By nature, the impact can be positive or negative, or neutral. A *direct impact* is caused directly by the specific action and generally occurs at the same time and place. An *indirect impact* is an induced change caused by the action and is generally expressed later in time or farther removed in distance, but is still reasonably foreseeable. A *cumulative impact* is the impact on the environment, which results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions on the same area. A cumulative impact can result from actions considered minor in isolation, yet collectively significant, taking place over a period of time (CEE, 2012).

The following factors were considered during the predication of the potential coastal specific environmental impacts associated with the proposed development. The associated criteria are provided in Table 3.

- The nature of the impact (status), i.e. Positive, negative, neutral, direct, indirect, and/or cumulative;

- The location and extent of the impact (extent), i.e. The area over which the impact will be expressed (maximum area considered);
- When the impact will be experienced, i.e. During construction, operation, and/or decommissioning phases;
- The duration of the impact (duration), i.e. Short-, medium-, long-term, and/or permanent;
- The likelihood of the impact actually occurring (probability);
- The importance of the impact and the level of mitigation required (significance);
- The potential irreversibility of the impact; and
- The nature of potential cumulative impacts.

Table 3. Criteria used to assess potential impacts

| CRITERIA | DESCRIPTION | | | |
|----------------------------------|---|---|---|--|
| Status | <i>Positive</i> (A benefit) | <i>Negative</i> (A loss) | <i>Neutral</i> | |
| Extent | <i>Site</i> Within immediate construction area | <i>Local</i> Within a 5km radius | <i>Regional</i> Affecting the region as a whole (provincial or parts of other provinces) | <i>National</i> Affecting South Africa |
| Duration | <i>Short term</i> 0-5 years | <i>Medium term</i> 5-15 years | <i>Long term</i> >15 years | <i>Permanent</i> |
| Intensity | <i>Low</i> Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected. | <i>Moderate</i> Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way. | <i>High</i> Natural, cultural and social functions and processes are altered to extent that they temporarily cease. | <i>Very High</i> Natural, cultural and social functions and processes are altered to extent that they temporarily cease. |
| Probability of occurrence | <i>Improbable</i> Low likelihood | <i>Probable</i> Distinct possibility | <i>Highly Probable</i> Most likely to occur | <i>Definite</i> Certain to occur |
| Cumulative | In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. | | | |
| Significance | Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact. | | | |
| | <i>Negligible</i> Not substantial and management is not required | <i>Low</i> Of minor importance; natural environment is affected; management may be required | <i>Medium</i> Important; natural functions and processes are affected; management is required to reduce negative impacts | <i>High</i> Of great importance; functions and processes are significantly or irreversibly altered; development is not feasible if negative impacts cannot be mitigated/reduced; management is critical |

7.4 Impact Assessment

This section considers potential impacts that could affect the study area because of the proposed development. It is noted that this assessment is applicable to the development component that is specifically coastal in nature, i.e. the eastern boundary that borders the Indian Ocean and the area immediately inland of the vegetated dune cordon.

It is necessary to assess the potential impacts of the proposed development in order to minimise environmental degradation of natural elements of the system and to formulate and implement appropriate

mitigation measures. With proactive and adaptive management, the impacts can be avoided or will be greatly reduced in terms of their extent, duration and overall significance. In this section, the potential impacts are assessed and rated in terms of their potential direct, indirect and cumulative effects. Mitigation measures to minimise the potential negative impacts are provided thereafter.

It is noted that this coastal impact assessment has been amended on numerous occasions and now reflects the negotiated layout plan, which has taken cognisance of potential negative impacts identified. All effort will be made below to adequately reflect this process.

7.4.1 Climate Change Vulnerability

The coastal location of the proposed development means that it is inherently exposed to risks associated with natural and dynamic coastal processes. This is exacerbated by the study area’s proximity to the Mhlali Estuary which adds the additional risk factor of terrestrial flooding. These factors have far-reaching and significant impacts for the sustainability of any development proposed in the coastal area, and were taken into account both during the feasibility assessment and at the earliest stages of the development planning concept by means of the delineation of a hazard line and limited development line. This approach was aligned with national and provincial thinking at the time in respect to the application of the proposed coastal set-back line or coastal management line methodology and best-practice risk aversion within the coastal zone in a South African context. An additional known risk factor within the KwaZulu-Natal coastal zone taken into consideration is the potential for geologically unstable areas to ‘slip’ or fail due to, *inter alia*, an advancing high-water mark because of coastal erosion. This has the potential to further negatively impact the sustainability of developments proposed in the coastal zone.

Mitigation:

Adherence to the aforementioned limited development line (i.e. setting back any proposed development from the coast) and the maintenance (and potentially rehabilitation/re-establishment) of natural coastal vegetation should prove adequate mitigation against the impacts of dynamic coastal processes and vulnerability to climate change. It is noted that the sea-level rise modelling exercise that informed the delineation of the hazard line and limited development line included the identification of areas with unstable geology that are prone to slippage/failure.

Implementation:

Mitigation measures proposed above have been taken into consideration and the layout plan adjusted to set-back from identified coastal risk.

| | Status | Extent | Duration | Probability of occurrence | Significance |
|--------------------|----------|----------|-----------|---------------------------|--------------|
| Without mitigation | Negative | Regional | Long term | Probable | High |
| With mitigation | Positive | Local | Long term | Improbable | Low |

7.4.2 Pollution

Solid waste will be generated by day-to-day construction as well as operational activities and may include, but will possibly not be limited to, concrete rubble and bricks, material off-cuts and other surplus construction and other materials. If not properly managed and contained, these items may find their way into drainage lines, wetlands, and other remaining natural areas and eventually into the coastal zone where they will not only pollute, but also impede flow and the ecological functioning of these habitats. Unwanted vegetation off-cuts, including large tree stumps, will also pose a threat to such habitats through physical damage, if not handled correctly, or through decomposition, which has the potential to result in nutrient enrichment.

Similarly to contamination by means of solid waste, liquid pollution may result from accidental spillage of fuels, oils, cement-laden water, curing compounds, sealants, paints and other chemicals. These materials are all associated with day-to-day construction activities and are common throughout construction sites. This pollution can be transported as contaminated run-off into the soil and groundwater systems. In terms of

sanitation infrastructure, practices in coastal areas, such as the installation of septic tanks and the illegal connection of sewage disposal and stormwater systems, can have severe negative pollution impacts.

Furthermore, the proposed design concept incorporates a “flexible open space system” which may comprise active recreation areas (sports grounds), passive recreation areas (seating areas, viewing points) and possibly market gardening, where conditions are suitable. In such instances, fertilizers and insecticides are likely to be applied, which is also applicable to landscaping and general maintenance of resort and residential gardens that are sure to be implemented. Certain chemicals (e.g. some organophosphates like Chlorpyrifos and Diazinon), are known to adversely affect aquatic biota, particularly fish. Pesticides are largely indiscriminate, resulting in the die-off of numerous organisms. These would likely enter watercourses through surface run-off. The use of such chemicals to manage and maintain the vegetation, including lawns, is thus strongly discouraged. Endemic vegetation and grass species should be planted as part of the landscaping scheme, as these are adapted to local conditions and would not require chemical maintenance.

Mitigation:

The establishment of site construction camps should be kept to a minimum. All site camps and storage areas for any development must be sited away from drainage lines, wetlands, steep slopes and other environmentally sensitive areas. Most importantly, construction and associated activities must be undertaken according to a site-specific approved Environmental Management Programme (EMPr) and must be monitored daily by an on-site environmental officer. All solid waste must be removed as soon as possible from each construction point and the broader development site to an appropriate disposal facility. Dumping of vegetation off-cuts in aquatic habitats is not recommended. Regular monitoring of the periphery of construction camps must be undertaken and any accumulated waste removed and disposed of at an appropriate disposal facility.

A method statement in respect to the use, handling, storage and disposal of all chemical and contaminated waste must be compiled and submitted as part of any EMPr. All chemicals must be stored in specifically demarcated and secured areas, which are suitably lined to avoid any contamination. An Emergency Response Plan for accidental spillages of chemical substances must also be developed. Every effort must be made to prevent the discharge of any pollutants, such as fuels, cements, concrete, lime, and chemicals into any aquatic or coastal habitats. Regular water quality monitoring of all water courses and wetlands must be undertaken for the early detection of harmful substances. In the event of a spill from any construction contractor, resident or hotel operator, a penalty should be issued and the ‘polluter pays’ principle should be applied for clean-up operations and rehabilitation, if necessary.

Waterborne sanitation infrastructure must be prioritised over discrete infrastructure such as septic tanks, soak pits and French drains. Under no circumstances must stormwater and sanitation infrastructure be linked such that sewage and stormwater are mixed.

Pesticides should not be applied to the grounds of the proposed development. If the use of chemicals is deemed necessary, a trained aquatic scientist and horticulturalist should be consulted in order to determine what chemicals may be used, in what quantities and during which seasons. The use of fertilizers in proposed market gardens should be kept to a minimum, as contaminated run-off will contribute to nutrient enrichment and potential eutrophication if it reaches the estuary.

These mitigation measures are not limited to the construction phase, and must be incorporated into an operational phase EMPr where applicable.

Implementation:

Waterborne sanitation is proposed to be implemented.

| | Status | Extent | Duration | Probability of occurrence | Significance |
|---------------------------|----------|--------|-------------|---------------------------|--------------|
| Without mitigation | Negative | Local | Medium term | Probable | Medium |
| With mitigation | Neutral | Local | Medium term | Improbable | Low |

7.4.3 Storm water Runoff and Contamination

Comment: Construction activities associated with mixed-use, residential and resort development, as proposed, generally result in the replacement of vegetated areas or bare ground with impervious or hardened surfaces. This has the effect of preventing natural groundcover from being able to absorb run-off from rainfall and other precipitation, i.e. increased surface run-off with a correspondingly high potential for soil erosion. A robust stormwater management system has the potential to mitigate this impact, but the ‘first flush’ emanating from run-off directed through a stormwater system carries many contaminants, particularly oils, fuels and heavy metals from roads, vehicle parking areas and general traffic, as well as litter and debris. This has potentially serious consequences for aquatic and terrestrial systems such as wetlands, streams, estuaries and the remaining naturally vegetated coastal areas. Specifically, toxic substances and solid waste can contaminate these areas. Furthermore, without flow attenuation, the ‘first flush’ or ‘pulse’ of stormwater input has the potential to alter river flow, erosion and deposition patterns, and ultimately river channel morphology.

Mitigation:

Stormwater design needs to ensure that stormwater runoff from the new hardened surfaces is clean and that flows are attenuated prior to reaching the estuary and coastal environment. Creative means of ‘scrubbing’ and removing litter and debris from the runoff must be implemented. Direct stormwater discharge into the Mhlali Estuary is strongly discouraged, and any potential influences on the natural functioning of the estuary mouth must be prevented.

Implementation:

The developer proposes to re-establish natural vegetation along drainage lines and restore wetland areas. While these systems are not being used to capitalise on the natural ecosystem services of filtration (‘polishing’ of contaminants) and flood control (slowing flow velocities and promoting percolation) prior to entering the estuary, it is noted that dry flood attenuation ponds have been included linked to the block plan. Sustainable urban drainage principles have been applied in the stormwater management plan, as detailed above.

| | Status | Extent | Duration | Probability of occurrence | Significance |
|---------------------------|------------------|--------------------------|------------------|---------------------------|---------------|
| Without mitigation | Negative | Local to regional | Long term | Highly Probable | High |
| With mitigation | Neutral/negative | Local to regional | Long term | Probable | Medium |

7.4.4 Soil Erosion

The earthworks and clearing of land associated with construction activity and development in general leads to soil exposure with the potential for erosion and consequent loss of valuable topsoil. While agricultural activity is known to have already depleted the soil component within much of the study area, healthier soils will still exist in the remaining pockets of indigenous vegetation. There is potential for eroded material to be transported from the site via surface water run-off into riparian, wetland and coastal areas that has the potential to result in eutrophication and oxygen depletion due to the nutrient-rich nature of this run-off from agricultural activities, as well as the siltation of the estuary. The potential for erosion is high, given that the land adjacent to the coastal area of the proposed development is currently used for agriculture, in conjunction with its steep topographical nature.

Mitigation:

Best-practice construction methods must be implemented to reduce erosion, particularly in steep areas. This potential impact is easily and significantly reduced if the following mitigation measures are implemented:

- The development layout must take the natural drainage patterns of the site into account, such that buildings and other infrastructure do not concentrate flowing water (especially during high rainfall events);
- Changes to the natural topography must be minimised, and the shape of mature dunes and other natural features must be retained at all costs;

- Wind-screening and sustainable stormwater control should be implemented to prevent soil loss from the site and reduce the formation of erosion channels (e.g. a network of co-ordinated shallow drains should be constructed during the land clearing phase);
- Filter strips (grass buffer strips) must be implemented wherever possible but as a minimum around the perimeter of the each development cluster as soon as construction is initiated;
- Sustainable urban drainage methods, such as porous paving techniques and grass swales, must be incorporated into the design concept to assist in flow attenuation;
- The removal of vegetation must only be undertaken as it becomes necessary for work to proceed and unnecessary removal of indigenous vegetation (especially in steep areas) should be avoided;
- The time that stripped areas are left open to exposure should be minimised wherever possible. Care should be taken to ensure that lead times are not excessive;
- Wind screening and storm water control should be undertaken to prevent soil loss from the site during construction;
- Topsoil must be conserved and re-used for rehabilitation purposes;
- Procedures that are in place to conserve topsoil during the construction phase of the project are to be applied at the set up phase i.e. topsoil is to be conserved while providing access to the site and setting up the camp;
- The removal of vegetation should only occur just prior to construction;
- Cleared areas should not be left exposed, and should be promptly rehabilitated/vegetated with indigenous plants;
- A storm water management system adjacent to all arterial/rural roads needs to be implemented to reduce runoff and subsequent erosion;
- Landscaping and re-vegetation should take place perpendicular to the slope to reduce flow velocities and minimise erosion; and
- Post construction, all areas disturbed by construction, including the site camp area, must be rehabilitated.

Runoff velocities can be further reduced through reconstruction/reinstatement/rehabilitation of wetland and riparian habitats as directed by a wetland expert. Suitable flow attenuation must be implemented prior to directed flow entering such wetlands to prevent scouring and exacerbated erosion.

Implementation:

Sustainable urban drainage principles have been applied in the stormwater management plan, as detailed above. Other issues have been fully incorporated into the landscape guidelines, also detailed above.

| | Status | Extent | Duration | Probability of occurrence | Significance |
|--------------------|----------|---------------|-----------|---------------------------|--------------|
| Without mitigation | Negative | Site to Local | Long term | Probable | High |
| With mitigation | Neutral | Site to Local | Long term | Probable | Medium |

7.4.5 Protection of Coastal Vegetation & Natural Habitats

The area under study is currently undeveloped, however, historical land use and agricultural practices have resulted in a number of negative environmental impacts and almost complete land transformation. Current negative impacts identified include further habitat loss, loss of sense of place, historical drainage of wetlands and potential eutrophication and chemical contamination from farming practices. Remnant coastal forest and riparian vegetation in relation to the estuary still exists and was required to be taken into consideration in the planning process.

The proposed development concept takes due cognisance of the original coastal feasibility assessment undertaken and previous versions of the impact assessment and depicts and incorporates a number of buffered sensitive coastal areas, highlighting them as environmental assets. The relatively intact vegetated dune cordon has been delineated and development proposed only in those areas where no natural vegetation remains. Furthermore, the environmental assets layer also incorporates areas identified for rehabilitation and expansion and low impact recreation.

The proactive identification of coastal risk (sea-level rise hazard line, proposed limited development line as well as potential slippage areas), incorporation of above mentioned buffers and the proposed location of development only landward of these lines/areas contributes to the mitigation of the potential negative impacts associated with unsustainably located development in the coastal zone associated with this proposed development. This is most visible in the proposed preservation (expansion and rehabilitation) of natural areas which allows for *inter alia* the migration of species and interconnection between terrestrial, freshwater and coastal ecosystems.

Mitigation:

Implementation of an operational EMPr to ensure the proposed protection, enhancement, expansion and showcasing of existing dune, estuary, beach and coastal forest vegetation as well as the protection of open views and view sheds of river and ocean.

Implementation:

The updated development concept still includes incorporates as well as buffers sensitive areas identified as well as requiring protection, expansion and rehabilitation.

| | Status | Extent | Duration | Probability of occurrence | Significance |
|--------------------|----------|-------------------|-----------|---------------------------|--------------|
| Without mitigation | - | - | - | - | - |
| With mitigation | Positive | Local to regional | Long term | Definite | High |

7.4.6 Use of Natural Resources

While current land use within the study area (i.e. commercial sugarcane agriculture) has undoubtedly had an adverse impact on its biodiversity, the establishment of resorts and residential areas within and adjacent to the coastal area is likely to negatively impact on fauna and flora. This includes the likely impact on marine living resources, which are likely to be affected by increased pedestrian traffic along the shoreline and estuary.

Mitigation:

The establishment of buffers around sensitive areas will have a mitigating effect on this impact, but regulations regarding the consumptive use of natural resources (flora and fauna) should be strictly enforced and local controls included into the operational EMPr. Non-consumptive use should be promoted, and particularly sensitive areas, such as marginal dune areas, should be demarcated and access restricted. This can be achieved by managing access points to the shoreline. The management and control of the remaining natural areas and the use of natural resources must be included in an operational EMPr which should include both a monitoring and penalty system.

Implementation:

Applicable / responsible coastal access has been proposed with access to and within sensitive areas managed/ controlled via pedestrian systems and elevated boardwalks, where possible.

| | Status | Extent | Duration | Probability of occurrence | Significance |
|--------------------|----------|-------------------|-----------|---------------------------|--------------|
| Without mitigation | Negative | Local to regional | Long term | Definite | High |
| With mitigation | Neutral | Local to regional | Long term | Definite | Medium |

7.4.7 Sense of Place

Changes in land use are usually associated with concomitant changes in sense of place. In the case of the proposed development, the sense of place will be significantly altered. Whilst the current sense of place tends towards a rural-agricultural aspect interspersed with remnant natural coastal forest and fragmented natural vegetation, a change in land use to resort development will undoubtedly alter this sense of place towards a more urbanised form.

Mitigation:

While changes in sense of place are difficult to quantify and are often subjective, there are mitigation measures that can be applied to ameliorate the aforementioned changes/impacts. These include the promotion of neutral colours that do not contrast with the surrounding landscape, as well as the implementation of indigenous landscaping and the removal of invasive alien plant species. Materials used to construct infrastructure such as decks, boardwalks and footpaths should prioritise the use of sustainably sourced natural materials rather than synthetic materials.

Implementation:

The final layout plan can be deemed to positively impact on sense of place with its emphasis on:

- creating a settlement with a unique coastal identity and character;
- establishing a functional and visual connection with the sites ecological assets;
- incorporating an integrated open space system; and
- proposing a range of development nodes, precincts and clusters integrated by the broader and dominant coastal landscape character.

| | Status | Extent | Duration | Probability of occurrence | Significance |
|--------------------|----------|-------------------|-----------|---------------------------|--------------|
| Without mitigation | Neutral | Local to regional | Long term | Definite | High |
| With mitigation | Positive | Local to regional | Long term | Definite | Medium |

7.4.8 Amenity/ Recreational Opportunities

The provision of appropriate beach amenity (facilities that aid and improve recreation activities) is a positive impact associated with sustainable development in the coastal zone. Among others, appropriate beach amenity could include ablution facilities, parking, and facilities that provide managed pedestrian access (including access for disabled persons) while protecting sensitive features.

Mitigation:

The establishment of resorts within the study area will result in increased demand for recreational opportunities and amenity. The ecological and social carrying capacity of the study area beach environment and shoreline is however limited², and as such, will be unable to support high intensity usage by large numbers of people. An extract from this report is included for ease of reference.

² See the attached Coastal Access and Beach Report prepared by RHDHV as part of the planning specialist report for further details and a ranking of the suitability of the respective beach areas. The area proposed for the coastal resort development falls within the coastal segment referred to as 'Christmas Bay Long Beach' within this report.



| | |
|-----------------------|--|
| Description | <p>Sensitive, relatively inaccessible area with high slippage potential. Attractive and potential diverse alternates beach experiences but high risk swimming. All effort should be made to maximise the value of the neighbouring natural assets.</p> <p><u>Accessibility:</u> Poor (no road infrastructure and adjacent private property).</p> <p><u>Beach Access:</u> Difficult due to ecologically sensitive frontal dune system and topography.</p> |
| Recommendation | <p>Potential low intensity usage due to limited accessibility, sensitive dune environments and potential for slippage.</p> |

Figure 8: Christmas Bay Long Beach Segment Assessment

For this reason, an opportunity exists to improve/establish beach amenity at the nearby Tinley Main Beach and Tinley Manor Launch Site Beach. A public-private partnership between the landowners and the KwaDukuza Municipality to develop and maintain public beach amenity that would benefit local residents and visitors alike is suggested. This would maximise the positive impact of creating beach amenity that emphasises the sustainable, non-consumptive use of the shoreline in this area.

| | Status | Extent | Duration | Probability of occurrence | Significance |
|--------------------|-----------------|-----------------|------------------|---------------------------|--------------|
| Without mitigation | - | - | - | - | - |
| With mitigation | Positive | Regional | Long term | Probable | High |

7.4.9 Coastal Access

Currently, access to the coastal area adjacent to the proposed development site is limited to access along the shoreline (in a roughly north to south and south to north direction) from the neighbouring areas of Tinley Manor Beach and Sheffield Beach/Christmas Bay. Access from an east to west direction within the confines of the affected property is limited to a single informal vehicular access point accessible with prior permission from Tongaat Hullet Developments and/or the respective farm manager. This is predominantly because of both the land ownership and the current agricultural land use in the hinterland of the study area. Current access to the coast is further hindered by the topography and existence of the vegetated dune cordon and the wetland areas immediately landward of the vegetated dune cordon. The dune vegetation and wetland areas are both natural barriers to access as well as important environmental assets that play a vital role in mitigating risk from a marine sea-level rise/storm surge perspective.

The initial development concept showed the establishment of four resorts at intervals inland of, but set-back from, the vegetated dune cordon and located landward of the identified coastal risk and slippage in such a way as to not impinge on identified environmental assets. The sustainability of this approach from an environmental perspective is commendable; but the fact that the development of resorts in this area has the potential to negatively impact on access to the coast (not access along the coast) is undeniable. A separate

study² was conducted responding specifically to this restriction of access and considered the prevailing legislative and policy context. National policy directives were considered which state that the overarching objectives of the provision of coastal access are as follows:

- Opportunities for public access must be provided at appropriate coastal locations in context of the environment and social opportunities and constraints; and
- Public access must be maintained and monitored to minimize adverse impacts on the environment and public safety and to resolve incompatible uses (Department of Environmental Affairs, 2014).

In this assessment the issue of coastal access was considered within a broader spatial context. This was deemed appropriate given that the coastal access is to be reported on at a municipal level in terms of the ICM Act. Furthermore, it is important for municipalities to consider the provision of coastal access at a macro or jurisdiction-wide scale, including the issue of accessibility (Department of Environmental Affairs, 2014). It was also necessary to broaden the scope of the access issue to include factors that are outside the spatial extent of the proposed development but that also influence the demand for and supply of access in the region. These factors include but are not limited to the following:

- The appropriate kind of access for each area based on its intended usage and associated ecological and social carrying capacity:
 - Carrying capacity is indicative of the level of intensity each area can sustain; and
 - Ecological and social carrying capacity is comprised of various factors;
- The adjacent coastal settlement of Tinley Manor Beach and its associated recreation facilities and boat launch site;
 - The close proximity of this area which is better suited to high intensity, diverse recreational use should alleviate the demand for access to such activity on the shoreline of the study area
 - The adjacent settlement of Sheffield Beach and its associated recreation facilities; and
 - Similarly, the proximity of this area should alleviate the demand for access to areas for recreational activity;
- Potential for consolidation/expansion of recreational facilities and amenity at existing swimming beaches located at:
 - Salt Rock;
 - Blythedale Beach; and
 - Zinkwazi;
- Potential for establishment of recreational facilities and amenity at new swimming beaches located at:
 - Tinley Manor Launch Site;
 - Tinley Manor Main Beach;
 - Zetheni ;
 - Black Rock;
 - Nonoti; and
 - Iti Bay.

A further potential impact associated with the provision of access in the coastal zone is the biophysical impact on natural vegetation and dune environments. These are dynamic systems that are sensitive to disturbance and encroachment, and incursions through and over dune vegetation can cause long-term and often irreparable damage. Particularly, where access points proliferate and are not formalised, the integrity of the vegetated dune cordon as a natural and resilient defence against the impact of dynamic coastal processes can be severely compromised.

Subsequent development:

As a result of this assessment as well as on-going discussions held with the KwaDukuza Municipality, Tongaat Hulett Developments resolved to amend their planned gated-estate development concept to a now publically accessible resort centred, lifestyle and mixed use village theme which includes a mix of residential and leisure development supported by a range of commercial and social facilities.

Residential and leisure oriented neighbourhoods are proposed to be integrated around village nodes and a high quality, well managed network of public spaces featuring leisure and recreation areas, along with major new beach resort developments and conservation zones.

Access to the coast with this phase of the development is now limited to pedestrian access via paths and elevated wooden boardwalks (Figure 9). Parking is provided at the centrally located low impact mixed use zone. It is further noted that a significantly sized medium impact mixed use zone is proposed to be provided to the north of the existing Tinley Manor providing for the establishment of additional recreational, amenity and beach access at the Tinley Manor Launch Site (Figure 2).

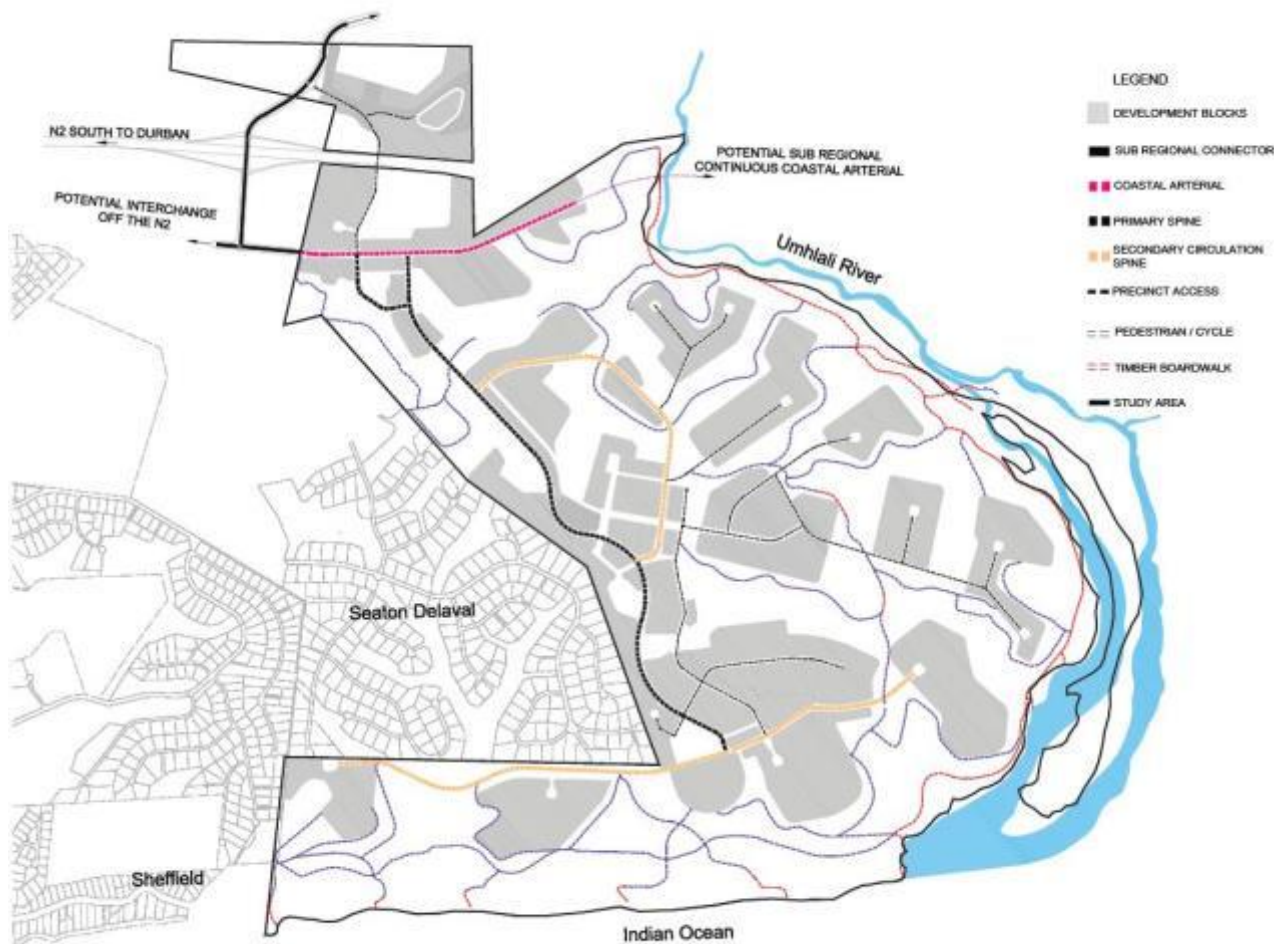


Figure 9: Access and Circulation Network

Mitigation:

With reference to the proposed first phase of development at Tinley Manor (Figure 1), the shoreline of the area under study is not suitable for high intensity beach activities, nor is it a safe swimming beach given the exposed nature of the shoreline. Use of this section of coast should be restricted to low intensity activities such as hiking/walking and recreational/subsistence fishing with limited swimming opportunities. High-intensity beach activities such as a large scale swimming beach, ski-boat launching and others should be concentrated in beach areas that are more suited to this purpose from an ecological and social carrying capacity perspective. To this end, Tinley Main Beach and Tinley Launch Site Beach are considered more appropriate for the aforementioned high intensity activities, with consolidated beach assessment scores³ of 41 and 39

³ See the Coastal Access and Beach Report prepared by RHDHV as part of the planning specialist report for further details and a ranking of the suitability of these beach areas. The area proposed for the coastal resort development falls within the coastal segment referred to as 'Christmas Bay Long Beach' within this report.

respectively. This is due to their comparatively better shoreline morphology, beach slope, prevailing surf conditions (linked to the sheltered nature of the shoreline) and accessibility, among others.

It is recommended that the proposed resorts consider the installation of alternative (high intensity) swimming and recreational facilities due to the limited presence of swimming beaches within the Christmas Bay Long Beach Segment. This is because the currently only identified potential swimming beach within the Christmas Bay Long Beach segment is in the extreme south of the segment and is in itself of a size that does not lend itself to a high number of users and/or intense usage. Additional coastal engineering study is proposed to consider this matter taking finer scale modelling into consideration. Accessibility is also a challenge at this potential swimming beach due to the neighbouring topography.

Access within sensitive areas that are unable to support high intensity use must focus on managed access points that facilitate sustainable use of coastal resources. In the case of the proposed development, this will be activities such as hiking and walking along the shoreline. Given the importance and sensitivity of the dune environment for protection from dynamic coastal processes, it is therefore recommended that coastal access within the Christmas Bay Long Beach segment be geared towards a strictly managed pedestrian access over the dune environment which does not compromise its ecological integrity.

With reference to the potential biophysical impacts associated with the provision of coastal access, the following recommendations are noted:

- The protection of the existing coastal vegetation on site (as indicated by the proposed development footprint) must be prioritised;
- Beach access points must be managed / controlled and denudation of dune vegetation avoided. Access points should be formalised by means of a raised wooden boardwalk that extends onto the beach, allowing for the re-establishment of the dune vegetation underneath the boardwalk as well as a more managed access to the beach;
- There must be a strong focus on consolidating/limiting the number of access points (informal and informal) onto the beach within the Christmas Bay Long Beach segment;
- Sound and practical architectural guidelines should be applied which take account of the sensitive nature of the surrounding environment;
- Development (detailed design) needs to take cognisance of both the risks and responsibilities associated with developing in the coastal zone;
- Alien invasive species management to be incorporated into routine maintenance and included into the operational EMP; and
- Vehicular beach access must be restricted except for emergency access and boat launching in line with the Public Boat Launch Site Regulations.

| | Status | Extent | Duration | Probability of occurrence | Significance |
|--------------------|-------------------|-------------------|-----------|---------------------------|--------------|
| Without mitigation | Negative | Local to Regional | Long term | Probable | High |
| With mitigation | Neutral/ positive | Local to Regional | Long term | Probable | Medium |

8 CONCLUSIONS

The proposed development concept has adopted a proactive approach in identifying environmental assets and sensitive areas upfront by means of the environmental asset layers that were derived from the previous coastal feasibility report. A risk averse approach also characterises the proposed development concept through the identification and incorporation of coastal risk into the proposed location of development. Such an approach is crucial to ensuring sustainability of settlement in a sensitive, dynamic and potentially hazardous natural environment such as the coastal zone. The information available (i.e. the development concept drawings) suggests a development footprint that is not in conflict with identified natural hazards such as slippages or sensitive features such as wetlands or the vegetated dune cordon.

Coastal access, which was identified as a potentially significant issue, has been predominantly resolved. Opportunities exist for an innovative public-private partnership with respect to providing adequate amenity and accessibility at beach locations that are suitable for high intensity activities and can cope with high user numbers. Construction phase impacts can be adequately mitigated through the addition of the proposed mitigation measures to the mandatory EMPr. The development of an operational phase EMPr is strongly recommended in mitigation of the impacts that are anticipated to occur during this phase of the development.

A crucial issue that this assessment attempts to illuminate is the ecological and social carrying capacity of coastal assets. If the mitigation measures described above are adequately implemented the coastal area adjacent to the proposed development (which incorporates the dune cordon, beach, shoreline and estuarine environment⁴) will be able to support the kinds and intensities of uses and users implied by the proposed development concept. Beach recreation within the shoreline abutting the proposed development will be limited to low impact activities due to inherent biophysical constraints and sensitive environments.

However, the close proximity of beach areas with significantly better opportunities for higher intensity recreation activity represents an opportunity, not only for proposed resort residents/visitors, but for the broader community to enjoy the benefits of the KwaDukuza coastal area, should the proposed public-private partnership be implemented at Tinley Manor Beach.

9. REFERENCES

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⁴ While the Mhlali Estuary is considered to form part of the coastal area, estuarine-specific issues, impacts and mitigation measures form part of the Estuarine Impact Assessment Report prepared by Royal HaskoningDHV.