Proposed residential development of Erf 2006 Parsonsvlei NMBM, Eastern Cape

BIODIVERSITY ASSESSMENT

FOR
Engineering and Advice Services (Pty) Ltd

BY

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DATE
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REVISION 1

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ACRONYMS

CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CSIR	Council for Scientific and Industrial Research
DFFE	Department of Forestry, Fisheries and Environment
DWAF	Department of Water Affairs and Forestry, now DWS
DWS	Department of Water and Sanitation formerly the Department of Water Affairs (DWA)
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Plan/Programme Report
ESA	Ecological Support Area
GA	General Authorisation (WUA type)
GIS	Geographic Information System
HGM	Hydrogeomorphic
IHI	Integrated Habitat Index
IUCN	International Union of Conservation of Nature
NAEMP	National Aquatic *Ecological Monitoring Program*
NEMA	National Environmental Management Act (Act No. 107 of 1998).
NFEPA	National Freshwater Ecosystem Priority Atlas (Nel *et al*., 2011).
NWA	National Water Act (Act 36 of 1998)
NWCS	National Wetland Classification System
PES	Present Ecological State
RTU	Recognisable Taxonomic Unit
SANBI	South African National Biodiversity Institute
SCC	Species of Special Concern
SQ	Subquaternary Catchment
ToR	Terms of Reference
WRC	Water Research Commission
WUA	Water Use Authorisation
WUL	Water Use License
WULA	Water Use License Application

SPECIALIST REPORT DETAILS

This report has been prepared as per the requirements of the Environmental Impact Assessment Regulations and the National Environmental Management Act (Act 107 of 1998), any subsequent amendments and any relevant National and / or Provincial Policies related to biodiversity assessments. This also includes the minimum requirements as stipulated in the National Water Act (Act 36 of 1998), as amended in Water Use Licence Application and Appeals Regulations, 2017 Government Notice R267 in Government Gazette 40713 dated 24 March 2017, which includes the minimum requirements for a Wetland Delineation/ Aquatic Report.

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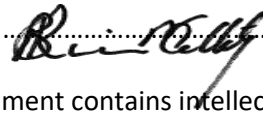
Expertise / Field of Study: BSc (Hons) Zoology, MSc Botany (Rivers), Ph.D Botany Conservation Importance rating, and has worked as an independent consulting specialist from 1996 to present.
I, **Dr. Brian Michael Colloty** declare that this report has been prepared independently of any influence or prejudice as may be specified by the National Department of Forestry, Fisheries and Environment and or Department of Water and Sanitation

Signed:…  Date:…20 June 2024……

1 Introduction

Engineering and Advices Services (Pty) Ltd appointed EnviroSci (Pty) Ltd to conduct an biodiversity impact assessment for the proposed the proposed development of a residential housing development on Erf 2006 within Nelson Mandela Bay Municipality (NMBM), in the Eastern Cape Province.

The regulatory requirements are also discussed with regard the National Water Act and NEMA in Section 4 of this report. While the PROTOCOL FOR SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR THE ENVIRONMENTAL IMPACTS ON BIODIVERSITY (Government Gazette 43110, 20 March 2020 as amended), superseding the Appendix 6 NEMA requirements, was also adhered to. This report thus meets the criteria to fulfil a Specialist Verification Assessment Report as the proposed site is located within an area rated as ***Very High*** sensitivity by the DFFE Screening Tool (See Screening Verification Statement – Appendix 2), related to the Aquatic theme that was rated Very High due to the presence of an Aquatic Ecological Support Area (Type 1). The Animal theme was rated High due to several bird species and Medium for two mammal species and an invertebrate), while the Plant theme was rated as Medium and the Terrestrial Environment, rated as Very High due to the potential presence of the Critically Endangered Algoa Sandstone Fynbos.

The site is situated within the Algoa Sandstone Fynbos vegetation unit, and is Critically Endangered (NSBA, 2018) and thus listed as a Threatened Ecosystem. Further the site is located within a Wetland Cluster catchment of the Papenkuils River, but not within any National Freshwater Ecosystem Priority Areas (NFEPAs) or listed Internal Bird Areas. The study area not located within any Strategic Water Resource Areas.

The findings of this report were supported by baseline data collected in a one day site-specific visit on 13 May 2024. A second visit was conducted on the 11 June to confirm the condition of the aquatic features observed in the surrounding catchment. This assessment also adheres to criteria contained in the DWAF 2005 / 2008 delineation manuals and the Wetland / Riverine Classification System. The survey was conducted in mind winter and after the site had been burnt, but had shown some recovery after recent heavy rainfall and armer conditions than normal, thus not limiting to the overall assessment of the site.

Several important national and provincial scale conservation plans were also considered, with the results of those studies where relevant being included in this report. Most conservation plans are produced at a high level, so it is important to verify or ground truth the actual status of the study area. Groundtruthing of terrestrial and aquatic resources in the project area was also important as the information was critical for the identification and mapping of important habitat where protected or endangered species are known to occur within the region.

Figure 1: The proposed site in relation to the surrounding environment

1.1 Aims and objectives

The aim of this report is to provide a summary of the aquatic and terrestrial (plant and animal) baseline information and identify any No-Go areas for the proposed development. The report also makes recommendations for further management and mitigation, to further reduce, avoid or mitigate the potential negative impacts and enhance positive impacts where possible. The implementation of these management actions and mitigation measures will ensure the responsible and sustainable use of South Africa's natural resources.

Certain aspects of the proposed development will trigger the need for Section 21, Water Use License Applications (WULAs) (or General Authorisation [GA] applications) such as river crossings or any activities within 500 m of a wetland. Once the final layout receives an EA, these applications must then be submitted to the Department of Water and Sanitation (DWS). Information regarding the state and function of the observed water bodies, including suitable No-Go buffer areas, are provided where relevant.

1.2 Assumptions and Limitations

To obtain a comprehensive understanding of the dynamics of both the flora and fauna of communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints these long-term studies are not feasible and are thus mostly based on instantaneous sampling. This limitation is common to many impact assessment type studies, but the findings are deemed adequate for the purposes of decision-making support regarding project acceptability in this Phase, unless otherwise stated.

Therefore, due to the scope of the work presented in this report, a long-term investigation of the proposed site was not possible and as such not perceived as part of the Terms of Reference. However, a concerted effort was made to assess as much of the potential site, as well as make use of any supporting literature, species distribution data and aerial photography.

It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

2 Terms of Reference

The methodology used in this assessment was developed in mind of the minimum requirements stipulated by DFFE and the DWS and included the following aspects:

- Desktop analysis
- Site investigation
- Compilation of one draft and one final site screening / sensitivity report for the project which adheres to the following (this list is not exhaustive):
    - The Initial Site Sensitivity Verification reporting requirements for environmental themes set out in Government Gazette No. 43110 which was promulgated on 20 March 2020 in terms of section 24(5)(a) and (h) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).
    - Identification and mapping of any discrepancies with the environmental sensitivity as identified on the national web based environmental screening tool.
    - Identification of sensitive areas to be avoided (including corresponding spatial data) and the determination of the respective buffers (if applicable) for the site.
    - Initial recommendations for the layout and allowable development footprint from a biodiversity perspective (including corresponding spatial data).
    - Recommendations regarding the areas to be utilised within the project site from a biodiversity perspective (including corresponding spatial data)
    - Assess the proposed development layout against the receiving environment in the form of an impact assessment
    - Provide any additional development guidelines and mitigations were relevant

3 Relevant legislation, policy and permit requirements

The following is pertinent to this study:

- Section 24 of The Constitution of the Republic of South Africa;
- Agenda 21 – Action plan for sustainable development of the Department of Environmental Affairs and Tourism (DEAT) 1998;
- National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) inclusive of all amendments, as well as the NEM: Biodiversity Act;
- National Water Act, 1998 (Act No. 36 of 1998);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002);
- National Forest Act (No. 84 of 1998); and
- National Heritage Resources Act (No. 25 of 1999) – could apply if cultural use or heritage is linked to any aquatic resources
- NEMA and the CARA identify and categorise invasive plants together with associated obligations on the landowner. Several Category 1 & 2 invasive plants were observed in covering extensive areas of the site under investigation, but were limited to the following species, which would be destroyed during the construction process.
    - *Pinus spp* (Pine trees)
    - *Eucalyptus spp* (Blue / Red Gums)
    - *Agave sisalana* (Sisal plant / Agave)
    - *Acacia mearnsii* (Black Wattle)
    - *Acacia cyclops* (Rooikrans)
    - *Acacia longifolia* (Longleaf wattle)
    - *Sisumbrium orientale* (Indian hedge mustard
    - *Foeniculum vulgare* (Fennel)
    - *Cyperus rotundus subsp rotundus* (Nut grass)
    - *Pennisetum clandestinum (Kikuyu)*
    - *Solanum maurtianum (Bugweed)*
    - *Argemone Mexicana (Mexican poppy)*
    - *Cestrum laevigatum* (Inkberry)

Based on an assessment of the proposed activities (Table 1) and past engagement with DWS, the following Water Use Authorisations may be required based on the following thresholds as listed in the following Government Notices, however ultimately the Department of Water and Sanitation (DWS) must determine if a General Authorisation (GA) or full WULA will be required during the pre-application process as it relates to the following, bearing in mind that this will only be conducted once a final project scope is known:

Table 1: Water Use Activities

	Water Use Activity	Applicable to this development proposal
S21(a)	Taking water from a water resource	N/A – water will be supplied by the Municipality
S21(b)	Storing water	N/A
S21(c)	Impeding or diverting the flow of water in a watercourse	If any works (permanent or temporary) are located within a 100m of a watercourse or 500m from a wetland boundary but no wetlands or watercourses were observed in close proximity to the site or within the respective regulated zones therefore N/A
S21(d)	Engaging in a stream flow reduction activity	N/A
S21(e)	Engaging in a controlled activity	N/A
S21(f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit	N/A
S21(g)	Disposing of waste in a manner which may detrimentally impact on a water resource	N/A
S21(h)	Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process	N/A
S21(i)	Altering the bed, banks, course or characteristics of a watercourse	If any works (permanent or temporary) are located within a 100m of a watercourse or 500m from a wetland boundary but no wetlands or watercourses were observed in close proximity to the site or within the respective regulated zones therefore N/A.
S21(j)	Removing, discharging or disposing of water found underground for the continuation of an activity or for the safety of persons	N/A
S21(k)	Using water for recreational purposes	N/A

3.1 Wetland and riverine buffer policy

Currently there are no formalised riverine or wetland buffer distances provided by the provincial authorities and as such the buffer model as described Macfarlane & Bredin (2017) for wetlands, rivers and estuaries was used.

These buffer models are based on the condition of the waterbody, the state of the remainder of the site, coupled to the type of development, as wells as the proposed alteration of hydrological flows. Based then on the information known for the site the buffer model provided the following:

Minor Drainage Lines

None observed within 100m of the proposed development

Wetlands

None observed within 500m of the proposed development

4 Methodology

4.1 Terrestrial fauna and flora

A desktop and literature review of the study area under investigation was conducted to collate as much information as possible prior to detailed fieldwork. The purpose of the desktop assessment was to rank relevant areas according to their ecological sensitivity and to identify areas of ecological risk prior to the site visit.

Other relevant literature, for example from the South African Biodiversity Information Facility, South African Herpetological Atlas Projects, relevant Red Data books, ordinances and all systematic bioregional / conservation plans) was also reviewed.

Fieldwork was limited to visual sightings by means of transect walks and plot-based sampling. Particular attention was paid to the occurrence of Red Data species or protected species as follows:

Vegetation units were sampled by means of the following techniques at each of the proposed development sites:

- Data collection was plot-based and in the form of vegetation samples within selected reference areas to categorise the various vegetation units.
- Results from the data analysis provided a description of the dominant and typical species occurring on the site(s), and includes:
    - Threatened, endemic or rare species, with an indication of the relative functionality and conservation importance of the specific community in the area under investigation (i.e. study area);
    - Invasive or exotic species present and localities in the area; and the
    - Functional and conservation importance of all vegetation communities in the investigation area.

Mammals& Birds were sampled by means of the following techniques:

- Fieldwork included visual sightings by means of transect walks to evaluate the presence of mammal taxa. During the site visit, specific attention was given to signs (droppings, burrows, vocalisations, etc.) of taxa and the presence of suitable habitat;
- A full list of species observed and expected to occur was made; and
- Specific reference was made to the occurrence of Red Data species.

Herpetofauna (reptiles and amphibians) were sampled by means of the following techniques:

- Visual observations;
- Active searching techniques; and
- Vocalisations (for amphibians).

Invertebrates were sampled by means of the following techniques:

- All taxa observed, were identified to species level if appropriate taxonomic literature is available (as is the case for butterflies), otherwise the concept known as Recognisable Taxonomic Units (RTUs) or morphospecies will be applied;
- The presence of conservation important taxa was verified by intensive searching of likely habitat types or burrows.

Additional information on faunal communities residing within the area of investigation was sourced from distributional data/records (both recent and historical), relevant literature, the private sector and other atlas projects.

Habitat areas (based on the species compositions of the vegetation analysis, topography and soils) were ranked into High / No-Go, Medium or Low classes in terms of their significance based on the Ecological Sensitivity and Conservation Importance. A sensitivity and habitat map (including buffer zones if applicable) was produced based on the above information. This combined with the aquatic sensitivity map will be utilised by the project proponent to finalise the development layout.

4.2 Aquatic Assessment

This study followed the approaches of several national guidelines with regards to wetland assessment. These have been modified by the author, to provide a relevant mechanism of assessing the present state of the study area aquatic systems, applicable to the specific environment and, in a clear and objective manner, identify and assess the potential impacts associated with the proposed development site based on information collected within the relevant farm portions.
Current water resource classification systems make use of the Hydrogeomorphic (HGM) approach, and for this reason, the National Wetland Classification System (NWCS) approach will be used in this study. It is also important to understand the legal definition of a wetland, the means of assessing wetland conservation and importance and the relevant legislation aimed at protecting wetlands. These aspects will be discussed in greater depth in this section of the report, as they form the basis of the study approach to assessing wetland impacts.
For reference the following definitions are as follows:

- **Drainage line**: A drainage line is a lower category or order of watercourse that does not have a clearly defined bed or bank. It carries water only during or immediately after periods of heavy rainfall i.e. non-perennial, and riparian vegetation may not be present.
- **Perennial and non-perennial:** Perennial systems contain flow or standing water for all or a large proportion of any given year, while non-perennial systems are episodic or ephemeral and thus contains flows for short periods, such as a few hours or days in the case of drainage lines.
- **Riparian**: The area of land adjacent to a stream or river that is influenced by stream-induced or related processes. Riparian areas which are saturated or flooded for prolonged periods would be considered wetlands and could be described as riparian wetlands. However, some riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).
- **Wetland**: Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil

(Water Act 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin *et al*., 1979).

- **Water course**: As per the National Water Act means -

(a) a river or spring;
(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks

4.2.1 Waterbody classification systems

Since the late 1960's, wetland classification systems have undergone a series of international and national revisions. These revisions allowed for the inclusion of additional wetland types, ecological and conservation rating metrics, together with a need for a system that would allude to the functional requirements of any given wetland (Ewart-Smith *et al*., 2006). Wetland function is a consequence of biotic and abiotic factors, and wetland classification should strive to capture these aspects. **Coupled to this was the inclusion of other criteria within the classification systems to differentiate between river, riparian and wetland systems, as well as natural versus artificial waterbodies.**

The South African National Biodiversity Institute (SANBI) in collaboration with several specialists and stakeholders developed the newly revised and now accepted National Wetland Classification Systems (NWCS) (Ollis *et al*., 2013). This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels, with including structural features at the finer or lower levels of classification (Ollis *et al*., 2013).

Wetlands develop in a response to elevated water tables, linked either to rivers, groundwater flows or seepage from aquifers (Parsons, 2004). These water levels or flows then interact with localised geology and soil forms, which then determines the form and function of the respective wetlands. Water is thus the common driving force, in the formation of wetlands (DWAF, 2005). It is significant that the HGM approach has now been included in the wetland classifications as the HGM approach has been adopted throughout the water resources management realm with regards to the determination of the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) and WET-Health assessments for aquatic environments. All these systems are then easily integrated using the HGM approach in line with the Eco-classification process of river and wetland reserve determinations used by the Department of Water and Sanitation (DWS). The Ecological Reserve of a wetland or river is used by DWS to assess the water resource allocations when assessing WULAs

The NWCS process is provided in more detail in the methods section of the report, but some of the terms and definitions used in this document are present below:

Definition Box

Present Ecological State is a term for the current ecological condition of the resource. This is assessed relative to the deviation from the Reference State. Reference State/Condition is the natural or pre-impacted condition of the system. The reference state is not a static condition, but refers to the natural dynamics (range and rates of change or flux) prior to development. The PES is determined per component - for rivers and wetlands this would be for the drivers: flow, water quality and geomorphology; and the biotic response indicators: fish, macroinvertebrates, riparian vegetation and diatoms. PES categories for every component would be integrated into an overall PES for the river reach or wetland being investigated. This integrated PES is called the EcoStatus of the reach or wetland.

EcoStatus is the overall PES or current state of the resource. It represents the totality of the features and characteristics of a river and its riparian areas or wetland that bear upon its ability to support an appropriate natural flora and fauna and its capacity to provide a variety of goods and services. The EcoStatus value is an integrated ecological state made up of a combination of various PES findings from component EcoStatus assessments (such as for invertebrates, fish, riparian vegetation, geomorphology, hydrology, and water quality).

Reserve: The quantity and quality of water needed to sustain basic *human needs* and *ecosystems* (e.g. estuaries, rivers, lakes, groundwater and wetlands) to ensure ecologically sustainable development and utilisation of a water resource. The *Ecological Reserve* pertains specifically to aquatic ecosystems.

Reserve requirements: The quality, quantity and reliability of water needed to satisfy the requirements of basic human needs and the Ecological Reserve (inclusive of instream requirements).

Ecological Reserve determination study: The study undertaken to determine Ecological Reserve requirements.

Licensing applications: Water users are required (by legislation) to apply for licenses prior to extracting water resources from a water catchment or any other activity that qualifies as a water use.

Ecological Water Requirements: This is the quality and quantity of water flowing through a natural stream course that is needed to sustain instream functions and ecosystem integrity at an acceptable level as determined during an EWR study. These then form part of the conditions for managing achievable water quantity and quality conditions as stipulated in the **Reserve Template**

Water allocation process (compulsory licensing): This is a process where all existing and new water users are requested to reapply for their licenses, particularly in stressed catchments where there is an over-allocation of water or an inequitable distribution of entitlements.

Ecoregions are geographic regions that have been delineated in a top-down manner on the basis of physical/abiotic factors. • NOTE: For purposes of the classification system, the 'Level I Ecoregions' for South Africa, Lesotho and Swaziland (Kleynhans *et al.* 2005), which have been specifically developed by the Department of Water Affairs & Forestry (DWAF) for rivers but are used for the management of inland aquatic ecosystems more generally, are applied at Level 2A of the classification system. These Ecoregions are based on physiography, climate, geology, soils and potential natural vegetation.

Wetland definition

Although the National Wetland Classification System (NWCS) (Ollis *et al*., 2013) is used to classify wetland types it is still necessary to understand the definition of a wetland. Terminology currently strives to characterise a wetland not only on its structure (visible form), but also to relate this to the function and value of any given wetland.

The Ramsar Convention definition of a wetland is widely accepted as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres" (Davis 1994). South Africa is a signatory to the Ramsar Convention and therefore its extremely broad definition of wetlands has been adopted for the proposed NWCS, with a few modifications.

Whereas the Ramsar Convention included marine water to a depth of six metres, the definition used for the NWCS extends to a depth of ten metres at low tide, as this is recognised as the seaward boundary of the shallow photic zone (Lombard et al., 2005). An additional minor adaptation of the definition is the removal of the term 'fen' as fens are considered a type of peatland. The adapted definition for the NWCS is, therefore, as follows (Ollis *et al*., 2013):

WETLAND: an area of marsh, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed ten metres.

This definition encompasses all ecosystems characterised by the permanent or periodic presence of water other than marine waters deeper than ten metres. The only legislated definition of wetlands in South Africa, however, is contained within the National Water Act (Act No. 36 of 1998) (NWA), where wetlands are defined as "land which is transitional between terrestrial and aquatic systems, where the water table is usually at, or near the surface, or the land is periodically covered with shallow water and which land in normal circumstances supports, or would support, vegetation adapted to life in saturated soil." This definition is consistent with more precise working definitions of wetlands and therefore includes only a subset of ecosystems encapsulated in the Ramsar definition. It should be noted that the NWA definition is not concerned with marine systems and clearly distinguishes wetlands from estuaries, classifying the latter as a watercourse (Ollis *et al*., 2013). Table 1 below provides a comparison of the various wetlands included within the main sources of wetland definitions used in South Africa.

Although a subset of Ramsar-defined wetlands was used as a starting point for the compilation of the first version of the National Wetland Inventory (i.e. "wetlands", as defined by the NWA, together with open waterbodies), it is understood that subsequent versions of the Inventory include the full suite of Ramsar-defined wetlands in order to ensure that South Africa meets its wetland inventory obligations as a signatory to the Convention (Ollis *et al.*, 2013).

Wetlands must therefore have one or more of the following attributes to meet the above definition (DWAF, 2005):

- A high-water table that results in the saturation at or near the surface, leading to anaerobic conditions developing in the top 50 cm of the soil.
- Wetland or hydromorphic soils that display characteristics resulting from prolonged saturation, i.e. mottling or grey soils
- The presence of, at least occasionally, hydrophilic plants, i.e. hydrophytes (water loving plants).

It should be noted that riparian systems that are not permanently or periodically inundated are not considered true wetlands, i.e. those associated with the drainage lines and rivers.

Table 2: Comparison of ecosystems considered to be 'wetlands' as defined by the proposed NWCS, the NWA and ecosystems included in DWAF's (2005) delineation manual.

Ecosystem	NWCS "wetland"	National Water Act wetland	DWAF (2005) delineation manual
Marine	YES	NO	NO
Estuarine	YES	NO	NO
Waterbodies deeper than 2 m (i.e. limnetic habitats often described as lakes or dams)	YES	NO	NO
Rivers, channels and canals	YES	NO[1]	NO
Inland aquatic ecosystems that are not river channels and are less than 2 m deep	YES	YES	YES
Riparian[2] areas that are permanently / periodically inundated or saturated with water within 50 cm of the surface	YES	YES	YES[3]
Riparian [3] areas that are not permanently / periodically inundated or saturated with water within 50 cm of the surface	NO	NO	YES[3]

[1] Although river channels and canals would generally not be regarded as wetlands in terms of the National Water Act, they are included as a 'watercourse' in terms of the Act

[2] According to the National Water Act and Ramsar, riparian areas are those areas that are saturated or flooded for prolonged periods and would be considered riparian wetlands, as opposed to non –wetland riparian areas that are only periodically inundated and the riparian vegetation persists due to having deep root systems drawing on water many meters below the surface.

[3] The delineation of 'riparian areas' (including both wetland and non-wetland components) is treated separately to the delineation of wetlands in DWAF's (2005) delineation manual.

4.2.2 National Wetland Classification System method

Due to the nature of the wetlands and watercourses observed, it was determined that the newly accepted NWCS should be adopted. This classification approach has integrated aspects of the HGM approach used in the WET-Health system as well as the widely accepted eco-classification approach used for rivers.

The NWCS (Ollis *et al*., 2013) as stated previously, uses hydrological and geomorphological traits to distinguish the primary wetland units, i.e. direct factors that influence wetland function. Other wetland assessment techniques, such as the DWAF (2005) delineation method, only infer wetland function based on abiotic and biotic descriptors (size, soils & vegetation) stemming from the Cowardin approach (Ollis *et al.,* 2013).

The classification system used in this study is thus based on Ollis *et al*. (2013) and is summarised below:

The NWCS has a six-tiered hierarchical structure, with four spatially nested primary levels of classification (Figure 2). The hierarchical system firstly distinguishes between Marine, Estuarine and Inland ecosystems (**Level 1**), based on the degree of connectivity the particular system has with the open ocean (greater than 10 m in depth). Level 2 then categorises the regional wetland setting using a combination of biophysical attributes at the landscape level, which operate at a broad bioregional scale.

This is opposed to specific attributes such as soils and vegetation. **Level 2** has adopted the following systems:

- Inshore bioregions (marine)
- Biogeographic zones (estuaries)
- Ecoregions (Inland)

Level 3 of the NWCS assess the topographical position of inland wetlands as this factor broadly defines certain hydrological characteristics of the inland systems. Four landscape units based on topographical position are used in distinguishing between Inland systems at this level. No subsystems are recognised for Marine systems, but estuaries are grouped according to their periodicity of connection with the marine environment, as this would affect the biotic characteristics of the estuary.
Level 4 classifies the hydrogeomorphic (HGM) units discussed earlier. The HGM units are defined as follows:

- Landform – shape and localised setting of wetland
- Hydrological characteristics – nature of water movement into, through and out of the wetland
- Hydrodynamics – the direction and strength of flow through the wetland

These factors characterise the geomorphological processes within the wetland, such as erosion and deposition, as well as the biogeochemical processes.
Level 5 of the assessment pertains to the classification of the tidal regime within the marine and estuarine environments, while the hydrological and inundation depth classes are determined for inland wetlands. Classes are based on frequency and depth of inundation, which are used to determine the functional unit of the wetlands and are considered secondary discriminators within the NWCS.
Level 6 uses six descriptors to characterise the wetland types based on biophysical features. As with Level 5, these are non-hierarchal in relation to each other and are applied in any order, dependent on the availability of information. The descriptors include:

- Geology;
- Natural vs. Artificial;
- Vegetation cover type;
- Substratum;
- Salinity; and
- Acidity or Alkalinity

It should be noted that where sub-categories exist within the above descriptors, hierarchical systems are employed, and these are thus nested in relation to each other.
The HGM unit (Level 4) is the focal point of the NWCS, with the upper levels (Figure 3 Figure – Inland systems only) providing means to classify the broad bio-geographical context for grouping functional wetland units at the HGM level, while the lower levels provide more descriptive detail on the particular wetland type characteristics of a particular HGM unit. Therefore Level 1 – 5 deals with functional aspects, while Level 6 classifies wetlands on structural aspects.

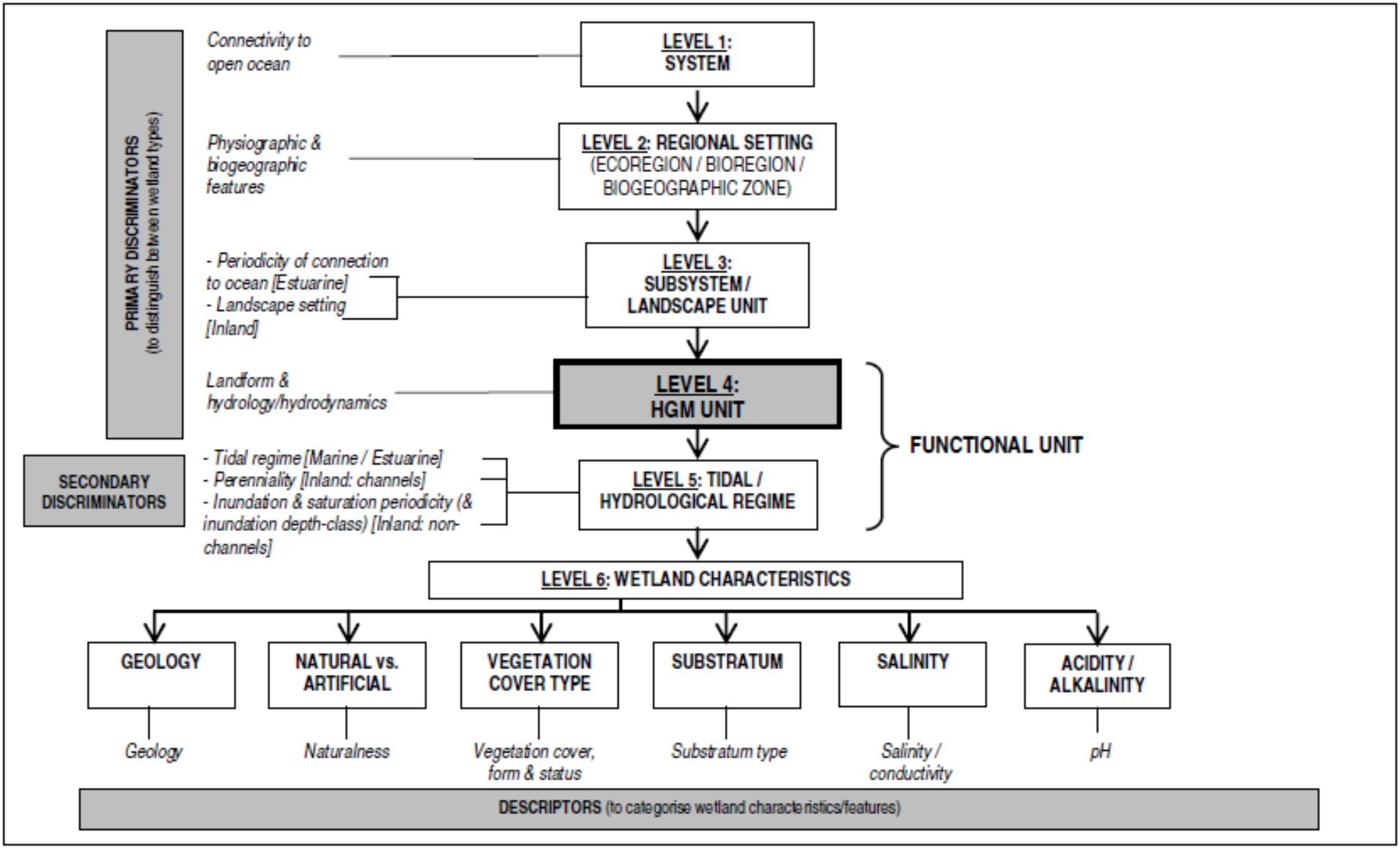


Figure 2: Basic structure of the NWCS, showing how 'primary discriminators' are applied up to Level 4 to classify Hydrogeomorphic (HGM) Units, with 'secondary discriminators' applied at Level 5 to classify the tidal/hydrological regime, and 'descriptors' applied

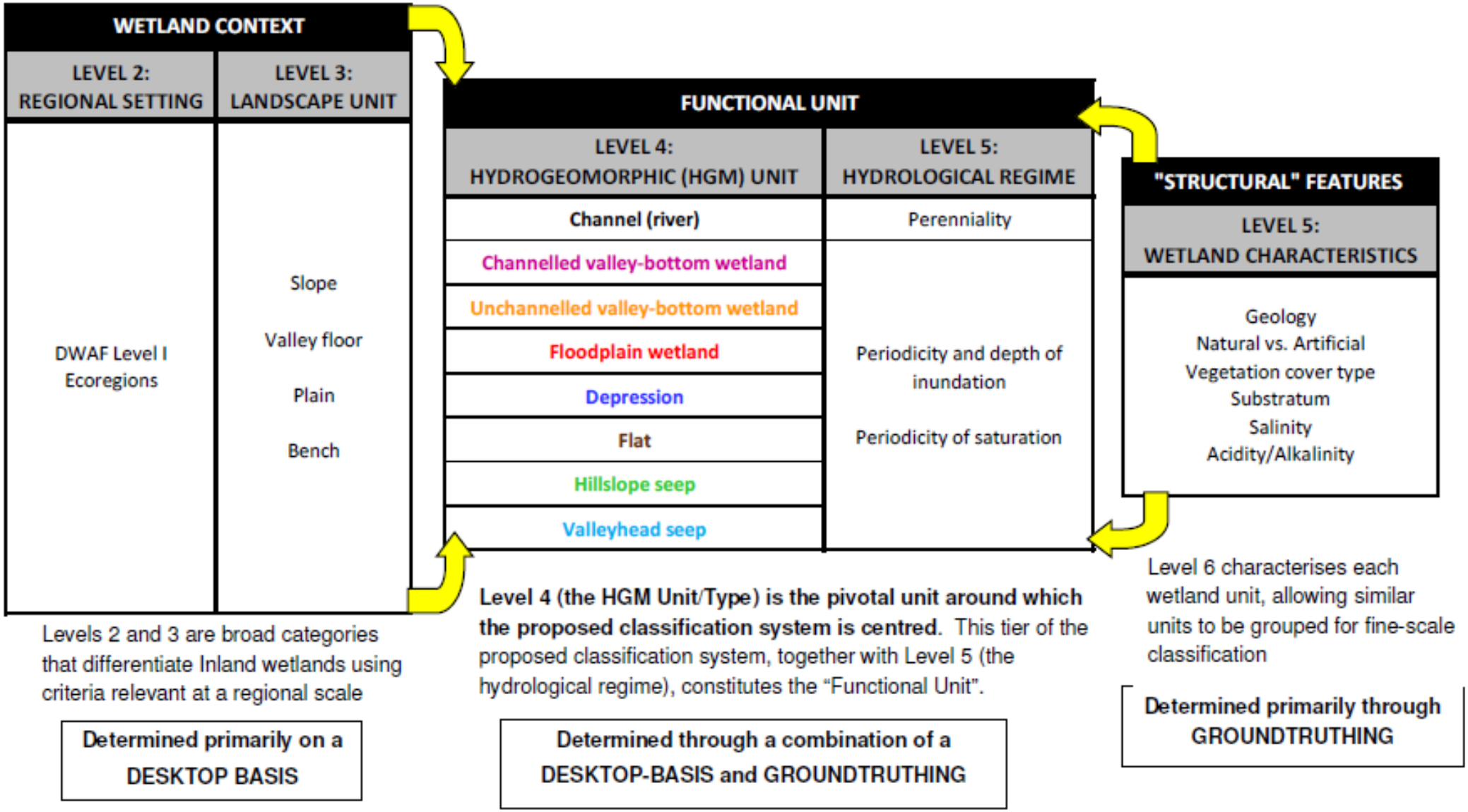


Figure 3: Illustration of the conceptual relationship of HGM Units (at Level 4) with higher and lower levels (relative sizes of the boxes show the increasing spatial resolution and level of detail from the higher to the lower levels) for Inland Systems (from Ollis *et al*., 2013)

4.2.3 Waterbody condition

To assess the PES or condition of the observed wetlands, a modified Wetland Index of Habitat Integrity (DWAF, 2007) was used. The Wetland Index of Habitat Integrity (WETLAND-IHI) is a tool developed for use in the National Aquatic Ecosystem Health Monitoring Programme (NAEHMP), formerly known as the River Health Programme (RHP). The output scores from the WETLAND-IHI model are presented in the standard DWAF A-F ecological categories (Table) and provide a score of the PES of the habitat integrity of the wetland system being examined. The author has included additional criteria into the model-based system to include additional wetland types. This system is preferred when compared to systems such as WET-Health – wetland management series (WRC 2009), as WET-Health (Level 1) was developed with wetland rehabilitation in mind and is not always suitable for impact assessments. This coupled with the degraded state of the wetlands in the study area, indicated that a complex study approach was not warranted, i.e. conduct a Wet-Health Level 2 and WET-Ecosystems Services study required for an impact assessment.

Table 3: Description of A – F ecological categories based on Kleynhans *et al*., (2005)

ECOLOGICAL CATEGORY	ECOLOGICAL DESCRIPTION	MANAGEMENT PERSPECTIVE
A	Unmodified, natural.	Protected systems; relatively untouched by human hands; no discharges or impoundments allowed
B	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	Some human-related disturbance, but mostly of low impact potential
C	Moderately modified. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.	**Multiple disturbances associated with need for socio-economic development, e.g. impoundment, habitat modification and water quality degradation**
D	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	
E	Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive.	**Often characterized by high human densities or extensive resource exploitation. Management intervention is needed to improve health, e.g. to restore flow patterns, river habitats or water quality**
F	Critically / Extremely modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.	

The WETLAND-IHI model is composed of four modules. The “Hydrology”, “Geomorphology” and “Water Quality” modules all assess the contemporary driving processes behind wetland formation and maintenance. The last module, “Vegetation Alteration”, provides an indication of the intensity of human land use activities

on the wetland surface itself and how these may have modified the condition of the wetland. The integration of the scores from these 4 modules provides an overall PES score for the wetland system being examined. The WETLAND-IHI model is an MS Excel-based model, and the data required for the assessment are generated during a site visit.

Additional data may be obtained from remotely sensed imagery (aerial photos; maps and/or satellite imagery) to assist with the assessment. The interface of the WETLAND-IHI has been developed in a format which is similar to DWA's River EcoStatus models which are currently used for the assessment of PES in riverine environments.

4.2.4 Aquatic ecosystem importance and function

South Africa is a Contracting Party to the Ramsar Convention on Wetlands, signed in Ramsar, Iran, in 1971, and has thus committed itself to this intergovernmental treaty, which provides the framework for the national protection of wetlands and the resources they could provide. Wetland conservation is now driven by the South African National Biodiversity Institute, a requirement under the National Environmental Management: Biodiversity Act (No 10 of 2004).

Wetlands are among the most valuable and productive ecosystems on earth, providing important opportunities for sustainable development (Davies and Day, 1998). However, wetlands in South Africa are still rapidly being lost or degraded through direct human induced pressures (Nel *et al.,* 2004).

The most common attributes or goods and services provided by wetlands include:

- Improve water quality;
- Impede flow and reduce the occurrence of floods;
- Reeds and sedges used in construction and traditional crafts;
- Bulbs and tubers, a source of food and natural medicine;
- Store water and maintain base flow of rivers;
- Trap sediments; and
- Reduce the number of water-borne diseases.

In terms of this study, the wetlands provide ecological (environmental) value to the area acting as refugia for various wetland associated plants, butterflies and birds.

In the past wetland conservation has focused on biodiversity as a means of substantiating the protection of wetland habitat. However not all wetlands provide such motivation for their protection, thus wetland managers and conservationists began assessing the importance of wetland function within an ecosystem.

Table below summarises the importance of wetland function when related to ecosystem services or ecoservices (Kotze et al., 2008). One such example is emergent reed bed wetlands that function as transformers converting inorganic nutrients into organic compounds (Mitsch and Gosselink, 2000).

Table 4: Summary of direct and indirect ecoservices provided by wetlands from Kotze *et al.*, 2008

Ecosystem services supplied by wetlands	Indirect benefits	Hydro-geochemical benefits	Flood attenuation	
			Stream flow regulation	
			Water quality enhancement benefits	Sediment trapping
				Phosphate assimilation
				Nitrate assimilation
				Toxicant assimilation
				Erosion control
			Carbon storage	
		Biodiversity maintenance		
	Direct benefits	*Provision of water for human use*		
		Provision of harvestable resources[2]		
		Provision of cultivated foods		
		Cultural significance		
		Tourism and recreation		
		Education and research		

Conservation importance of the individual wetlands was based on the following criteria:

- Habitat uniqueness;
- Species of conservation concern;
- Habitat fragmentation or rather, continuity or intactness with regards to ecological corridors; and
- Ecosystem service (social and ecological).

The presence of any or a combination of the above criteria would result in a HIGH conservation rating if the wetland was found in a near natural state (high PES). Should any of the habitats be found modified the conservation importance would rate as MEDIUM, unless a Species of Conservation Concern (SCC) was observed, in which case it would receive a HIGH rating. Any system that was highly modified (low PES) or had none of the above criteria, received a LOW conservation importance rating. Wetlands with HIGH and MEDIUM ratings should thus be excluded from development with incorporation into a suitable open space system, with the maximum possible buffer being applied. Natural wetlands or Wetlands that resemble some form of the past landscape but receive a LOW conservation importance rating could be included into stormwater management features and should not be developed to retain the function of any ecological corridors.

5 Description of the affected environment

5.1 Climate

The site is located within the bimodal rainfall region of South Africa, with a Mean Annual Precipitation (MAP) for the coastal region at ca. 680 mm per annum. Annual average temperatures range between 7.6 and 25 o C, with frost a rare occurrence of no more than 3 days per year (Mucina & Rutherford, 2007).

5.2 Geology and soils

The site is underlain acidic lithosols derived from Ordovician sandstones of the Table Mountain Group.

5.3 Slope and aspect

The region is characterised by an higher lying plateaux surrounded by river valleys associated with the Papenkuils and Baakens river and ranges between 175 to 180 mASL (Above Sea Level).

5.4 Terrestrial environment

The study area spans one vegetation type defined by Mucina and Rutherford (2007), as amended in the National Vegetation Map 2012 and 2017/18 spatial information (Figure 4). This vegetation unit, known as Algoa Sandstone Fynbos (FFs 29), a form of Algoa Grassy Fynbos, is listed as Critically Endangered and is therefore considered a Threatened Ecosystem (Figure 3), as per the National Environmental Management: Biodiversity Act.

The species associated with Algoa Sandstone Fynbos are dominated by a variety of grasses, Ericas and Proteas, and is only located within a narrow coastal belt between the Van Stadens River in the West and Summerstrand in the East, within NMBM. A potential species checklist is included in 3, however the species observed, did indicate that disturbance had taken place within the site in the past, evidenced by the high number of invasive plants species (Plate 1) listed above, illegal solid waste / building rubble disposal (Plate 2) and presence of old building foundations (Plate 3). None of the dominant Protea or Erica species were observed.

Plant species that remained, therefore included mostly grasses, and forbs, as shown in Table 5 below, with the site mostly dominated by the presence of the alien tree species in particular and are shown strong regrowth after the last fire.

Figure 5, indicates finer scale mapping of the site, with regard a vegetation and bioregional assessment conducted by SRK (2014) for NMBM. The associated mapping detail indicates that the site could contain Rowallan Park Grassy Fynbos and Malabar Grassy Fynbos. The later was found to be dominated by the alien Acacia Thickets, while the former is comparable to the Algoa Sandstone Fynbos in species.

Table 5: Important indigenous plant species associated with Algoa Sandstone Fynbos and the species observed within the study area shown in green

Plant taxa	Conservation Status / Importance
Agathosma ovata (Thunb.) Pillans	Least Concern
Andropogon eucomus Nees	Least Concern
Brachiaria serrata (Thunb.) Stapf	Least Concern
Crassula pellucida L. ssp. marginalis (Dryand. in Aiton) Toelken	Least Concern
Cymbopogon pospischilii (K.Schum.) C.E.Hubb.	Least Concern
Cynodon dactylon (L.) Pers.	Least Concern
Digitaria eriantha Steud.	Least Concern
Ehrharta calycina Sm.	Least Concern
Erica etheliae L.Bolus	Least Concern / Protected under PNCO
Erica zeyheriana (Klotzsch) E.G.H.Oliv.	Least Concern
Euryops ericifolius (Bél.) B.Nord.	Least Concern
Eustachys paspaloides (Vahl) Lanza & Mattei	Least Concern
Helichrysum appendiculatum (L.f.) Less.	Least Concern
Helichrysum teretifolium (L.) D.Don	Least Concern
Pentameris heptameris (Nees) Steud.	Least Concern
Restio capensis (L.) H.P.Linder & C.R.Hardy	Least Concern
Tephrosia capensis (Jacq.) Pers. var. hirsuta Harv.	Least Concern
Thamnochortus cinereus H.P.Linder	Least Concern
Themeda triandra Forssk.	Least Concern
Tristachya leucothrix Trin. ex Nees	Least Concern
Syncarpha spp	Least Concern
Gazania krebsianna	Least Concern
Watsonia spp	Least Concern
Drosera aliciae	Least Concern
Pelargonium spp	Least Concern / Protected PNCO
Elegia spp	Least Concern

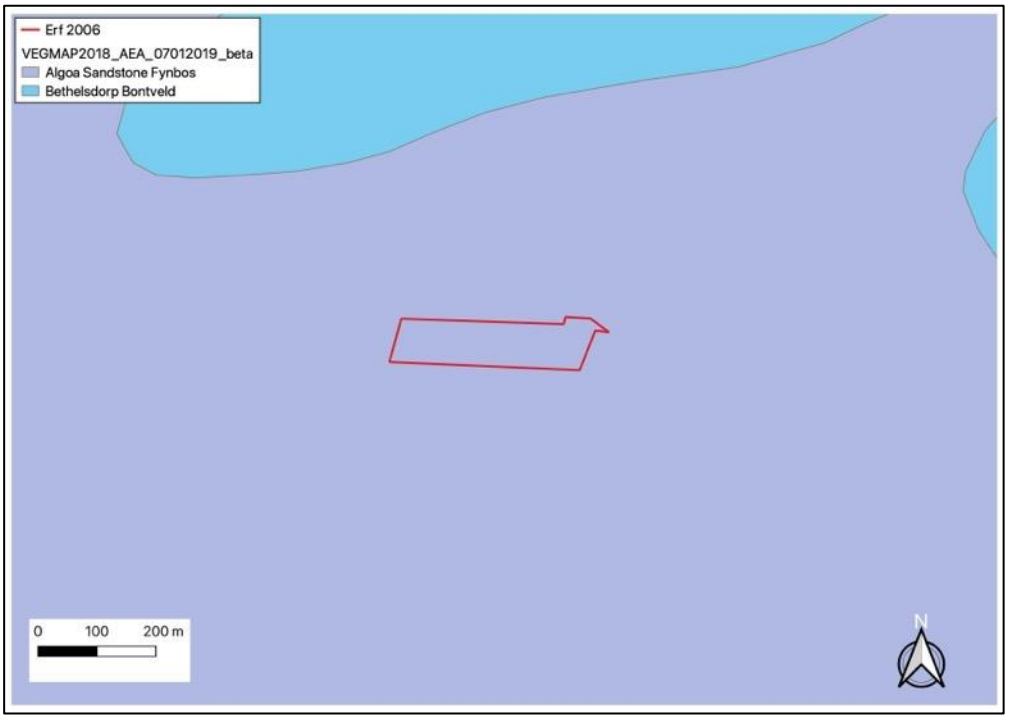


Figure 4: Vegetation South Africa VegMap as per Mucina & Rutherford (2007) revised 2018

Figure 5: NMBM Vegetation map (SRK, 2014)

Plate 1: A view of the central portion of the site, dominated by grass and alien Acacia stands

Plate 2: A view of the eastern portion of the site, near Burchell Rd and thus contained large areas with building rubble and garden waste such as the Cycad leaf

Plate 3: Row of foundation stones of an old building in the middle of the site

Table 6, includes species highlighted by the DFFE Screening tool, that are rated as having a Medium Sensitivity within the site. These species were actively searched for, with none of the species highlighted (Table 6) being observed. However several small clumps, not representing more than 30 plants of the Near Threatened *Pelargonium reniforme* were observed. These plants are easily relocated and should be removed prior to construction and relocated to any of the local conservation areas in the area (e.g. Van der Kemps Kloof) once the correct permits have been obtained. It is therefore suggested that prior to construction a scan of the site should be conducted and then any additional species be relocated that are protected under the provincial / national legislation.

Table 6: Sensitive plant species (Medium Sensitivity) that have the potential to occur within the site according to the DFFE Screening Tool Results.

Screening Tool Plant Species*	Conservation importance	Habitat	Observed Y/N
Agathosma gonaquensis	Critically Endangered	Several known locations along the Baakens River	No
Agathosma stenopetala	Vulnerable B1ab(iii)	Tertiary sands	No
Argyrolobium crassifolium	Endangered A2c; B1ab	Grassland below 300mASL	No
Aristea nana	Least Concern	Until recently rarely been collected and has usually been confused with similarly low growing A. pusilla. Despite their superficial similarity Aristea nana and A. pusilla are probably not related	No
Aspalathus recurvispina	Critically Endangered B1ab(iii)+2ab(iii); C2a(ii)	All six locations known through historical records are in areas now transformed to suburbs of Port Elizabeth, and it was thought extinct until a small subpopulation of ± 200 plants was found in a 1.5 ha roadside fragment of natural vegetation in Humewood. This subpopulation is likely to continue declining due to the effects of fragmentation and degradation of the habitat, as well as alien plant invasion.	No
Bobartia macrocarpa	Vulnerable A2c;	Flat open grassy patches	No
Caputia scaposa var. addoensis	Endangered B1ab(iii)	Known in the Baakens River Valley	No
Centella tridentata var. hermanniifolia	Rare	This species has been recorded from only five sites, most of which are mountain slopes that are not threatened. It is therefore listed under the IUCN 3.1 Criteria, globally, as Least Concern but is nationally categorised as Rare.	
Corpuscularia lehmannii	Critically Endangered B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)	Two remaining subpopulations are severely fragmented and continue to decline due to ongoing habitat loss. At one of the remaining locations near Coega >60% of this species' habitat has been lost to mining in the past five years	No
Disperis woodii	Vulnerable B2ab(i,ii,iii,iv,v)	It grows in damp grassland, usually in open places with sandy soils, sometimes within grass tussocks, from sea level to 800 m.	No
Erica chloroloma	Vulnerable B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)	Coastal dune fynbos	No
Erica zeyheriana	Vulnerable A4bc; B1ab+2ab	Remnant lowland grassy fynbos on sand.	No
Gymnosporia elliptica	Vulnerable B1ab	Coastal plains, with specimens recorded along the Baakens River in the past	No
Holothrix longicornu	Critically Endangered	Lower sandstone slopes thought to be extinct	No
Lebeckia gracilis	Endangered	Coastal fynbos in deep, sandy soil below 300 mABSL	No
Lotononis acuminata	Vulnerable B1ab	Disturbed renosterveld and grassy fynbos	No
Rapanea gilliana	Endangered B1ab	Coastal sand dunes	No
Rapanea gilliana	Endangered B1ab(ii,iii,iv,v)	Endangered B1ab(ii,iii,iv,v)	
Selago rotundifolia	Vulnerable B1ab	Forest margins or grassy flats	No
Sensitive species 1252	Vulnerable B1ab	Disturbed renosterveld and grassy fynbos	No
Sensitive species 141	Endangered B2ab	Coastal sands	No

Sensitive species 236	Vulnerable B1ab	Coastal forelands	Similar species observed but will need a flowering specimen to confirm
Sensitive species 249	Critically Endangered B1ab	Lowland fynbos in marshy drainage lines, 300 mASL.	No
Sensitive species 264	Endangered B1ab	Flats and lower slopes in semi-arid areas	No
Sensitive species 294			
Sensitive species 448	Vulnerable B1ab	Sandy loam, clay or moderately fertile soils derived forms the Witteberg slopes, mostly confined to the coastal plain	No
Sensitive species 588			
Sensitive species 654			
Sensitive species 657			
Sensitive species 670			
Sensitive species 695	Vulnerable B1ab	Between low scrub and sand dunes on lowland flats in areas with an annual rainfall of 400-800 mm	No

*Due to the sensitivity of some of the species, the names of which are not allowed to be shown

Table 7, includes the faunal species observed during this assessment, none of which are considered sensitive or conservation needy. No other mammals were observed, but it assumed rats and mice may frequent the area, as well mongoose that are prevalent in NMBM. With regards Species 8. (Mammal), *Chlorotalpa duthieae* (Mammal) listed by the DFFE Screening Tool, is unlikely to occur within the site, but would disperse to the remainder of the site once construction starts. The invertebrate, *Aneuryphymus montanus* occurrence is unknow due to past and present disturbance within the site, but is a high mobile species and could also disperse easily as it is typically migratory. Similarly any of the birds listed as having high sensitivity, could frequent the site, but due the state and availability would not have any permanent habitat within the site and thus the site would not be considered sensitivity in this regard. The DFFE screening listed these species - *Tyto capensis, Circus ranivorus, Bradypterus sylvaticus, Circus maurus, Neotis denhami, Afrotis afra*

Table 7: Faunal species observed within the site

Taxon	Common Name	Conservation status and habitat	Site observation
Invertebrates			
Phymateus viridipes	Green milkweed locust	Least Concern	
Reptiles			
Hemidactylus mabouia	Common Tropical House Gecko	**Least Concern** (ARRSA, 2023) Widespread	Observed in building rubble near school fence
Birds			
Euplectes capensis	Bishop, Yellow	RDB, 2015 Least Concern	Flyover
Corvus albus	Crow, Pied	RDB, 2015 Least Concern	Flyover
Streptopelia senegalensis	Dove, Laughing	RDB, 2015 Least Concern	Feeding within site
Bostrychia hagedash	Ibis, Hadeda	RDB, 2015 Least Concern	Feeding within site
Passer melanurus	Sparrow, Cape	RDB, 2015 Least Concern	Feeding within site
Pycnonotus capensis	Cape Bulbul	RDB, 2015 Least Concern	Feeding within site
Alopochen aegyptiacus	Egyptian Goose	RDB, 2015 Least Concern	Flyover
Motacilla capensis	Cape Wagtail	RDB, 2015 Least Concern	Feeding within site

5.5 Aquatic Environment

The proposed project site is located in within the upper catchment areas of the Papenkuils River (M20A) (Figure 6), with several small drainage lines surrounding the proposed development, but all well removed from the proposed activities, > 114m. The lack of any watercourses and or wetlands within the site was substantiated by the National Wetland Inventory (SAIIE v2) spatial data, (Figure 6).

Further the study site is excluded from any National Freshwater Ecosystems Priority Atlas areas (NFEPA - Nel *et al.,* 2011, Strategic Water Resources Areas and Wetland Clusters (Figure 7). The site is however considered part of an Ecological Support Areas identified in the Eastern Cape Biodiversity Conservation Plan (2019) (Figure 7), but no Aquatic Critical Biodiversity Areas would be affected.

It should however be noted, that none of the potential wetlands as shown in the Wetland Inventory were observed (Plate 4), and only a small number of valley bottom systems are located in the Papenkuils River, but more than 1km from the proposed site. The remaining features near the site are man-made stormwater features such as the detention pond and the adjacent channel (Plate 5).

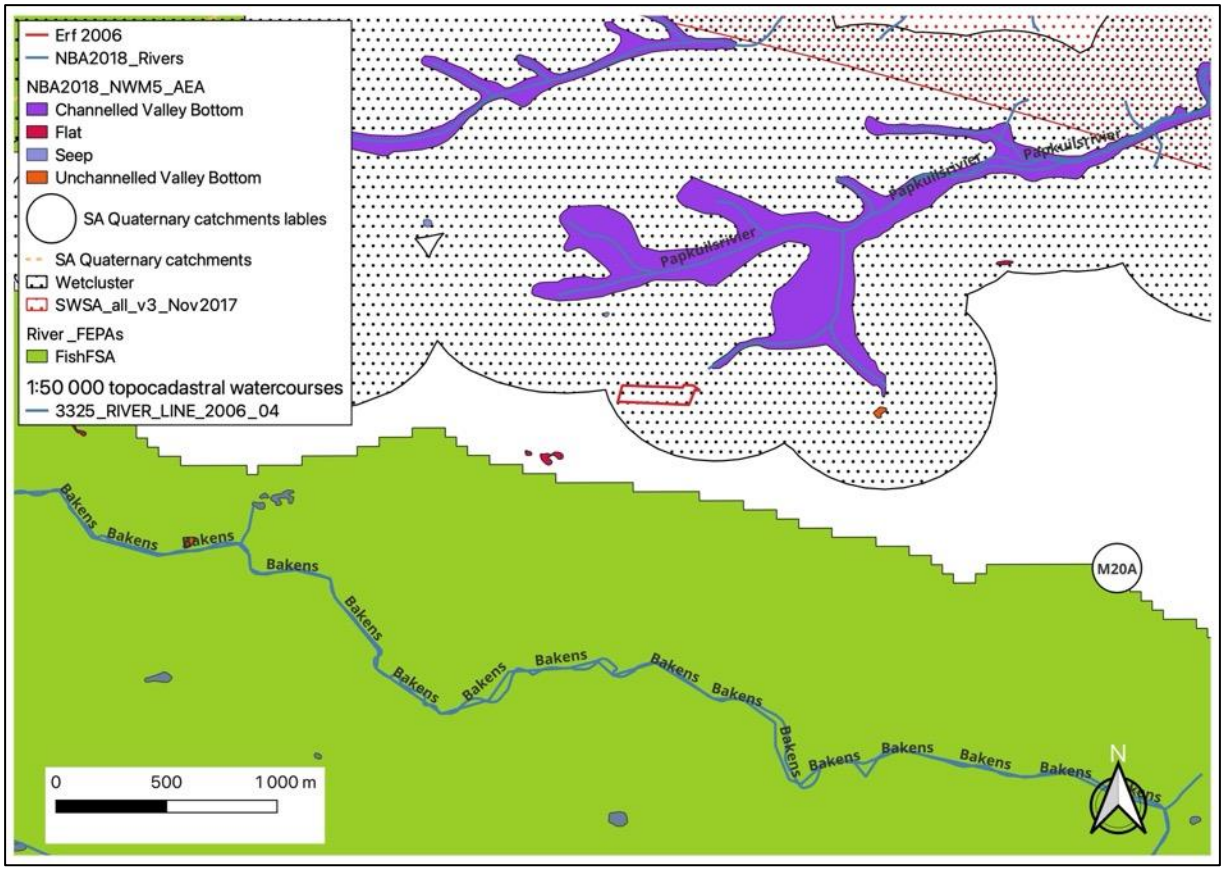


Figure 6: Watercourses and mainstem rivers known within the greater catchments as well as any known NFEPAs, SWSA and wetlands within the subquaternary catchment M20A

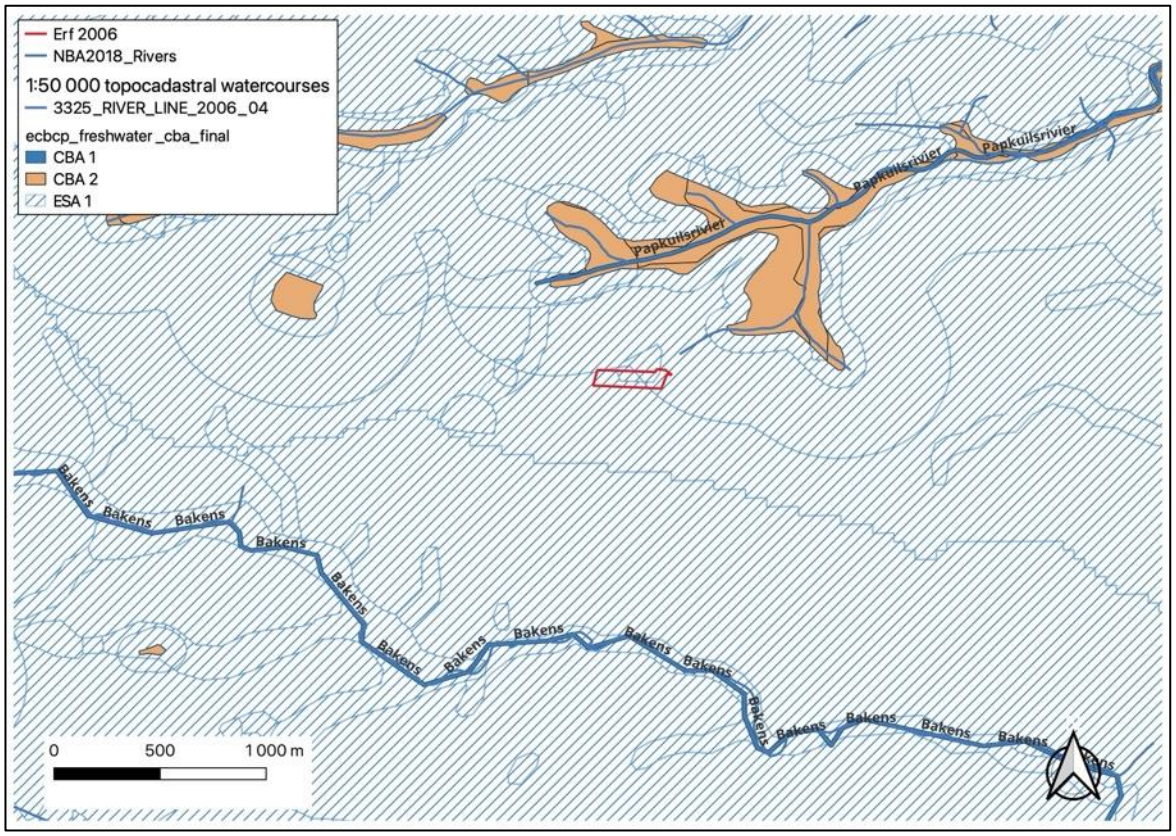


Figure 7: Results of the ECBCP 2019, for the Aquatic Environment

Plate 4: A view of the water course downstream of Curro, showing the high degree of impact (alien trees) mowing of banks and incised banks, with small valley bottom wetlands (red arrow) more than 500m from the site

Plate 5: Excavated trench that drains stormwater from the western properties towards the detention pond)

6 Site Sensitivity

Using the baseline description and the field data collected, while considering the current disturbances and site characteristics, were identified, then categorised into one of number pre-determined sensitivity categories to provide protection and/or guide the development of the layout.

In summary the various habitats or land cover areas have been rated based on the following:

High = No Go	"No go" areas or setbacks and areas or features that are considered of such significance that impacting them may be regarded as fatal flaw or strongly influence the project impact significance profile Therefore areas or features that are considered to have a high sensitivity or where project infrastructure would be highly constrained and should be avoided as far as possible. Infrastructure located in these areas are likely to drive up impact significance ratings and mitigations
Medium	Buffer areas and or areas that are deemed to be of medium sensitivity but should still be avoid as this would minimise impacts and or the need for additional Water Use Authorisation
Low	Areas of low sensitivity or constraints, such as artificial systems with little to no biological value or would not result in any future licensing requirements e.g. dry earth wall farm dams
Neutral	Unconstrained areas (left blank in mapping)

Based then on the criteria above and the observed habitats. No sensitivity habitats were thus found within the study area and the site sensitivity would be considered LOW (Figure 8). Notably the site is also not part of any Terrestrial Critical Biodiversity Area (Figure 9). To reiterate, no habitat that would resemble the Critically Endangered Algoa Sandstone Fynbos was found intact within the site due to past activities and the high density of alien vegetation.

Figure 8: Site sensitivity rating where the site would be considered LOW

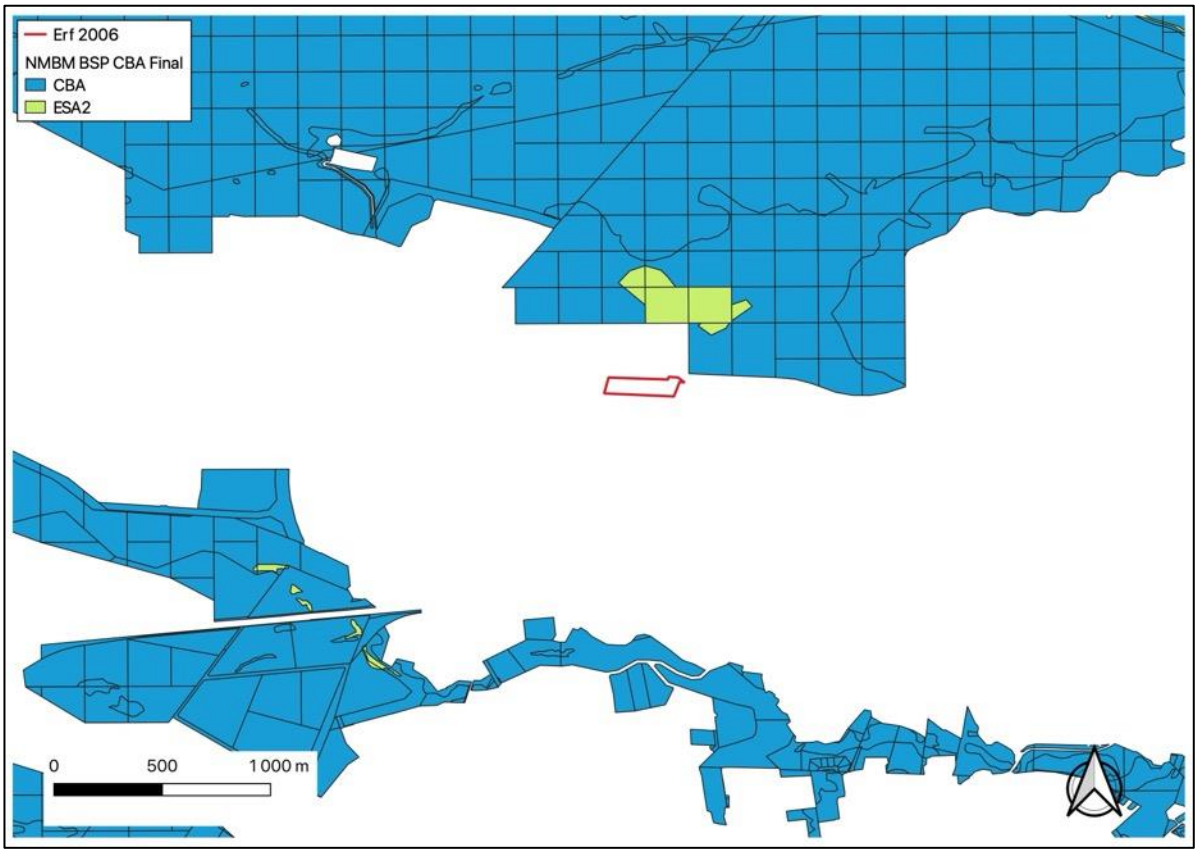


Figure 9: NMBM, 2014 Critical Biodiversity Areas (Terrestrial)

7 Impact Assessment

During this investigation it was found that the greatest number of impacts would occur within the terrestrial environment and none would be related to any natural aquatic systems / watercourses.

With regard to the decommissioning phase, this would be the same as the construction phase, with a degree of impact reversal with rehabilitation of the natural veld conditions.

7.1 No-Go Option

With regard the No-Go option it is assumed that the site would continue to remain unchanged and remain in its current natural condition, which would see a steady increase in the alien tree cover, and or rubble being dumped. This would continue into the long-term with a Low to Moderate intensity that would impact on the local scale and no mitigation are thus proposed other than consistent alien clearing should the site remain vacant.

7.2 Alternative Assessment

No technical alternatives were assessed in this report due to the design constraints, considering that no sensitive areas were identified in this assessment (Figure 10).

UNIT TYPE	FLOORS	BEDRMS	BATH	GARAGES	AREA	TOTAL AREA	COV	TOTAL COV	NUMBER UNITS	PARKING BAYS	TOTAL BAYS	OPEN SPACE	TOTAL SPACE	TOTAL AREA
A	DOUBLE	3	2	2	142 m2	3124	89	1958	22	1,5	33	24	528	3408 m2
B	SINGLE	3	2	2	114 m2	2508	114	2508	22	1,5	33	24	528	2508 m2
C	SINGLE	2	2	2	103 m2	3296	103	3296	32	1,5	48	24	768	3296 m2
D	WALKUPS	2	2	0	54 m2	1296	27	648	24	1,5	36	18	432	1296 m2
E	WALKUPS	2	1	0	50 m2	2350	25	1175	47	1,5	70,5	18	846	2350 m2
F	WALKUPS	1	1	0	35 m2	280	18	140	8	1,25	10	12	96	280 m2
TOTAL					498	12854	376	9725	155	8,75	230,5	120	3198	13138 m2

SITE AREA	31076 m2
NUMBER OF UNITS	155
UNIT AREA	12854 m2
GATEHOUSE	72 m2
COMMUNITY CENTRE	142 m2
TOTAL	13068 m2
COVERAGE AREA	9939 m2
COVERAGE	32% m2
PARKING NEEDED	230,5 bays
PARKING UNITS	233 bays
PARKING VISITORS	49 bays
PARKING PARAPLEGIC	5 bays
TOTLA PROVIDED	282 bays
OPEN SPACE REQUIRED	3198 m2
OPEN SPACE PROVIDED	3265 m2

Figure 10: Project layout

7.3 Terrestrial Impacts

7.3.1 Impact 1: Loss of vegetation and in particular species / habitats that are unique listed as threatened or contain higher numbers of listed / protected species

Impact 1	Loss of vegetation and in particular species / habitats

Issue	The destruction of habitats that are that are unique or contain higher numbers of listed / protected species. While the site vegetation unit has been classified as Critically Endangered (Algoa Sandstone Fynbos)	
Description of Impact		
During construction, vegetation clearing for development will be required. However the proposed site will only impact areas that are currently disturbed (grazing & fire), transformed or illegal dumping. The proposed layout thus makes use of the areas, which have seen a great deal of disturbance in the past.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**

Intensity	High	Medium
Duration	Long-term	Medium-Term
Extent	Regional	Local
Consequence	Very High	Low
Probability	Probable	Possible
Significance	Very High -	Very Low -
Degree to which impact can be reversed	Medium	
Degree to which impact may cause irreplaceable loss of resources	Medium	
Degree to which impact can be mitigated	High -	
Mitigation actions		
The following measures are recommended:	• It is recommended that the development option discussed in this assessment, the Preferred option, be selected that will avoid any residual impacts on sensitive habitats. • All temporary works areas (laydowns and camps) can only be placed in previously disturbed areas within the site, and this includes any temporary access roads or storage areas. • Alien vegetation management must be initiated at the beginning of the construction period and must extend into any remaining areas into the operation phase. • It is recommended as best practice to conduct a search and rescue programme for any listed or protected plants species, although this consideration was not used to reduce the potential impact ratings. Any plants removed could easily be relocated into areas that will need rehabilitation post construction or relocated to nearby conservation areas.	
Monitoring		
The following monitoring is recommended:	• The revegetation of any temporary sites as well as any previously degraded areas must begin from the onset of the project, with the involvement of a botanist to assist with the revegetation specifications. • Regeneration of alien vegetation must be monitored once all areas have been cleared, forming part of a long-term alien vegetation management plan	
Cumulative impacts		
Nature of cumulative impacts	Additional loss of sensitive vegetation / habitats related to other projects, most of which have or could result in additional clearing of thicket / grassland mosaics, is unlikely due to the nature of the project site.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	Low -

7.3.2 Impact 2: Loss of habitat containing protected species or Species of Special Concern

Impact 2	Loss of habitat containing protected species or Species of Special Concern

Issue	Based on the observations made, it was evident that several protected and listed species do occur.	
Description of Impact		
During construction, vegetation clearing for development will be required. However these species can be easily relocated to a better protected environment.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Very Low	Medium
Duration	Long-term	Medium-Term
Extent	Local	Local
Consequence	Low	Low
Probability	Probable	Possible
Significance	Low -	Very Low -
Degree to which impact can be reversed	High	
Degree to which impact may cause irreplaceable loss of resources	Low	
Degree to which impact can be mitigated	High -	
Mitigation actions		
The following measures are recommended:	• All temporary works areas (laydowns and camps) can only be placed in previously disturbed areas within the site, and this includes any temporary access roads or storage areas. • Alien vegetation management must be initiated at the beginning of the construction period and must extend into any remaining areas into the operation phase on the Tankatara Farm. • It is recommended as best practice to conduct a search and rescue programme for any listed or protected plants species, although this consideration was not used to reduce the potential impact ratings. Any plants removed could easily be relocated into areas that will need rehabilitation post construction.	
Monitoring		
The following monitoring is recommended:	• The revegetation of any temporary sites as well as any previously degraded areas must begin from the onset of the project, with the involvement of a botanist to assist with the revegetation specifications. • Regeneration of alien vegetation must be monitored once all areas have been cleared, forming part of a long-term alien vegetation management plan	

Cumulative impacts		
Nature of cumulative impacts	Additional loss of sensitive vegetation / habitats related to other projects, most of which have or could result in additional clearing of thicket / grassland mosaics, is unlikely due to the nature of the project site.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	Low -

7.3.3 Impact 3: Loss of any critical corridors and connect habitats that are linked to any future conservation plans or protected areas expansion

Impact 3	**Loss of any critical corridors and connected habitats that are linked to any conservation plans or critical biodiversity spatial plans**

Issue	The destruction of habitats that are listed form part of any ecological corridors (e.g. Aquatic ESA), or developmental setback buffer	
Description of Impact		
During construction, vegetation clearing for development will be required. However no terrestrial Critical Biodiversity Areas and or Ecological Support areas will be affected		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Medium
Duration	Medium-Term	Medium-Term
Extent	Local	Local
Consequence	Low	Low
Probability	Possible	Possible
Significance	Very Low -	Very Low -
Degree to which impact can be reversed	High	
Degree to which impact may cause irreplaceable loss of resources	Low	
Degree to which impact can be mitigated	High	
Mitigation actions		
The following measures are recommended:	• All temporary works areas (laydowns and camps) can only be placed in previously disturbed areas within the site, and this includes any temporary access roads or storage areas. • Alien vegetation management must be initiated at the beginning of the construction period and must extend into any remaining areas into the operation phase on the Tankatara Farm. • It is recommended as best practice to conduct a search and rescue programme for any listed or protected plants species, although this consideration was not used to reduce the potential impact ratings. Any plants removed could easily be	

	relocated into areas that will need rehabilitation post construction.	
Monitoring		
The following monitoring is recommended:	• The revegetation of any temporary sites as well as any previously degraded areas must begin from the onset of the project, with the involvement of a botanist to assist with the revegetation specifications. • Regeneration of alien vegetation must be monitored once all areas have been cleared, forming part of a long-term alien vegetation management plan	
Cumulative impacts		
Nature of cumulative impacts	Additional loss of sensitive vegetation / habitats related to other projects, most of which have or could result in additional clearing of thicket / grassland mosaics, is unlikely due to the nature of the project site.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low-	Low -

7.3.4 Impact 4: The potential spread of alien vegetation

Impact 4	The potential spread of alien vegetation

Issue	Several Alien Invasive Species were found present on the site	
Description of Impact		
During construction, vegetation clearing for development will be required. This disturbance then allows for the alien species to colonise the soils, if left unmanaged.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	Medium
Duration	Long-term	Medium-Term
Extent	Regional	Local
Consequence	Very High	Low
Probability	Probable	Possible
Significance	Very High -	Very Low -
Degree to which impact can be reversed	Medium	
Degree to which impact may cause irreplaceable loss of resources	Medium	
Degree to which impact can be mitigated	High -	
Mitigation actions		
The following measures are recommended:	• All temporary works areas (laydowns and camps) can only be placed in previously disturbed areas within the site, and this includes any temporary access roads or storage areas. • Alien vegetation management must be initiated at the beginning of the construction period and must extend into any remaining areas into the operation phase	
Monitoring		
The following monitoring is recommended:	• The revegetation of any temporary sites as well as any previously degraded areas must begin from the onset of the project, with the involvement of a botanist to assist with the revegetation specifications. • Regeneration of alien vegetation must be monitored once all areas have been cleared, forming part of a long-term alien vegetation management plan	
Cumulative impacts		
Nature of cumulative impacts	Additional loss of sensitive vegetation / habitats related to other projects, most of which have or could result in additional clearing of thicket / grassland mosaics, is unlikely due to the nature of the project site.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**

	High -	Low -

7.4 Aquatic Ecosystems

The proposed layout has avoided any of the natural aquatic features shown in this assessment, and is also not located within the regulated areas of wetland or riverine areas on adjoining properties. However stormwater will be generated by the site and will need to be managed to avoid the following additional impacts

7.4.1 Impact 5: Changes to the hydrological regime and increased potential for erosion within the catchment

Impact 5	**Changes to the hydrological regime and increased potential for erosion**

Issue	As the proposed development will result in large hard engineered surfaces, this poses the potential for increase runoff volumes, concentrated in areas.	
Description of Impact		
Increase runoff volumes, especially with high velocities, not only increases the potential for erosion, but also changes the regional hydrology, i.e. flows are redirected. However this site has not direct connection with water courses or drainage features so this probability of this impact is low, but the cognisance of proper stormwater managed, as well as rain capture systems for water use must be implemented.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Very Low	Medium
Duration	Long-term	Medium-Term
Extent	Local	Local
Consequence	Low	Low
Probability	Probable	Possible
Significance	Low -	Very Low -
Degree to which impact can be reversed	Medium	
Degree to which impact may cause irreplaceable loss of resources	Medium	
Degree to which impact can be mitigated	High -	
Mitigation actions		
The following measures are recommended:	• The preferred option is recommended as all aquatic systems have been avoided. • A construction and operational stormwater management plan must be developed post EA, detailing the structures and actions that must be installed to prevent the increase of surface water flows directly into any natural systems. • Effective stormwater management must include measures to slow, spread and deplete the energy of concentrated flows	

	thorough effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed areas • Rain harvesting is also advocated.	
Monitoring		
The following monitoring is recommended:	• Stormwater systems must be inspected on an annual basis to ensure these are functional. • Any concentrated runoff and or erosion where observed must be rectified with the appropriate stormwater management measures, e.g. gabions, reno mattresses or energy dissipators	
Cumulative impacts		
Nature of cumulative impacts	Additional loss of sensitive vegetation / habitats related to other projects, most of which have or could result in additional clearing of thicket / grassland mosaics, is unlikely due to the nature of the project site	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	High -	Low -

7.4.2 Impact 6: Changes to water quality

Impact 6	**Changes to the water quality**

Issue	Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and or decommissioning of the development, although not directly as there is not connection with the site and any natural systems downstream, but will require stormwater management that will need to be discharged off site	
Description of Impact		
During both preconstruction, construction and the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities, as well as maintenance activities, could be washed downslope. It is also proposed that aircraft refilling will take place, so spills during these operations or from the storage facility could also take place. However this is improbable due to the lack of any surface water connectivity related to the impact of important downstream areas.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Very Low	Medium
Duration	Long-term	Medium-Term
Extent	Local	Local
Consequence	Low	Low
Probability	Probable	Possible
Significance	Low -	Very Low -
Degree to which impact can be reversed	Medium	

Degree to which impact may cause irreplaceable loss of resources	Medium	
Degree to which impact can be mitigated	High -	
Mitigation actions		
The following measures are recommended:	• All construction/operational materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination. • Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. • Chemical storage containers must be regularly inspected so that any leaks are detected early; • Littering and contamination of water sources during construction must be prevented by effective construction camp management; • Emergency plans must be in place in case of spillages onto road surfaces in both the construction and operational phases; • No stockpiling should take place within a water course, wetland or buffers and all stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;	
Monitoring		
The following monitoring is recommended:	• The revegetation of any temporary sites as well as any previously degraded areas must begin from the onset of the project, with the involvement of a botanist to assist with the revegetation specifications • Stormwater systems must be inspected on an annual basis to ensure these are functional. • Any concentrated runoff and or erosion where observed must be rectified with the appropriate stormwater management measures, e.g. gabions, reno mattresses or energy dissipators	
Cumulative impacts		
Nature of cumulative impacts	Additional loss of sensitive vegetation / habitats related to other projects, most of which have or could result in additional clearing of thicket / grassland mosaics, is unlikely due to the nature of the project site (conservation)	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	High -	Low -

7.5 Cumulative impacts

Impact 7	Cumulative Impacts

Issue	The creation of any additional development within the study area is likely due to the housing needs of the municipality, therefore the overall character of the area could change	
Description of Impact		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction & Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Very Low	Very Low
Duration	Medium-Term	Medium-Term
Extent	Local	Local
Consequence	Low	Low
Probability	Possible	Possible
Significance	Very Low -	Very Low -
Degree to which impact can be reversed	Medium	
Degree to which impact may cause irreplaceable loss of resources	Low	
Degree to which impact can be mitigated	High -	
Mitigation actions		
The following measures are recommended:	• Alien vegetation management must be initiated at the beginning of the construction period and must extend into any remaining areas into the operation phase	
Monitoring		
The following monitoring is recommended:	• Regeneration of alien vegetation must be monitored once all areas have been cleared, forming part of a long-term alien vegetation management plan • Stormwater systems must be inspected on an annual basis to ensure these are functional. • Any concentrated runoff and or erosion where observed must be rectified with the appropriate stormwater management measures, e.g. gabions, reno mattresses or energy dissipators	
Cumulative impacts		
Nature of cumulative impacts	Additional loss of sensitive vegetation / habitats related to other projects, most of which have or could result in additional clearing of fynbos/ grassland areas mosaics, is likely due to the nature of the greater areas needs	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	High -	Low -

8 Conclusion and Recommendations

During this assessment, no sensitive habitats were observed and thus it is envisaged that all of the impacts would remain LOW (with mitigation) and that the overall residual impacts would be VERY LOW. Therefore there is no objection to the project by the specialist. This is based on the assumption that all mitigations will be upheld as stated in this report, in particular the alien vegetation and stormwater management.

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10 Appendix 1 – Copy of Specialist CV

CURRICULUM VITAE
Dr Brian Michael Colloty
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Pari Park
Port Elizabeth, 6070
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083 498 3299

Profession: Ecologist & Environmental Assessment Practitioner (Pr. Sci. Nat. 400268/07)
Member of the South African Wetland Society
Specialisation: Ecology and conservation importance rating of inland habitats, wetlands, rivers & estuaries
Years experience: 25 years

SKILLS BASE AND CORE COMPETENCIES

- 25 years experience in environmental sensitivity and conservation assessment of aquatic and terrestrial systems inclusive of Index of Habitat Integrity (IHI), WET Tools, Riparian Vegetation Response Assessment Index (VEGRAI) for Reserve Determinations, estuarine and wetland delineation throughout Africa. Experience also includes biodiversity and ecological assessments with regard sensitive fauna and flora, within the marine, coastal and inland environments. Countries include Mozambique, Kenya, Namibia, Central African Republic, Zambia, Eritrea, Mauritius, Madagascar, Angola, Ghana, Guinea-Bissau and Sierra Leone. Current projects also span all nine provinces in South Africa.
- 15 years experience in the coordination and management of multi-disciplinary teams, such as specialist teams for small to large scale EIAs and environmental monitoring programmes, throughout Africa and inclusive of marine, coastal and inland systems. This includes project and budget management, specialist team management, client and stakeholder engagement and project reporting.
- GIS mapping and sensitivity analysis

TERTIARY EDUCATION

- 1994: B Sc Degree (Botany & Zoology) - NMU
- 1995: B Sc Hon (Zoology) - NMU
- 1996: M Sc (Botany - Rivers) - NMU
- 2000: Ph D (Botany – Estuaries & Mangroves) – NMU

EMPLOYMENT HISTORY

- 1996 – 2000 Researcher at Nelson Mandela University – SAB institute for Coastal Research & Management. Funded by the WRC to develop estuarine importance rating methods for South African Estuaries
- 2001 – January 2003 Training development officer AVK SA (reason for leaving – sought work back in the environmental field rather than engineering sector)
- February 2003- June 2005 Project manager & Ecologist for Strategic Environmental Focus (Pretoria) – (reason for leaving – sought work related more to experience in the coastal environment)
- July 2005 – June 2009 Principal Environmental Consultant Coastal & Environmental Services (reason for leaving – company restructuring)
- June 2009 – August 2018 Owner / Ecologist of Scherman Colloty & Associates cc
- August 2018 Owner / Ecologist - EnviroSci (Pty) Ltd

SELECTED RELEVANT PROJECT EXPERIENCE

World Bank IFC Standards

- Kenmare Mining Pilivilli, Mozambique - wetland (mangroves, peatlands and estuarine) assessment and biodiversity offset analysis - current
- Botswana South Africa 400kv transmission line (400km) biodiversity assessment on behalf of Aurecon - current
- Farim phosphate mine and port development, Guinea Bissau – biodiversity and estuarine assessment on behalf of Knight Piesold Canada – 2016.
- Tema LNG offshore pipeline EIA – marine and estuarine assessment for Quantum Power (2015).
- Colluli Potash South Boulder, Eritrea, SEIA marine baseline and hydrodynamic surveys co-ordinator and coastal vegetation specialist (coastal lagoon and marine) (on-going).
- Wetland, estuarine and riverine assessment for Addax Biofeuls Sierra Leone, Makeni for Coastal & Environmental Services:

2009

- ESHIA Project manager and long-term marine monitoring phase coordinator with regards the dredge works required in Luanda bay, Angola. Monitoring included water quality and biological changes in the bay and at the offshore disposal outfall site, 2005-2011

South African

- Plant and animal search and rescue for the Karusa and Soetwater Wind Farms on behalf of Enel Green Power, Current
- Plant and animal search and rescue for the Nxuba, Oyster Bay and Garob Wind Farms on behalf of Enel Green Power, 2018 - 2019
- Plant and Animal Search and Rescue for the Port of Ngqura, Transnet Landside infrastructure Project, with development and management of on site nursery, Current
- Plant and Animal Search and Rescue for the Port of Ngqura, OTGC Tank Farm Project (2019)
- Plant search and rescue, for NMBM (Driftsands sewer, Glen Hurd Drive), Department of Social Development (Military veterans housing, Despatch) and Nxuba Wind Farm, - current
- Wetland specialist appointed to update the Eastern Cape Biodiversity Conservation Plan, for the Province on behalf of EOH CES appointment by SANBI – current. This includes updating the National Wetland Inventory for the province, submitting the new data to CSIR/SANBI.
- CDC IDZ Alien eradication plans for three renewable projects Coega Wind Farm, Sonop Wind Farm and Coega PV, on behalf of JG Afrika (2016 – 2017).
- Nelson Mandela Bay Municipality Baakens River Integrated Wetland Assessment (Inclusive of Rehabilitation and Monitoring Plans) for CEN IEM Unit - Current
- Rangers Biomass Gasification Project (Uitenhage), biodiversity and wetland assessment and wetland rehabilitation / monitoring plans for CEM IEM Unit – 2017
- Gibson Bay Wind Farm implementation of the wetland management plan during the construction and operation of the wind farm (includes surface / groundwater as well wetland rehabilitation & monitoring plan) on behalf of Enel Green Power - 2018
- Gibson Bay Wind Farm 133kV Transmission Line wetland management plan during the construction of the transmission line (includes wetland rehabilitation & monitoring plan) on behalf of Eskom – 2016.
- Tsitsikamma Community Wind Farm implementation of the wetland management plan during the construction of the wind farm (includes surface / biomonitoring, as well wetland rehabilitation & monitoring plan) on behalf of Cennergi – completed May 2016.
- Alicedale bulk sewer pipeline for Cacadu District, wetland and water quality assessment, 2016
- Mogalakwena 33kv transmission line in the Limpopo Province, on behlaf of Aurecon, 2016
- Cape St Francis WWTW expansion wetland and passive treatment system for the Kouga Municipality, 2015
- Macindane bulk water and sewer pipelines wetland and wetland rehabilitation plan 2015
- Eskom Prieska to Copperton 132kV transmission line aquatic assessment, Northern Cape on behalf of Savannah Environmental 2015.
- Joe Slovo sewer pipeline upgrade wetland assessment for Nelson Mandela Bay Municipality 2014
- Cape Recife Waste Water Treatment Works expansion and pipeline aquatic assessment for Nelson Mandela Bay Municipality 2013
- Pola park bulk sewer line upgrade aquatic assessment for Nelson Mandela Bay Municipality 2013
- Transnet Freight Rail – Swazi Rail Link (Current) wetland and ecological assessment on behalf of Aurecon for the proposed rail upgrade from Ermelo to Richards Bay
- Eskom Transmission wetland and ecological assessment for the proposed transmission line between Pietermaritzburg and Richards Bay on behalf of Aurecon (2012).
- Port Durnford Exarro Sands biodiversity assessment for the proposed mineral sands mine on behalf of Exxaro (2009)
- Fairbreeze Mine Exxaro (Mtunzini) wetland assessment on behalf of Strategic Environmental Services (2007).
- Wetland assessment for Richards Bay Minerals (2013) – Zulti North haul road on behalf of RBM.
- Biodiversity and aquatic assessments for 118 renewable projects in the past 9 years in the Western, Eastern, Northern Cape, KwaZulu-Natal and Free State provinces. Clients included RES-SA, Red Cap, ACED Renewables, Mainstream Renewable, GDF Suez, Globeleq, ENEL, Abengoa amongst others. Particular aquatic sensitivity assessment and Water Use License Applications on behalf of Mainstream Renewable Energy (8 wind farms and 3 PV facilities.), Cennergi / Exxaro (2 Wind farms), WKN Wind current (2 wind farms & 2 PV facilities), ACED (6 wind farms) and Windlab (3 Wind farms) were also conducted. Several of these projects also required the assessment of the proposed transmission lines and switching stations, which were conducted on behalf of Eskom.
- Vegetation assessments on the Great Brak rivers for Department of Water and Sanitation, 2006 and the Gouritz Water Management Area (2014)
- Proposed FibreCo fibre optic cable vegetation assessment along the PE to George, George to Graaf Reinet, PE to Colesburg, and East London to Bloemfontein on behalf of SRK (2013-2015).

11 Appendix 2: Site verification report, as per the DFFE Screening Tool guideline

Site verification report

Government Notice No. 645, dated 10 May 2019, includes the requirement that an Initial Site Sensitivity Verification Report must be produced for a development footprint. As per Part 1, Section 2.3, the outcome of the Initial Site Verification must be recorded in the form of a report that-

(a) Confirms or disputes the current use of the land and environmental sensitivity as identified by the national web based environmental screening tool;
(b) Contains a motivation and evidence of either the verified or different use of the land and environmental sensitivity;
(c) Is submitted together with the relevant reports prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

This report has been produced specifically to consider the aquatic and terrestrial ecology theme and addresses the content requirements of (a) and (b) above. The report will be appended to the respective specialist study included in the Scoping and EIA Reports produced for the projects.

Site sensitivity based on the biodiversity theme included in the Screening Tool and specialist assessment

Based on the DFFE Screening Tool, the site contains areas of very high and medium sensitivity due to the presence of the following (Figures 1-4).

- Animal theme was rated High due to several bird species and Medium for two mammal species and an invertebrate),
- Aquatic theme that was rated Very High due to the presence of an Aquatic Ecological Support Area (Type 1).
- Plant theme was rated as Medium
- Terrestrial Environment rated as Very High due to the potential presence of the Critically Endangered Algoa Sandstone Fynbos.

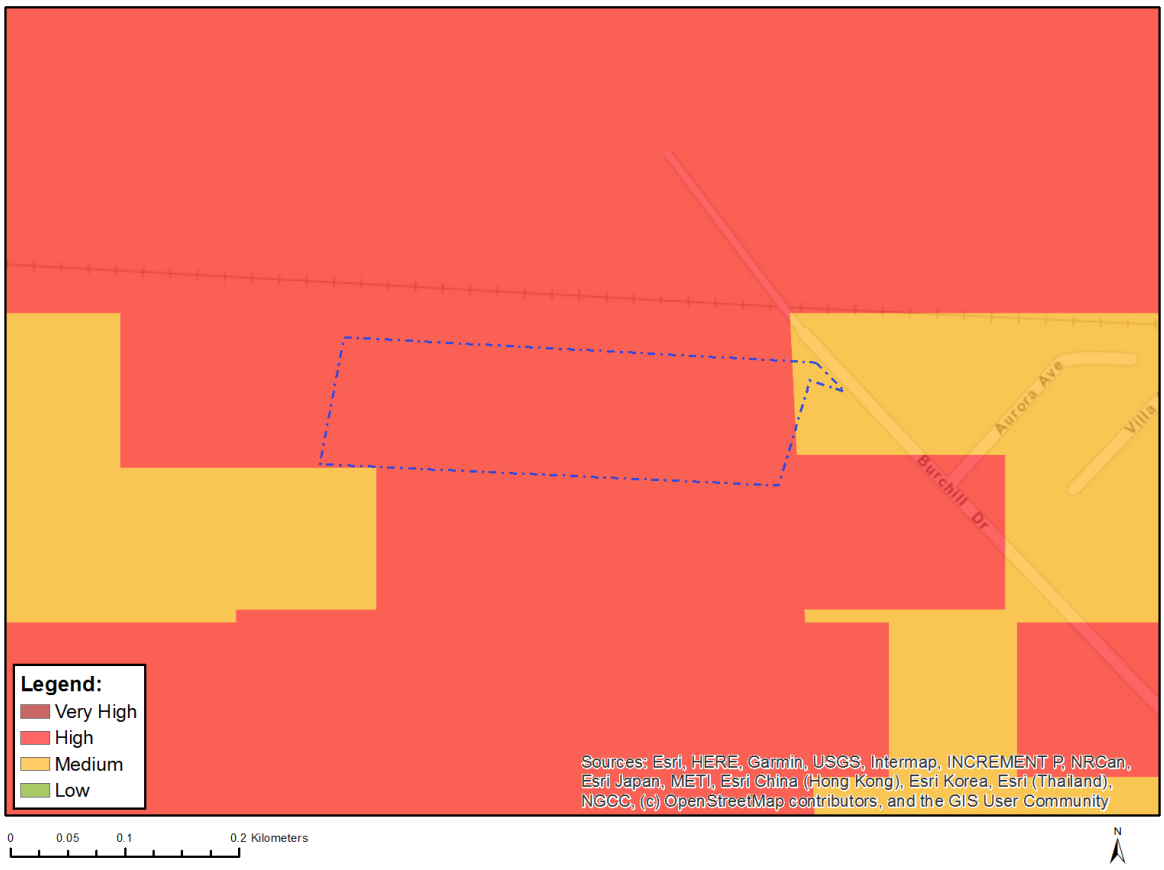

Figure 1: DFFE screening tool results for animals where Red – High and Orange = Medium.

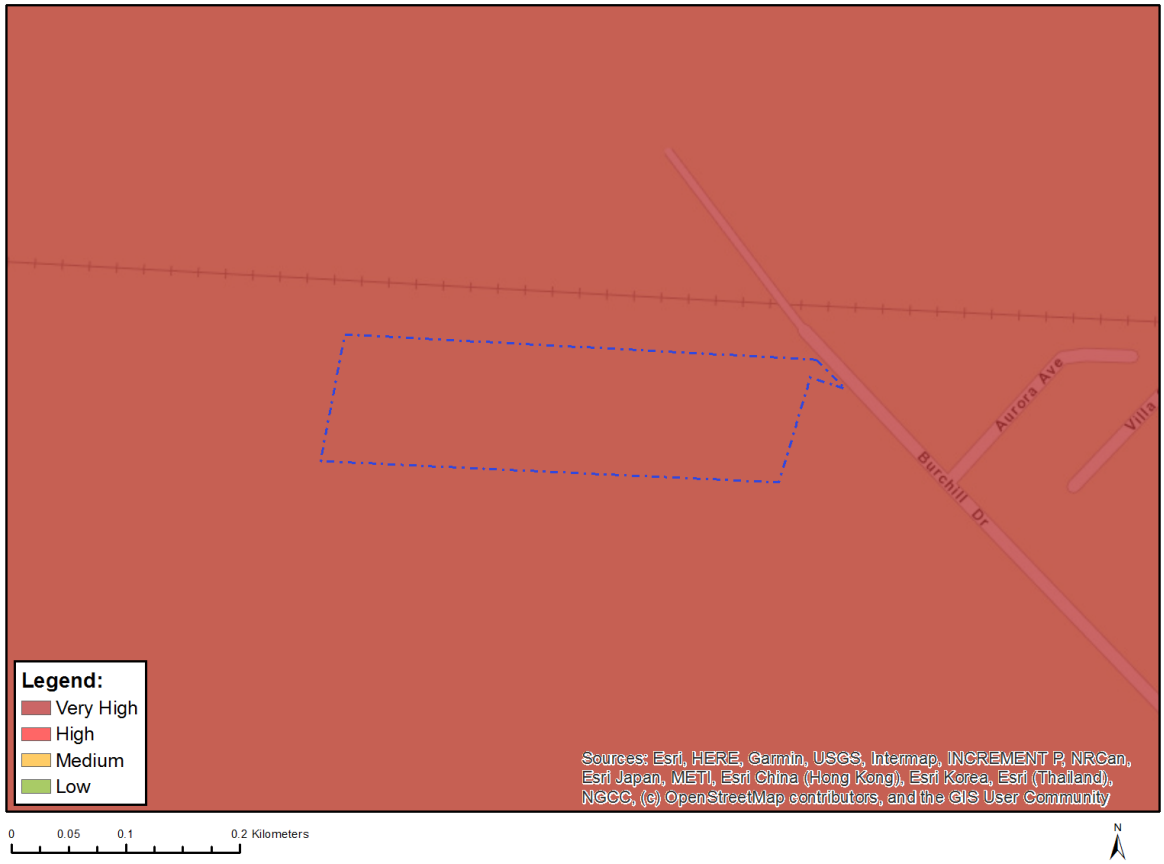

Figure 2. DFFE Screening Tool outcome for the aquatic biodiversity theme, = Very High

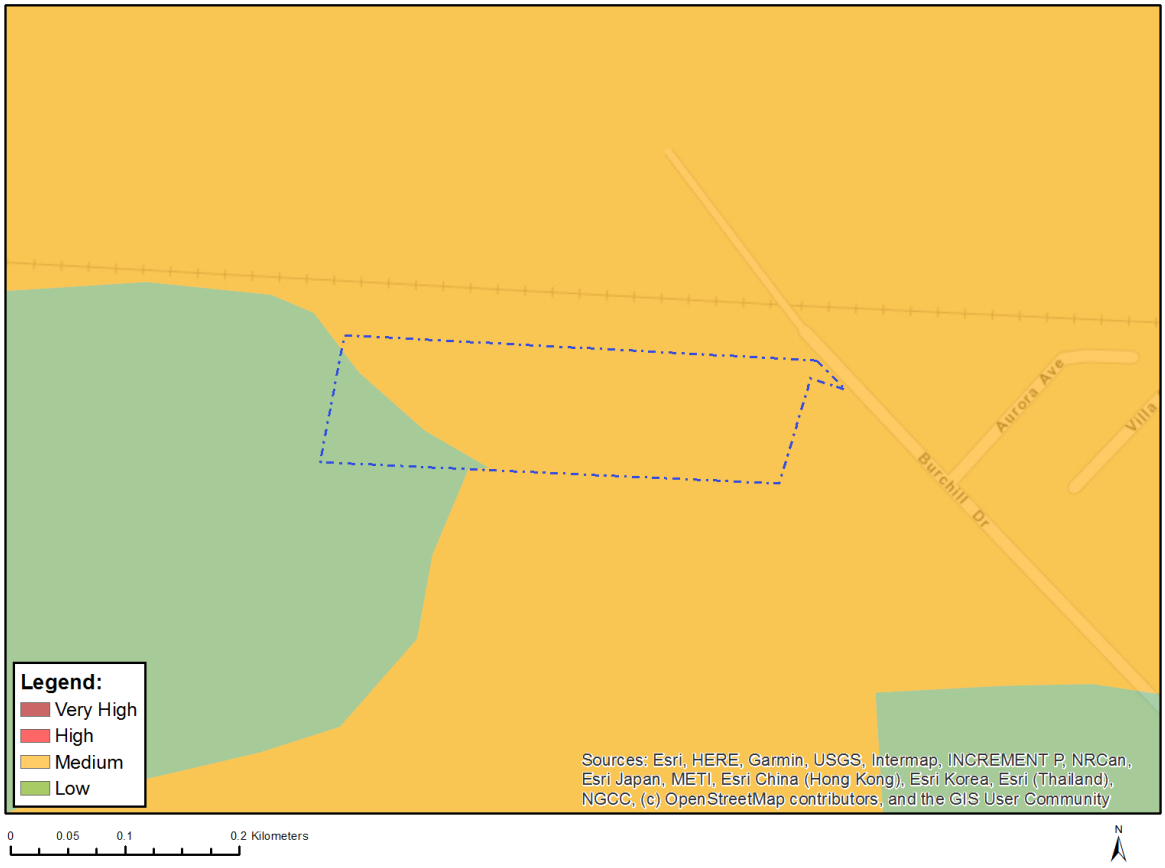

Figure 3. DFFE Screening Tool outcome for the Plant biodiversity theme, Orange = Medium and Green = Low.

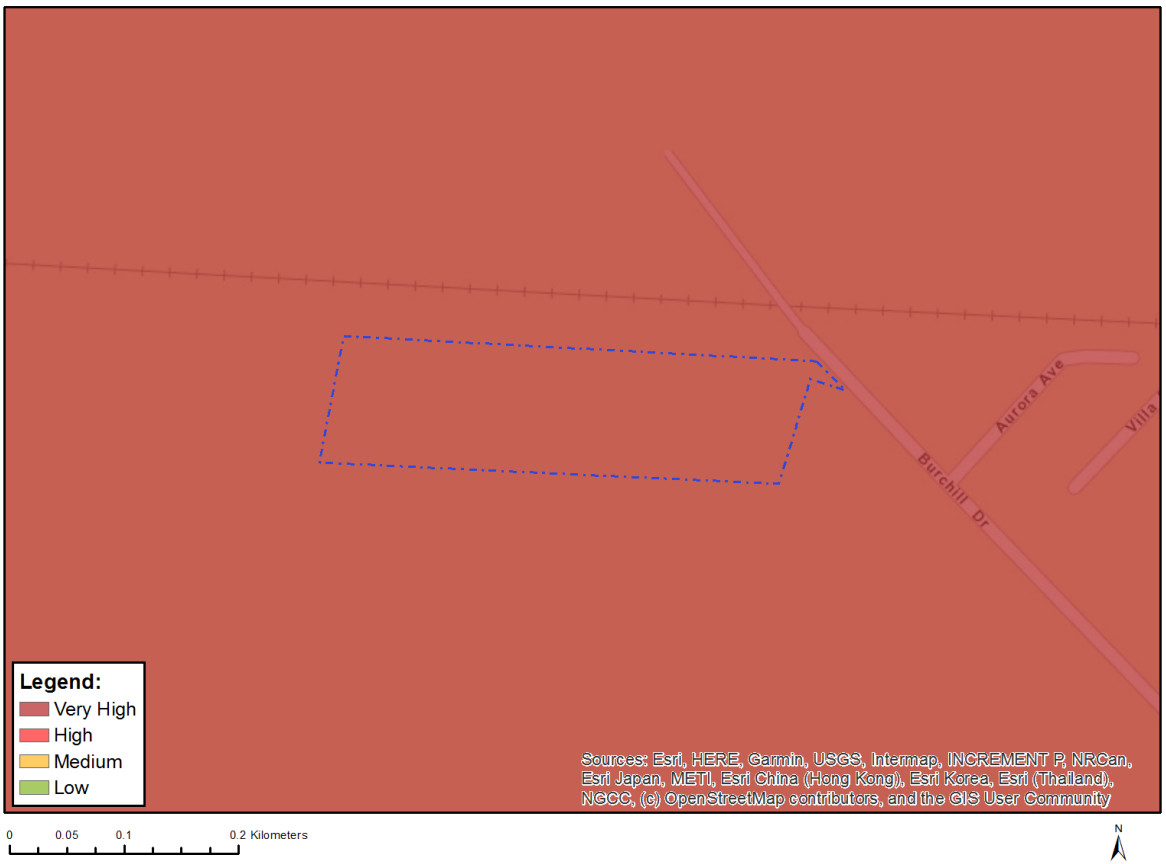

Figure 4. DFFE Screening Tool outcome for the Terrestrial biodiversity theme, Red = Very High

Based on the above outcomes, the specialist refutes the environmental sensitivities identified for this site. The findings have been informed by site visits undertaken by Dr Brian Colloty in May and June 2024.

Motivation of the outcomes of the sensitivity map and key conclusions

In conclusion, the DFFE Screening Tool identified several sensitivity ratings within the study area, namely, Very High and Medium. However based on the site based investigations, the current state of the receiving environment was found to be in a poor or degraded state, with little to no natural habitat function or connectivity between any natural habitats.

Therefore, environmental sensitivity input received from the ecology specialist will be taken forward and considered within the EA process, but the proposed layout is deemed acceptable by the ecologist as the footprint is within a LOW sensitivity area.

12 Appendix 3: Species Checklists

PLANT GROWTH FORM	FAMILY	TAXON
Tall Shrubs	PROTEACEAE	*Protea eximia (Salisb. ex Knight) Fourc.*
Tall Shrubs	PROTEACEAE	*Protea neriifolia R.Br.*
Tall Shrubs	PROTEACEAE	*Protea repens (L.) L.*
Low Shrubs	RUTACEAE	*Agathosma hirta (Lam.) Bartl. & H.L.Wendl.*
Low Shrubs	RUTACEAE	*Agathosma ovata (Thunb.) Pillans*
Low Shrubs	ERICACEAE	*Erica zeyheriana (Klotzsch) E.G.H.Oliv.*
Low Shrubs	ASTERACEAE	*Euryops ericifolius (Bél.) B.Nord.*
Low Shrubs	ASTERACEAE	*Helichrysum appendiculatum (L.f.) Less.*
Low Shrubs	ASTERACEAE	*Helichrysum teretifolium (L.) D.Don*
Low Shrubs	PROTEACEAE	*Leucadendron salignum P.J.Bergius*
Low Shrubs	PROTEACEAE	*Leucadendron xanthoconus (Kuntze) K.Schum.*
Low Shrubs	PROTEACEAE	*Leucadendron spissifolium (Salisb. ex Knight) I.Williams ssp. phillipsii (Hutch.) I.Williams*
Low Shrubs	PROTEACEAE	*Leucospermum cuneiforme (Burm.f.) Rourke*
Low Shrubs	PROTEACEAE	*Protea cynaroides (L.) L.*
Low Shrubs	PROTEACEAE	*Protea foliosa Rourke*
Low Shrubs	FABACEAE	*Tephrosia capensis (Jacq.) Pers. var. acutifolia E.Mey.*
Low Shrubs	FABACEAE	*Tephrosia capensis (Jacq.) Pers. var. hirsuta Harv.*
Low Shrubs	FABACEAE	*Tephrosia capensis (Jacq.) Pers. var. capensis*
Low Shrubs	FABACEAE	*Tephrosia capensis (Jacq.) Pers. var. angustifolia E.Mey.*
Low Shrubs	FABACEAE	*Tephrosia capensis (Jacq.) Pers. var. longipetiolata H.M.L.Forbes*
Succulent Herb	CRASSULACEAE	*Crassula pellucida L. ssp. marginalis (Dryand. in Aiton) Toelken*
Graminoids	POACEAE	*Andropogon eucomus Nees*
Graminoids	POACEAE	*Brachiaria serrata (Thunb.) Stapf*
Graminoids	POACEAE	*Cymbopogon pospischilii (K.Schum.) C.E.Hubb.*
Graminoids	POACEAE	*Cynodon dactylon (L.) Pers.*
Graminoids	POACEAE	*Digitaria eriantha Steud.*
Graminoids	POACEAE	*Ehrharta calycina Sm.*
Graminoids	POACEAE	*Eustachys paspaloides (Vahl) Lanza & Mattei*
Graminoids	RESTIONACEAE	*Restio capensis (L.) H.P.Linder & C.R.Hardy*
Graminoids	POACEAE	*Pentameris heptameris (Nees) Steud.*
Graminoids	POACEAE	*Pentaschistis pallida (Thunb.) H.P.Linder*
Graminoids	RESTIONACEAE	*Thamnochortus cinereus H.P.Linder*
Graminoids	POACEAE	*Themeda triandra Forssk.*
Graminoids	POACEAE	*Tristachya leucothrix Trin. ex Nees*
Low Shrubs	RUTACEAE	*Agathosma gonaquensis Eckl. & Zeyh.*
Low Shrubs	FABACEAE	*Cyclopia pubescens Eckl. & Zeyh.*
Low Shrubs	ERICACEAE	*Erica etheliae L.Bolus*
Geophytic Herb	ORCHIDACEAE	*Holothrix longicornu G.J.Lewis*

Source SANBI ADU http://vmus.adu.org.za/index.php?database Accessed 10 June 2024

AMPHIBIANS			
Hyperoliidae	*Hyperolius marmoratus*	Painted Reed Frog	Least Concern (IUCN ver 3.1, 2013)
Pipidae	*Xenopus laevis*	Cape Clawed Toad	Least Concern
Pyxicephalidae	*Amietia delalandii*	Delalande's River Frog	Least Concern (2017)
Pyxicephalidae	*Amietia fuscigula*	Cape River Frog	Least Concern (2017)
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	Least Concern (2013)
Pyxicephalidae	*Cacosternum nanum*	Bronze Caco	Least Concern (2013)
Pyxicephalidae	*Strongylopus fasciatus*	Striped Stream Frog	Least Concern
Pyxicephalidae	*Strongylopus grayii*	Clicking Stream Frog	Least Concern
REPTILES			
Agamidae	*Agama aculeata aculeata*	Common Ground Agama	Least Concern (SARCA 2014)
Agamidae	*Agama atra*	Southern Rock Agama	Least Concern (SARCA 2014)
Colubridae	*Dispholidus typus typus*	Boomslang	Least Concern (SARCA 2014)

Cordylidae	*Pseudocordylus microlepidotus microlepidotus*	Cape Crag Lizard	Least Concern (SARCA 2014)
Elapidae	*Naja nivea*	Cape Cobra	Least Concern (SARCA 2014)
Gekkonidae	*Afroedura nov sp. 1 (Kouga)*		
Lacertidae	*Pedioplanis burchelli*	Burchell's Sand Lizard	Least Concern (SARCA 2014)
Lacertidae	*Tropidosaura gularis*	Cape Mountain Lizard	Least Concern (SARCA 2014)
Lamprophiidae	*Lycodonomorphus rufulus*	Brown Water Snake	Least Concern (SARCA 2014)
Lamprophiidae	*Psammophylax rhombeatus*	Spotted Grass Snake	Least Concern (SARCA 2014)
Scincidae	*Acontias orientalis*	Eastern Legless Skink	Least Concern (SARCA 2014)
Testudinidae	*Chersina angulata*	Angulate Tortoise	Least Concern (SARCA 2014)
Viperidae	*Bitis arietans arietans*	Puff Adder	Least Concern (SARCA 2014)
LEPIDOPTERA			
HESPERIIDAE	*Spialia sataspes*	Boland sandman	Least Concern (SABCA 2013)
LYCAENIDAE	*Aloeides aranda*	Aranda copper	Least Concern (SABCA 2013)
LYCAENIDAE	*Aloeides damarensis damarensis*	Damara copper	Least Concern (SABCA 2013)
LYCAENIDAE	*Aloeides depicta*	Depicta copper	Least Concern (SABCA 2013)
LYCAENIDAE	*Aloeides juana*	Juana copper	Least Concern (SABCA 2013)
LYCAENIDAE	*Aloeides pallida liversidgei*	Giant copper	Least Concern (SABCA 2013)
LYCAENIDAE	*Cacyreus marshalli*	Common geranium bronze	Least Concern (SABCA 2013)
LYCAENIDAE	*Capys alpheus alpheus*	Orange banded protea	Least Concern (SABCA 2013)
LYCAENIDAE	*Chrysoritis beulah*	Beulah's opal	Least Concern (SABCA 2013)
LYCAENIDAE	*Chrysoritis chrysaor*	Burnished opal	Least Concern (SABCA 2013)
LYCAENIDAE	*Chrysoritis zeuxo cottrelli*	Cottrell's daisy copper	Least Concern (SABCA 2013)
LYCAENIDAE	*Lachnocnema durbani*	D'Urban's woolly legs	Least Concern (SABCA 2013)
LYCAENIDAE	*Lampides boeticus*	Pea blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Lepidochrysops sp.*		
LYCAENIDAE	*Lepidochrysops ketsi ketsi*	Ketsi blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Lepidochrysops patricia*	Patricia blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Lepidochrysops poseidon*	Baviaanskloof blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Lepidochrysops robertsoni*	Robertson's blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Lepidochrysops variabilis*	Variable blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Leptomyrina lara*	Cape black-eye	Least Concern (SABCA 2013)
LYCAENIDAE	*Tarucus thespis*	Vivid dotted blue	Least Concern (SABCA 2013)
LYCAENIDAE	*Thestor murrayi*	Murray's skolly	Least Concern (SABCA 2013)
LYCAENIDAE	*Trimenia argyroplaga argyroplaga*	Large silver-spotted copper	Least Concern (SABCA 2013)
NYMPHALIDAE	*Acraea neobule neobule*	Wandering donkey acraea	Least Concern (SABCA 2013)
NYMPHALIDAE	*Aeropetes tulbaghia*	Table mountain beauty	Least Concern (SABCA 2013)
NYMPHALIDAE	*Charaxes pelias*	Protea charaxes	Least Concern (SABCA 2013)
NYMPHALIDAE	*Danaus chrysippus orientis*	African monarch, Plain tiger	Least Concern (SABCA 2013)
NYMPHALIDAE	*Hypolimnas misippus*	Common diadem	Least Concern (SABCA 2013)
NYMPHALIDAE	*Junonia hierta cebrene*	Yellow pansy	Least Concern (SABCA 2013)
NYMPHALIDAE	*Pardopsis punctatissima*	Polka dot	Least Concern (SABCA 2013)
NYMPHALIDAE	*Precis archesia archesia*	Garden commodore	Least Concern (SABCA 2013)
NYMPHALIDAE	*Precis octavia sesamus*	Gaudy Commodore	Least Concern (SABCA 2013)
NYMPHALIDAE	*Pseudonympha magus*	Silver-bottom brown	Least Concern (SABCA 2013)
NYMPHALIDAE	*Pseudonympha trimenii ruthae*	Trimen's brown	Least Concern (SABCA 2013)
NYMPHALIDAE	*Stygionympha vigilans*	Western hillside brown	Least Concern (SABCA 2013)
NYMPHALIDAE	*Stygionympha wichgrafi williami*	Wichgraf's hillside brown	Least Concern (SABCA 2013)
NYMPHALIDAE	*Vanessa cardui*	Painted lady	Least Concern (SABCA 2013)

PAPILIONIDAE	*Papilio demodocus demodocus*	Citrus swallowtail	Least Concern (SABCA 2013)
PIERIDAE	*Belenois aurota*	Brown-veined white	Least Concern (SABCA 2013)
PIERIDAE	*Pontia helice helice*	Common meadow white	Least Concern (SABCA 2013)
PIERIDAE	*Teracolus eris eris*	Banded gold tip	Least Concern (SABCA 2013)
AVES (BIRDS)			
Common_group	**Common_species**	**Genus**	**Species**
Apalis	Bar-throated	*Apalis*	*thoracica*
Apalis	Yellow-breasted	*Apalis*	*flavida*
Barbet	Acacia Pied	*Tricholaema*	*leucomelas*
Barbet	Black-collared	*Lybius*	*torquatus*
Batis	Cape	*Batis*	*capensis*
Bishop	Southern Red	*Euplectes*	*orix*
Bokmakierie	Bokmakierie	*Telophorus*	*zeylonus*
Boubou	Southern	*Laniarius*	*ferrugineus*
Brownbul	Terrestrial	*Phyllastrephus*	*terrestris*
Bulbul	Cape	*Pycnonotus*	*capensis*
Bunting	Cinnamon-breasted	*Emberiza*	*tahapisi*
Bunting	Golden-breasted	*Emberiza*	*flaviventris*
Bush-shrike	Olive	*Telophorus*	*olivaceus*
Buzzard	Jackal	*Buteo*	*rufofuscus*
Buzzard	Steppe	*Buteo*	*vulpinus*
Camaroptera	Green-backed	*Camaroptera*	*brachyura*
Canary	Brimstone	*Crithagra*	*sulphuratus*
Canary	Cape	*Serinus*	*canicollis*
Canary	Forest	*Crithagra*	*scotops*
Canary	Yellow-fronted	*Crithagra*	*mozambicus*
Chat	Anteating	*Myrmecocichla*	*formicivora*
Chat	Familiar	*Cercomela*	*familiaris*
Cisticola	Grey-backed	*Cisticola*	*subruficapilla*
Cisticola	Lazy	*Cisticola*	*aberrans*
Cisticola	Levaillant's	*Cisticola*	*tinniens*
Cisticola	Zitting	*Cisticola*	*juncidis*
Coot	Red-knobbed	*Fulica*	*cristata*
Cormorant	Reed	*Phalacrocorax*	*africanus*
Cormorant	White-breasted	*Phalacrocorax*	*carbo*
Coucal	Burchell's	*Centropus*	*burchellii*
Crane	Blue	*Anthropoides*	*paradiseus*
Crested-flycatcher	Blue-mantled	*Trochocercus*	*cyanomelas*
Crow	Cape	*Corvus*	*capensis*
Crow	Pied	*Corvus*	*albus*
Cuckoo	Black	*Cuculus*	*clamosus*
Cuckoo	Klaas's	*Chrysococcyx*	*klaas*
Cuckoo	Red-chested	*Cuculus*	*solitarius*
Cuckoo-shrike	Black	*Campephaga*	*flava*
Cuckoo-shrike	Grey	*Coracina*	*caesia*
Dove	Laughing	*Streptopelia*	*senegalensis*
Dove	Lemon	*Aplopelia*	*larvata*
Dove	Red-eyed	*Streptopelia*	*semitorquata*
Dove	Tambourine	*Turtur*	*tympanistria*

Drongo	Fork-tailed	*Dicrurus*	*adsimilis*
Duck	African Black	*Anas*	*sparsa*
Duck	Yellow-billed	*Anas*	*undulata*
Eagle	African Crowned	*Stephanoaetus*	*coronatus*
Eagle	Martial	*Polemaetus*	*bellicosus*
Eagle	Verreaux's	*Aquila*	*verreauxii*
Eagle-owl	Spotted	*Bubo*	*africanus*
Egret	Cattle	*Bubulcus*	*ibis*
Firefinch	African	*Lagonosticta*	*rubricata*
Fiscal	Common (Southern)	*Lanius*	*collaris*
Fish-eagle	African	*Haliaeetus*	*vocifer*
Flycatcher	African Dusky	*Muscicapa*	*adusta*
Flycatcher	Fiscal	*Sigelus*	*silens*
Flycatcher	Spotted	*Muscicapa*	*striata*
Goose	Egyptian	*Alopochen*	*aegyptiacus*
Goose	Spur-winged	*Plectropterus*	*gambensis*
Goshawk	African	*Accipiter*	*tachiro*
Goshawk	Southern Pale Chanting	*Melierax*	*canorus*
Grassbird	Cape	*Sphenoeacus*	*afer*
Grebe	Little	*Tachybaptus*	*ruficollis*
Greenbul	Sombre	*Andropadus*	*importunus*
Guineafowl	Helmeted	*Numida*	*meleagris*
Gull	Kelp	*Larus*	*dominicanus*
Harrier	Black	*Circus*	*maurus*
Harrier-Hawk	African	*Polyboroides*	*typus*
Heron	Black-headed	*Ardea*	*melanocephala*
Heron	Grey	*Ardea*	*cinerea*
Honeyguide	Greater	*Indicator*	*indicator*
Honeyguide	Lesser	*Indicator*	*minor*
Honeyguide	Scaly-throated	*Indicator*	*variegatus*
Hoopoe	African	*Upupa*	*africana*
Hornbill	Crowned	*Tockus*	*alboterminatus*
Ibis	African Sacred	*Threskiornis*	*aethiopicus*
Ibis	Hadeda	*Bostrychia*	*hagedash*
Indigobird	Dusky	*Vidua*	*funerea*
Kestrel	Rock	*Falco*	*rupicolus*
Kingfisher	Brown-hooded	*Halcyon*	*albiventris*
Kingfisher	Half-collared	*Alcedo*	*semitorquata*
Kingfisher	Malachite	*Alcedo*	*cristata*
Kingfisher	Pied	*Ceryle*	*rudis*
Kite	Black-shouldered	*Elanus*	*caeruleus*
Kite	Yellow-billed	*Milvus*	*aegyptius*
Lapwing	Blacksmith	*Vanellus*	*armatus*
Lapwing	Crowned	*Vanellus*	*coronatus*
Lark	Red-capped	*Calandrella*	*cinerea*
Longclaw	Cape	*Macronyx*	*capensis*
Marsh-harrier	African	*Circus*	*ranivorus*
Martin	Brown-throated	*Riparia*	*paludicola*
Martin	Rock	*Hirundo*	*fuligula*

Masked-weaver	Southern	*Ploceus*	*velatus*
Moorhen	Common	*Gallinula*	*chloropus*
Mousebird	Red-faced	*Urocolius*	*indicus*
Mousebird	Speckled	*Colius*	*striatus*
Neddicky	Neddicky	*Cisticola*	*fulvicapilla*
Olive-pigeon	African	*Columba*	*arquatrix*
Oriole	Black-headed	*Oriolus*	*larvatus*
Palm-swift	African	*Cypsiurus*	*parvus*
Paradise-flycatcher	African	*Terpsiphone*	*viridis*
Pigeon	Speckled	*Columba*	*guinea*
Plover	Three-banded	*Charadrius*	*tricollaris*
Prinia	Karoo	*Prinia*	*maculosa*
Puffback	Black-backed	*Dryoscopus*	*cubla*
Quelea	Red-billed	*Quelea*	*quelea*
Raven	White-necked	*Corvus*	*albicollis*
Robin-chat	Cape	*Cossypha*	*caffra*
Rock-thrush	Cape	*Monticola*	*rupestris*
Rush-warbler	Little	*Bradypterus*	*baboecala*
Saw-wing	Black (Southern race)	*Psalidoprocne*	*holomelaena*
Scrub-robin	Brown	*Cercotrichas*	*signata*
Scrub-robin	White-browed	*Cercotrichas*	*leucophrys*
Seedeater	Streaky-headed	*Crithagra*	*gularis*
Sparrow	Cape	*Passer*	*melanurus*
Sparrow	House	*Passer*	*domesticus*
Sparrow	Southern Grey-headed	*Passer*	*diffusus*
Sparrowhawk	Black	*Accipiter*	*melanoleucus*
Sparrowhawk	Little	*Accipiter*	*minullus*
Spoonbill	African	*Platalea*	*alba*
Spurfowl	Red-necked	*Pternistis*	*afer*
Starling	Black-bellied	*Lamprotornis*	*corruscus*
Starling	Cape Glossy	*Lamprotornis*	*nitens*
Starling	Common	*Sturnus*	*vulgaris*
Starling	Pied	*Spreo*	*bicolor*
Starling	Red-winged	*Onychognathus*	*morio*
Stilt	Black-winged	*Himantopus*	*himantopus*
Stonechat	African	*Saxicola*	*torquatus*
Stork	White	*Ciconia*	*ciconia*
Sugarbird	Cape	*Promerops*	*cafer*
Sunbird	Amethyst	*Chalcomitra*	*amethystina*
Sunbird	Collared	*Hedydipna*	*collaris*
Sunbird	Greater Double-collared	*Cinnyris*	*afer*
Sunbird	Grey	*Cyanomitra*	*veroxii*
Sunbird	Malachite	*Nectarinia*	*famosa*
Sunbird	Orange-breasted	*Anthobaphes*	*violacea*
Sunbird	Southern Double-collared	*Cinnyris*	*chalybeus*
Swallow	Barn	*Hirundo*	*rustica*
Swallow	Greater Striped	*Hirundo*	*cucullata*
Swallow	Lesser Striped	*Hirundo*	*abyssinica*
Swallow	White-throated	*Hirundo*	*albigularis*

Swamp-warbler	Lesser	*Acrocephalus*	*gracilirostris*
Swift	Alpine	*Tachymarptis*	*melba*
Swift	Horus	*Apus*	*horus*
Swift	Little	*Apus*	*affinis*
Swift	White-rumped	*Apus*	*caffer*
Tchagra	Southern	*Tchagra*	*tchagra*
Teal	Cape	*Anas*	*capensis*
Thrush	Olive	*Turdus*	*olivaceus*
Tinkerbird	Red-fronted	*Pogoniulus*	*pusillus*
Tit-babbler	Chestnut-vented	*Parisoma*	*subcaeruleum*
Trogon	Narina	*Apaloderma*	*narina*
Turaco	Knysna	*Tauraco*	*corythaix*
Turtle-dove	Cape	*Streptopelia*	*capicola*
Wagtail	Cape	*Motacilla*	*capensis*
Warbler	Knysna	*Bradypterus*	*sylvaticus*
Warbler	Victorin's	*Cryptillas*	*victorini*
Waxbill	Common	*Estrilda*	*astrild*
Waxbill	Swee	*Coccopygia*	*melanotis*
Weaver	Cape	*Ploceus*	*capensis*
Weaver	Dark-backed	*Ploceus*	*bicolor*
Weaver	Spectacled	*Ploceus*	*ocularis*
Weaver	Thick-billed	*Amblyospiza*	*albifrons*
Weaver	Village	*Ploceus*	*cucullatus*
White-eye	Cape	*Zosterops*	*virens*
Whydah	Pin-tailed	*Vidua*	*macroura*
Wood-dove	Emerald-spotted	*Turtur*	*chalcospilos*
Wood-hoopoe	Green	*Phoeniculus*	*purpureus*
Woodland-warbler	Yellow-throated	*Phylloscopus*	*ruficapilla*
Woodpecker	Cardinal	*Dendropicos*	*fuscescens*
Woodpecker	Knysna	*Campethera*	*notata*
Woodpecker	Olive	*Dendropicos*	*griseocephalus*