

September 2020

TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

SCOPING REPORT

Proposed development of the 450MW Emergency Risk Mitigation Power Plant (RMPP) and associated infrastructure on sites located in Alton, KwaZulu-Natal.



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ABBREVIATIONS AND ACRONYMS

CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
CCPP	Combined Cycle Power Plant
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CREW	Custodians of Rare and Endangered Wildflowers
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEFF	Department of Environment, Forestry and Fisheries
DHSWS	Department of Human Settlements, Water and Sanitation
DWA	Department of Water Affairs
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMF	Environmental Management Framework
EMP	Environmental Management Plan
ESA	Ecological Support Areas
ESMP	Environmental Services Management Plan
GA	General Authorisation (GN 509)
GIS	Geographical Information Systems
GPS	Global Positioning System
HRSG	Heat Recovery Steam Generators
IUCN	International Union for Conservation of Nature and Natural Resource
LNG	Liquid Natural Gas
KCDM	King Cetshwayo District Municipality
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act (Act 57 of 2003)
NFA	National Forests Act (Act 84 of 1998)
NFEPA	National Freshwater Ecosystems Priority Areas
NWA	National Water Act (Act 36 of 1998)
PA	Primary Aquifers
PA _s	Protected Areas in terms of NEMPAA
PRECIS	National Herbarium Pretoria (PRE) Computerised Information System
SANBI	South African National Biodiversity Institute
SARCA	South African Reptile Conservation Assessment
SDF	Spatial Development Framework
SIBIS	Integrated Biodiversity Information System
TOPS	NEMBA Threatened or Protected Species
ULM	City of uMhlathuze Local Municipality
VEGMAP	Vegetation Map of Southern Africa
WMA	Water Management Area

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EXECUTIVE SUMMARY

Exigent Engineering Consultants CC has been appointed by Savannah Environmental (Pty) Ltd, on behalf of Phinda Power Producers (Pty) Ltd, to conduct a specialist terrestrial biodiversity scoping impact assessment for the proposed of a 450MW Emergency Risk Mitigation Power Plant and associated infrastructure on development sites with a combined total extent of approximately 11,4 hectares, located in Alton industrial, Richards Bay, within the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province.

This study conforms to the requirements as set out in Government Notice No. 648 of Government Gazette 45421, published on 10 May 2019, which provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities the terms of Government Notice No. 320 for the Procedures for the Assessment and minimum criteria for reporting on identified environmental themes, as released on the 20 March 2020, in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act 1998, when applying for an Environmental Authorisation.

The proposed development site is in the heart of the Alton Industrial Area of Richards Bay, with all neighbouring properties comprising of existing industrial activities. The vegetation on site was broadly classified into two vegetation communities, namely *Helichrysum - Chrysanthemoides* coastal grasslands (Figure 6-1), and a small portion (only approximately 1,29 hectare) of the site consisted of *Eucalyptus* plantations. A *Phragmites - Typha* channelled valley bottom wetland community was observed on the eastern border of the site, and the Closed coastal woodland vegetation community was identified south of the proposed LPG Storage Terminal but does also not impede into the site.

Potential plant species of special concern include *Crinum stuhlmannii* in the *Helichrysum - Chrysanthemoides* coastal grasslands and *Alsophila dregei*, *Boophone disticha*, *Ficus trichopoda* and *Barringtonia racemosa* individuals in the *Phragmites - Typha* channelled valley bottom wetlands. A search and rescue operation will be required for all protected species confirmed within the development area and those species that have a high probability of occurrence which will be impacted by the proposed development. Relevant permits must be obtained for all required species in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) and the KwaZulu-Natal Nature Conservation Ordinance (15 of 1974). No protected species were observed during the site visit, however searches for the potential species will be continued during follow-up site visits.

Faunal distribution data were obtained from various available databases, publications and field guides to ascertain the historical occurrence of species within the degree grid cell. Approximately 48 small mammal species have the potential to use the study site. Small mammal trapping will occur for 3 days by means of pitfall traps and live rodent traps as part of the detailed studies for the EIA phase of the process.

Data from pentads 2840_3200 and 2845_3200 were accessed for avifaunal distribution. The Richards Bay Game Reserve Important Bird Area is located approximately 3,4 km south of the development site. Consequentially, 358 bird species have previously been recorded in these pentads. During the site investigation, birds were identified through direct observation in all areas of the proposed development site while scanning for soaring birds took place sporadically. Twelve bird species were observed during this study's site investigation but are unlikely to be impacted by the proposed activities. None are of conservation importance. Further observations will continue during further fieldwork in the EIA Phase.

This Scoping Report for the Terrestrial Biodiversity Impact Assessment therefore considers and reports on the anticipated environmental impacts that the proposed development may have and will form part of the submissions to the National Department of Environment, Forestry and Fisheries in terms of the National Environmental Management Act, 1998 (Act No. 108 of 1998) and the 2014 Environmental Impact Assessment Regulations as amended in April 2017.

1. INTRODUCTION

Exigent Engineering Consultants CC (Exigent) has been appointed by Savannah Environmental (Pty) Ltd (Savannah), on behalf of Phinda Power Producers (Pty) Ltd (Phinda), to conduct specialist terrestrial biodiversity impact assessment for the proposed construction of a 450MW Emergency Risk Mitigation Power Plant (RMPP) and associated infrastructure in Alton industrial area, Richards Bay, within the City of uMhlatuze Local Municipality (ULM) and the King Cetshwayo District Municipality (KCDM), KwaZulu-Natal Province (KZN, Figure 1-1).

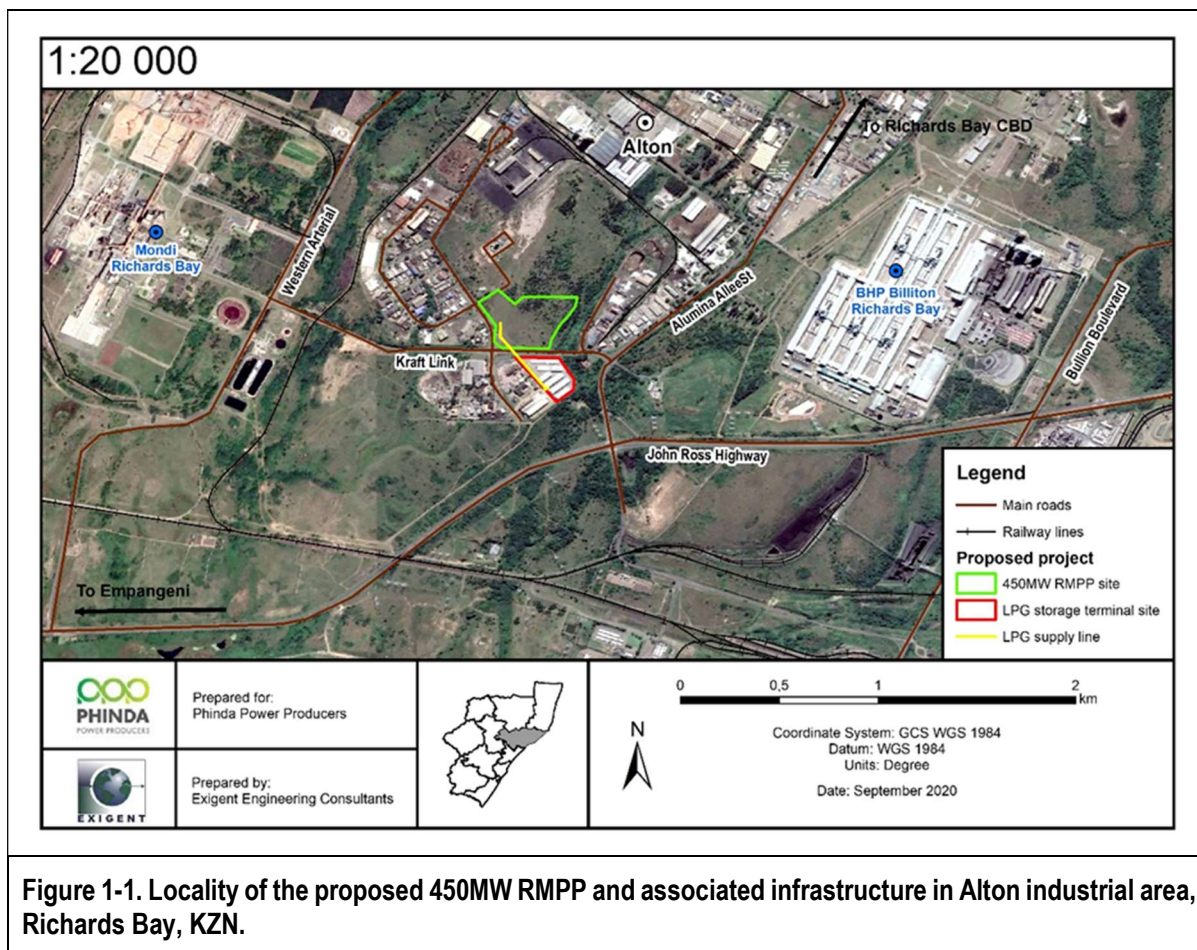


Figure 1-1. Locality of the proposed 450MW RMPP and associated infrastructure in Alton industrial area, Richards Bay, KZN.

1.1. Project description

Phinda proposes the construction of a 450MW Emergency RMPP which involves the construction of a gas-fired power station which will provide mid-merit power supply to the electricity grid.

The 450MW RMPP is planned to operate on a mid-merit basis at a minimum annual average dispatch rate of ~50% (i.e. operational between 5am and 9:30pm daily and being deployed on average for a minimum 72% over the year during this time period) and a maximum annual average dispatch rate of ~70%. The 450MW RMPP has been designed and developed as a power balance system to manage electricity demand during day time peak periods to provide energy, capacity and ancillary services to promote the stability of the national grid and assist in levelling out the variability in renewables energy electricity supply and meet short term fluctuations in electricity demand. In addition, the 450MR RMPP can provide back up support for daytime base load generation in the event of unscheduled maintenance on Eskom's base load electricity generation fleet.

The power station will have an installed capacity of up to 450MW, to be operated on either Liquid Petroleum Gas (LPG) or naphtha as the initial fuel source and later to be converted from utilising LPG/naphtha to liquid natural

gas (LNG). For the initial fuel source, either LPG would be supplied by road from the existing LPG import terminal in Richards Bay or naphtha would be supplied via pipeline from the import berths at Richards Bay. Once LNG import and regassification infrastructure is established in Richards Bay in accordance with the Department of Minerals and Energy, Transnet Limited and the Independent Power Producer (IPP) Office's planning, natural gas would be supplied to the 450MW RMPP via a natural gas pipeline from this import terminal. The use of either Naphtha or LPG and the associated infrastructure required in respect of each of these alternative fuel sources, will be investigated further within the EIA phase and the preferred fuel source presented. The LNG terminal and regassification infrastructure and naphtha supply infrastructure at the port of Richards Bay and the relevant pipelines do not form part of the scope of this assessment, whereas LPG infrastructure does form part of this report.

The main infrastructure associated with the facility includes the following:

- Main Power Island consisting of either gas turbines comprising of air intake, air filter structures and exhaust stack for the generation of electricity through the use of natural gas, naphtha or LPG; or Gas engines comprising of reciprocating internal combustion engines and exhaust stack utilising LPG or natural gas.
- Generator and Auxiliary transformers.
- Balance of Plant systems.
- Dry Cooling systems.
- Auxiliaries.
- 132kV interconnecting substation and power lines connecting to the grid transmission infrastructure (The power lines to the grid transmission structure will be applied for under a separate environmental approval process).
- LPG fuel pipe routing between the LPG storage site and the power plant site or Naphtha import pipeline from the port of Richards Bay to the onsite storage of Naphtha (the Naphtha pipeline will be applied for under a separate environmental approval process).
- Stormwater management ponds.
- LPG storage comprising of up to 15 000m³ of storage in total, comprising of a number of either bullets or spheres storage tanks in design or;
- Naphtha storage on the power plant site of up to 90,000m³ in total, comprising of a number of tanks.
- Once imported LNG is available in Richards Bay, the 450MP RMPP will be converted from utilising LPG / Naphtha to the use of regassified LNG by means of a new dedicated natural gas pipeline which will replace or supplement the LPG / Naphtha supply to the power plant (The approval for the pipeline will be conducted under a separate process).
- 3 effluent reticulation systems - i.e. 1) sanitary wastewater system; 2) oily water collection system and 3) storm water and rainwater collection system.
- Diesel generator to provide start-up power to the first gas engine / turbine.

This specific specialist report therefore entails a terrestrial biodiversity scoping assessment for the proposed 450MW RMPP and associated infrastructure and considers and reports on the environmental impacts that this proposed Plant may have. The report will form part of the submissions to the National Department of Environment, Forestry and Fisheries (DEFF) in terms of the National Environmental Management Act, 1998 (NEMA) (Act No. 108 of 1998) and the 2014 Environmental Impact Assessment (EIA) Regulations, as amended in April 2017.

2. SCOPE OF WORK

This study conforms to the requirements as set out in Government Notice (GN) No. 648 of Government Gazette (GG) 45421, published on 10 May 2019, which provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities the terms of GN No. 320 for the Procedures for the Assessment and minimum criteria for reporting on identified environmental themes in terms of Sections 24(5)(a) and (h) and 44 of the National

Environmental Management Act (NEMA, Act 107 of 1998), when applying for an Environmental Authorisation (EA), as released on the 20 March 2020.

2.1. Ecological assessment

The following will be included in the Terrestrial Biodiversity Scoping Impact Assessment Report:

1. Description of the preferred site - the following aspects, as a minimum, must be considered in the baseline description:
 - A description of the ecological drivers/processes of the system and how the proposed development will impact these;
 - Ecological functioning and ecological processes that operate within the proposed development site;
 - The ecological corridors that the development would impede including migration and movement of flora and fauna;
 - The description of any significant landscape features (including rare or important flora/faunal associations, presence of Strategic Water Source Areas (SWSAs) or Freshwater Ecosystem Priority Areas (FEPA) sub catchments);
 - A description of terrestrial biodiversity and ecosystems on the proposed development site, including
 -
 - Main vegetation types;
 - Threatened ecosystems, including Listed Ecosystems as well as locally important habitat types identified;
 - Ecological connectivity, habitat fragmentation, ecological processes and fine-scale habitats; and
 - Species, distribution, important habitats (e.g. feeding grounds, nesting sites, etc.) and movement patterns identified.
2. Identify any alternative development footprints within the preferred development site which would be of a “low” sensitivity and verified through the Initial Site Sensitivity Verification;
3. The Terrestrial Biodiversity Impact Assessment must be based on the results of a site inspection undertaken on the preferred development site and must identify:
 - Terrestrial Critical Biodiversity Areas (CBAs), including:
 - The reasons why an area has been identified as a CBA;
 - An indication of whether or not the development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation;
 - The impact on species composition and structure of vegetation with an indication of the extent of clearing activities;
 - The impact on ecosystem threat status;
 - The impact on explicit subtypes in the vegetation;
 - The impact on overall species and ecosystem diversity of the site; and
 - The impact on populations of species of special concern in the CBA.
 - Terrestrial Ecological Support Areas, including:
 - The impact on the ecological processes that operate within or across the site;
 - The extent the development will impact on the functionality of the ESA; and
 - Loss of ecological connectivity due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna.
 - Protected Areas as defined by the National Environmental Management: Protected Areas Act, 2004 including:
 - An opinion on whether the proposed development aligns with the objectives/purpose of the Protected Area and the zoning as per the Protected Area Management Plan;
 - Priority Areas for Protected Area Expansion, including:
 - The way in which in which the development will compromise or contribute to the expansion of the protected area network.

- Strategic Water Source Areas (SWSA) including:
 - The impact(s) on the terrestrial habitat of a Strategic Water Source Area, and
 - The impacts of the development on the SWSA water quality and quantity.
 - Freshwater Ecosystem Priority Area (FEPA) sub catchments, including:
 - The impacts of the development on habitat condition and/or species in the FEPA sub catchment.
 - Indigenous Forests, including:
 - Impact on the ecological integrity of the forest; and
 - Extent of natural or near natural indigenous forest area lost.
4. The findings of the Terrestrial Biodiversity Impact Assessment must be written up in a Terrestrial Biodiversity Impact Assessment Report.

3. ASSUMPTIONS AND LIMITATIONS

- In order to obtain a comprehensive understanding of the dynamics of the development 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 replication. Due to time constraints, such long-term studies are not always feasible, and conclusions will be based on field surveys conducted on 18-20 September 2019 and 28-31 January 2020.
- Faunal surveys and further follow-up site visits are planned prior to the submission of the Terrestrial Biodiversity Impact Assessment Report during the Environmental Impact Assessment (EIA) phase of this project.

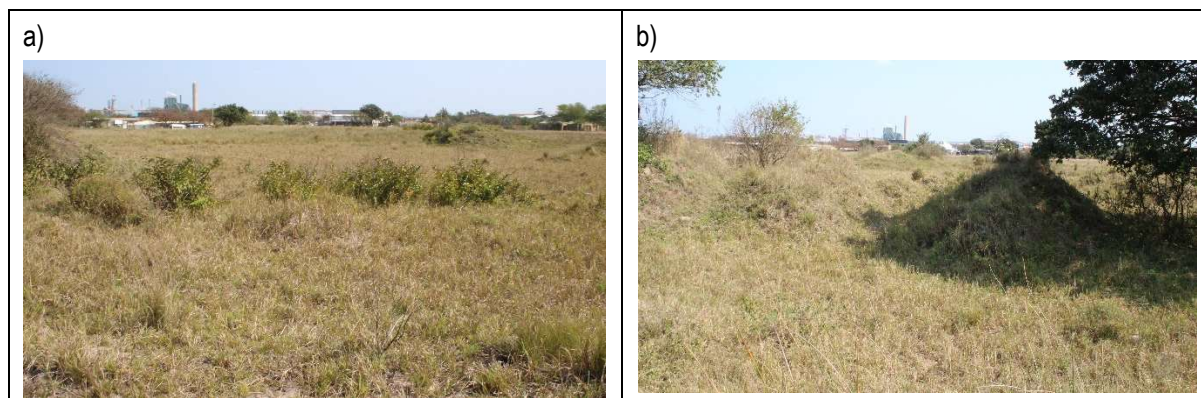
4. DESCRIPTION OF RECEIVING ENVIRONMENT

4.1. Locality

The development is proposed within the quarter degree grid cell 2832 CC and quaternary catchment W12F in the Alton industrial area of Richards Bay within the jurisdiction of the ULM and the KCDM, KZN Province.

The proposed 450MW RMPP and its associated infrastructure is located north of Kraft link, on the southern section of Erf 1854. With the centre point geographical coordinates at 28°45'58.62"S and 32°00'39.55"E. The proposed LPG storage terminal is located south of Kraft Link on Lot 1795 of the Richards Bay Industrial Park Portions 6-18 at centre point coordinates at 28°46'7.52"S and 32°00'44.11"E. The 450MW RMPP site will be accessed on the west side from the existing Kabelring road (Figure 4-2).

The 450MW RMPP and its associated infrastructure are proposed on an undeveloped area while existing mini-factories and warehouses exist on the proposed LPG Storage Terminal. These structures will be demolished in order to accommodate the proposed development (Figure 4-1).



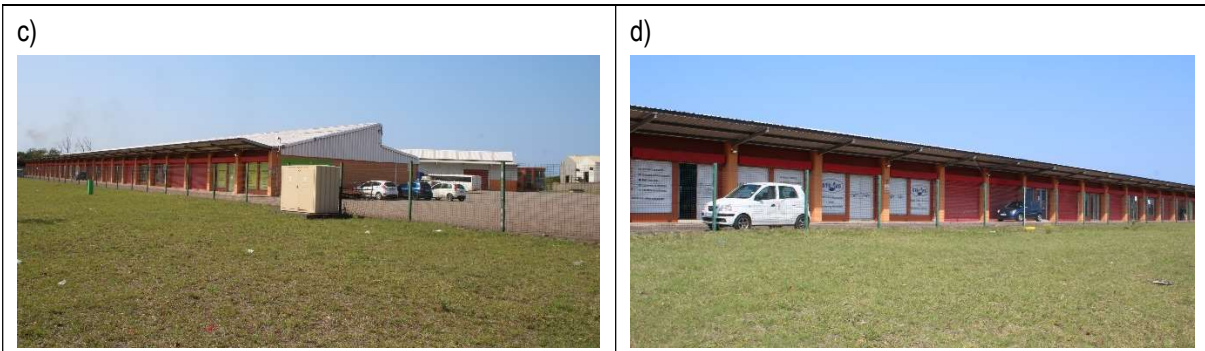


Figure 4-1. Land use where a) and b) depicts the undeveloped area proposed for the 450MW RMPP and associated infrastructure and c) and d) the existing mini-factories and warehouses on the proposed LPG Storage Terminal site.

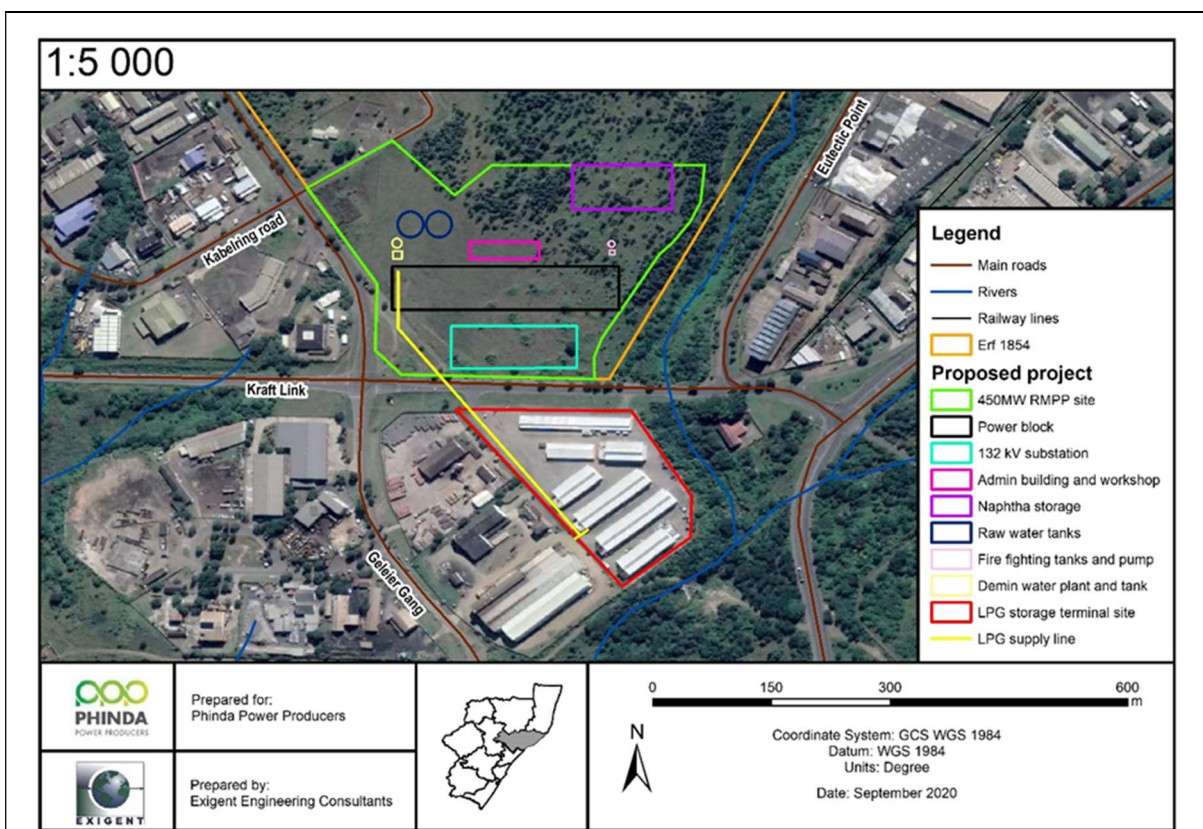


Figure 4-2. The proposed 450MW RMPP and associated infrastructure setting.

4.2. Biophysical description

4.2.1. Climate

The climate of the area can be described as summer rainfall towards the interior but comprise generally of a weak rainfall seasonality, especially closer to the coast. The development site experiences relatively high precipitation reaching mean annual precipitation values of approximately 1200 mm in coastal localities, decreasing to the

interior. High humidity and temperature are experienced during summer months with the mean maximum being 35.3 °Celsius and a mean winter temperature of 5.5 °Celsius. No incidence of frost is recorded within the development site (Mucina & Rutherford, 2006).

4.2.2. Geology and geography

The development site is generally characterised as a relatively flat landscape. It comprises of 18 000 years old quaternary sediments of marine origin mainly with yellowish and argillaceous redistributed sands of the Berea and Muzi Formations (Maputaland Group). The soils are nutritiously very poor and well leached, except in the interdune depressions where organic-rich soils are often present (Mucina & Rutherford, 2006). The main land types “Ha” and “Hb” present on site may include the Constantia, Shepstone and Vilafontes soil forms while the less distributed “Db” land type on site is associated with a wide variety of geological units such as the basement granites, Natal Group sandstones, Dwyka tillites, Ecca shales and sandstones, mudstones, shale and/or sandstones of the Escourt, Emakwezini, Nyoka, Ntabene and Clarens Formations, siltstone/sandstone of the Zululand Group and some Cenozoic deposits. The “Db” broad soil pattern is generally situated in low gradient slopes and are therefore prone to inundation/flooding. “Db” landtype unit is characterised by duplex soils with non-red B horizons (Council for Geoscience, 2012).

The site is underlain by the KwaMbonambi Formation which forms part of the Maputaland Group. The older Port Durnford Formation consists of mainly carbonaceous mudstone and claystones. The KwaMbonambi Formation consists of a variety of grey, orange and red sands. Peat occurs on the seaward, wetter margins of this formation (Roberts *et al.*, 2006). According to Grundling & Grobler (2005), peat accumulates mostly along the eastern and southern coastline and the eastern parts of the central plateau in wetter areas of the country. They are very rare and unique wetland types of Southern Africa that provide an important ecosystem habitat due to the diversity that they support, their size, distribution and threats (Grundling & Grobler, 2005). No peat soils were detected during the site visit.

The Agricultural Potential and Soils Impact Assessment Report conducted for the proposed study (Phipson, 2020) confirms that the proposed project site is underlain mostly by the Fernwood Soil Form whilst the Witbank Soil Form was classified below the building rubble and road building detritus mounds located on the proposed development site.

4.2.3. Hydrology

The development site falls within the Pongola to Mtamvuna Water Management Area (WMA, GN 1056 in GG 40279 of 16 September 2016). This WMA includes major rivers such as the Pongola, Mhlathuze, Mkuze, Thukela, Mvoti and Umgeni Rivers amongst various others, within the quaternary catchment W12F. The major water resources of the uMhlathuze Catchment is uMhlathuze and Nseleni rivers, Goedertrouw dam and several irrigation dams and impoundments, several lakes and pans (such as Lake Cubhu, Mzingazi Lake, Nhlabane Lake and Nsezi Lake), riparian areas along most of the riverine habitat, hillslope seepages, valley bottom wetland systems and Mhlathuze River Floodplain and Estuary. The most important wetland systems within the Umhlathuze Catchment are Mzingazi, Qhubu and Nhlabane Lake (as it supplies water to Richards Bay and surroundings), Mhlathuze Floodplain, Mhlathuze Estuary and its associated valley bottom wetland feeding into it, and Mountainous seeps in the upper reaches of Mhlathuze River (DWA, 2014).

The National spatial data (November, 2017) identifies several non-perennial rivers, lakes, vleis and open reservoirs in Alton of which only one perennial river runs directly adjacent to the 450MW RMPP and LPG Storage Terminal sites (Figure 4-3).

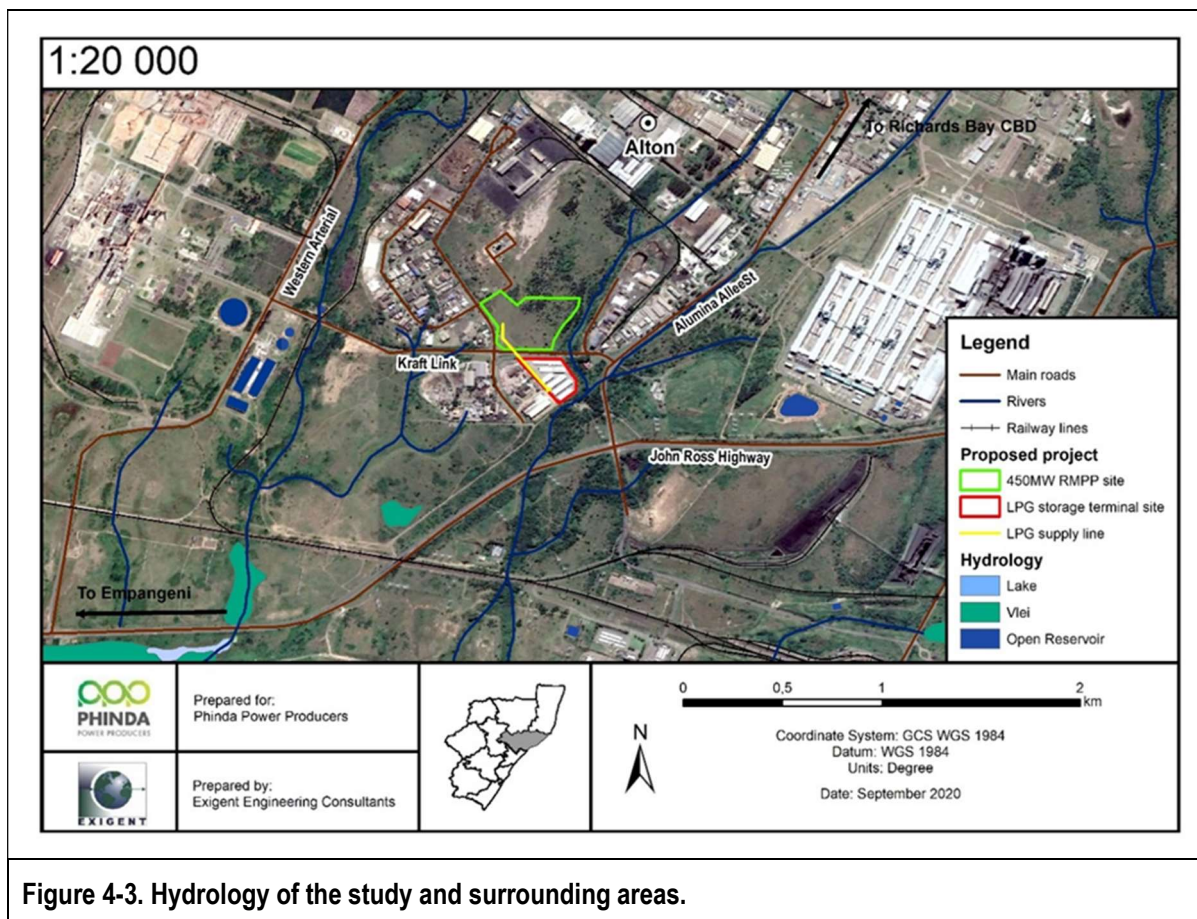


Figure 4-3. Hydrology of the study and surrounding areas.

Due to the waterlogged nature of the lower laying areas of the coastal plain, three major stormwater drainage channels were historically constructed to mitigate flooding and enable development in the Alton industrial area. One of these drainage channels forms the eastern boundary of the proposed development site. Although it has historically been artificially channelled, the channel bed is earthen and therefore functions as a natural wetland.

Based on ground truthing, four natural wetland units were identified within the DHSWS' 500 m regulated area. Two were classified as *Phragmites - Typha* channelled valley bottom wetlands; one located to the west of the proposed development site and the other along the eastern border of the site. Two *Imperata cylindrica* depression wetlands are located upstream on Erf 1854 at the northern boundary of the 500 m regulatory area. These depression wetlands will not experience change to one of the four main wetland drivers, viz. habitat, biota, flow and water quality by the proposed development therefore, no further assessment for the purposes of this development is required. The hydrology of the site is described in more detail in the Aquatic Biodiversity Impact Assessment Report (Exigent 2020).

4.2.4. General description of the vegetation of the area

The development site is located within the Indian Ocean Coastal Belt Biome, located within the Maputaland Coastal Belt vegetation type (Mucina & Rutherford, 2006). According to the National vegetation data (BGIS SANBI, 2018) and Ezemvelo KZN Wildlife (EKZNW, 2011), the 450MW RMPP and the associated infrastructure is located within the Maputaland Wooded Grassland. Both databases identify *Ficus trichopoda* swamp forest approximately 170 m to the west, outside of the proposed development area.

According to the Ecosystem Threat Status of the National Biodiversity Assessment (NBA, SANBI 2018) and EKZNW (2011) the Maputaland Wooded Grassland is classified as **Endangered**.

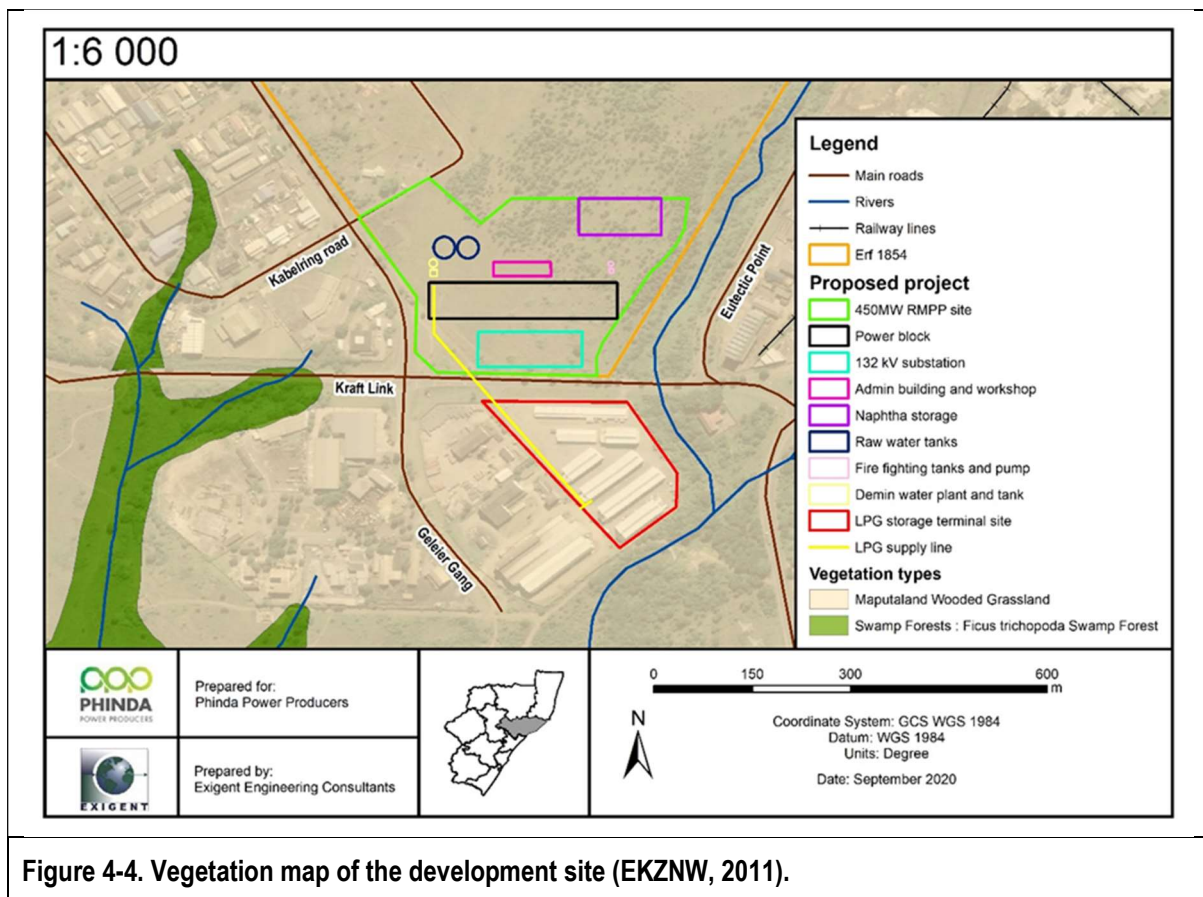


Figure 4-4. Vegetation map of the development site (EKZNW, 2011).

However, following ground truthing, much of the area identified as Maputaland Wooded Grassland is, in fact industrial development. Vegetation confirmed on the development site resembles that of Maputaland Wooded Grassland albeit the natural woody layer has been greatly reduced. Detailed vegetation descriptions are presented in Section 6.1 of this report.

5. METHODOLOGY

5.1. Desktop evaluation

Prior to conducting the development site visit, an initial level 1 (desktop) survey was done using Google Earth's map timeline function to detect changes in visible vegetation gradients. Maps are available from 2004-2019. Possible ecological sensitive features were identified, and GPS coordinates were noted to assist with the study area visit.

5.2. Literature review and database survey

A literature survey and database review were conducted to assist with the study. The full reference to resources used is listed in Section 13. The broad-scale national databases are used as baseline with focus then shifting to the available ULM databases.

Other relevant resources include:

- BRAHMS Online Website
- National Red List of Threatened Plants of South Africa (Raimondo et al., 2009)
- South African Bird Atlas Project 2 (SABAP2);

- Animal Demography Unit, MammalMAP/BirdMAP (AMU, 2019);
- The Red Data Book of the Mammals of South Africa: A Conservation Assessment (Friedmann and Daly (Eds), 2004);
- Floral, Mammal and Bird field guides and books.

5.2.1. National databases

The Integrated Biodiversity Information System (SIBIS) database from the South African National Biodiversity Institute (SANBI) contains information from several SANBI databases, namely:

- Acocks (plant species observations);
- Custodians of Rare and Endangered Wildflowers (CREW) (threatened plant species localities);
- DNA laboratories (plant and reptile DNA accessions);
- Garden Accessions (plant collection records);
- MSB (plant seed collection records);
- National Herbarium Pretoria (PRE) Computerised Information System (PRECIS) (taxonomy and herbarium specimens);
- Species Status (NEMBA-listed species);
- TSP (threatened plant species);
- National Freshwater Ecosystems Priority Areas (NFEPA) – (Nel *et al.*, 2011). This mapping product highlights potential rivers and wetlands that should be earmarked for conservation on a national basis;
- National Spatial Biodiversity Assessment (2018).

The SIBIS database provides information of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List status, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix listing or NEMBA Threatened or Protected Species (TOPS) status of the development site, on an interactive map.

NFEPA database includes various water and water related layers, including wetland delineation and vegetation data, catchment data, areas of high groundwater recharge and water management areas. Based on the NFEPA database, the development site lies within the Indian Ocean Coastal Belt Group 1 wetland vegetation type with a channelled valley bottom wetland located to the west, outside the development area. The NBA database classified the mid-section of this wetland unit as a unchannelled valley bottom wetland (SANBI, 2018) This wetland unit was located during the site visit and is described in the Aquatic Biodiversity Impact Assessment report (Exigent, 2020).

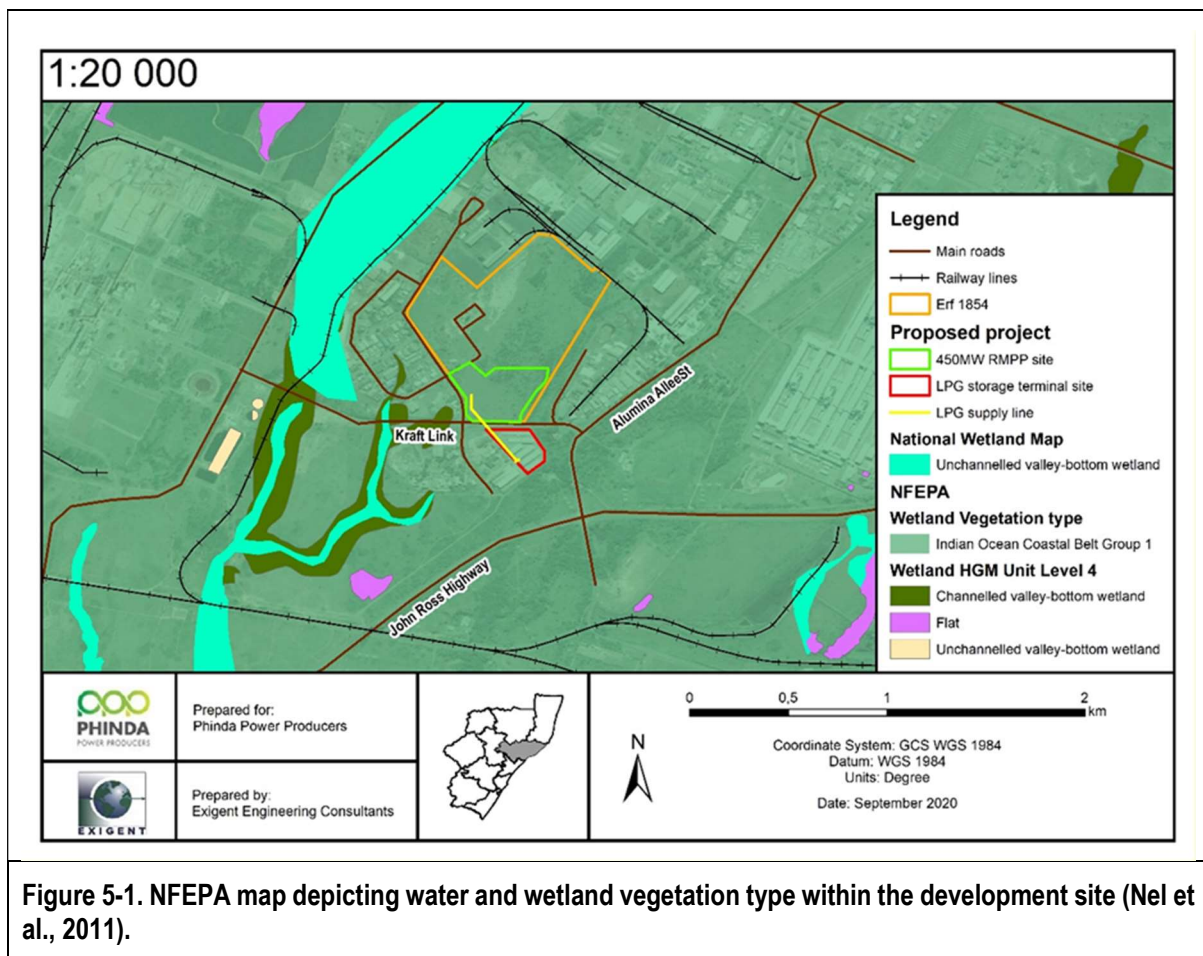


Figure 5-1. NFEPA map depicting water and wetland vegetation type within the development site (Nel et al., 2011).

The development is therefore proposed in the Indian Ocean Coastal Belt Group 1 but lies outside any wetlands identified in the NBA and NFEPA databases.

5.2.2. Provincial databases

The EKZNW Strategic Environmental Assessment (SEA) Database (2000) was used to model the distribution of a selection of 255 red data and endemic species. The species listed in Section 9 are those SEA species that have the potential to occur in the area.

The EKZNW Conservation Plan (C-Plan) was used in a GIS assessment of the development site. This database includes the layers of the following databases:

- National Land Cover 2000 (ver.1.2) edited for errors known to occur in provincial protected areas (January 2004);
- Provincial and national protected areas of the province (EKZNW);
- National Vegetation Map (BGIS SANBI, 2018);
- Forests of KZN (EKZNW, 2003);
- Wetlands of KZN (EKZNW, 2004);
- Biophysical data from Schulze, R.E. (1997);
- South African Atlas of Agrohydrology and Climatology. Water Research Commission, Pretoria; and
- Species distributions from Ezemvelo KZN Wildlife's Biodiversity database and supplemented by species specialist group records and inputs (EKZNW).

The first use of the conservation planning analysis in C-Plan is an **irreplaceability map** of the planning area. This map is divided into 2 x 2 km grid cells called 'planning units'. Each cell has associated with it an 'Irreplaceability Value' which is one reflection of the cell's importance with respect to the conservation of biodiversity. Irreplaceability reflects the planning units' ability to meet set 'targets' for selected biodiversity 'features' (EKZMW, 2004, Incomplete Draft). Where a planning unit has an irreplaceability value of 0, all biodiversity features recorded here are conserved to the target amount within reserves in South Africa, and there is unlikely to be a biodiversity concern with the development within the development site. An irreplaceability value of 1 would imply there are various issues of biodiversity concern within the development site, which requires conservation and, therefore, development of the site is not recommended.

Minset is a feature that is utilized within the C-Plan. This tool uses a minimum amount of study areas to optimize the achievement of conservation targets by placing numerous constraints on the users. It presents the most efficient solution to achieving conservation targets and other land use constraints (EKZMW, 2011).

The EKZMW Minset data classifies the major conservation areas into 4 main categories:

Critical Biodiversity Area (CBA) Mandatory: These are areas that have no other options than to meet their required biodiversity targets for both the biodiversity patterns and the ecological process features. This category is subdivided into two sets, depending on the irreplaceability of the area.

- CBA 1 Mandatory areas have an irreplaceability score that is equal to 1, meaning that the area is highly irreplaceable.
- CBA 2 Mandatory areas have an irreplaceability score that lies between 0.8 and is smaller than 1.

CBA Optimal: These areas are ideal areas to meet their biodiversity conservation targets whilst aiming to avoid high cost areas. This classification is allocated to areas with an irreplaceability score that lies between 0 and 0.8. This category as well as the CBA Mandatory Areas are determined by the National Threatened Ecosystems, the National and KZN Protected Area Expansion Strategy, the KZN threatened Ecosystems, Forests and macro-ecological corridors that are in areas that are under great environmental pressures.

Ecological Support Areas (ESA): Areas that are not essential for meeting biodiversity targets directly. However, they do play an important role in supporting and sustaining the ecological functioning of the CBAs. These areas are determined by the macro-ecological corridors.

Ecological Infrastructure (EI) or previously known as Ecosystem Goods and Service Areas (EGSA): These are areas that are classified as natural/near natural vegetation which has the capability of delivering important ecosystem goods and services to the KZN province and the inhabitants of the land.

Based on the EKZMW CBA data, the 450MW RMPPP Power Plant and LPG Storage Terminal sites are proposed within an irreplaceable area (Figure 5-2). These areas are considered critical for meeting biodiversity targets and thresholds and are required to ensure the persistence of viable populations of species and the functionality of ecosystems. The Land use management objectives are to maintain these areas in a natural state with limited to no biodiversity loss (EKZMW, 2016).

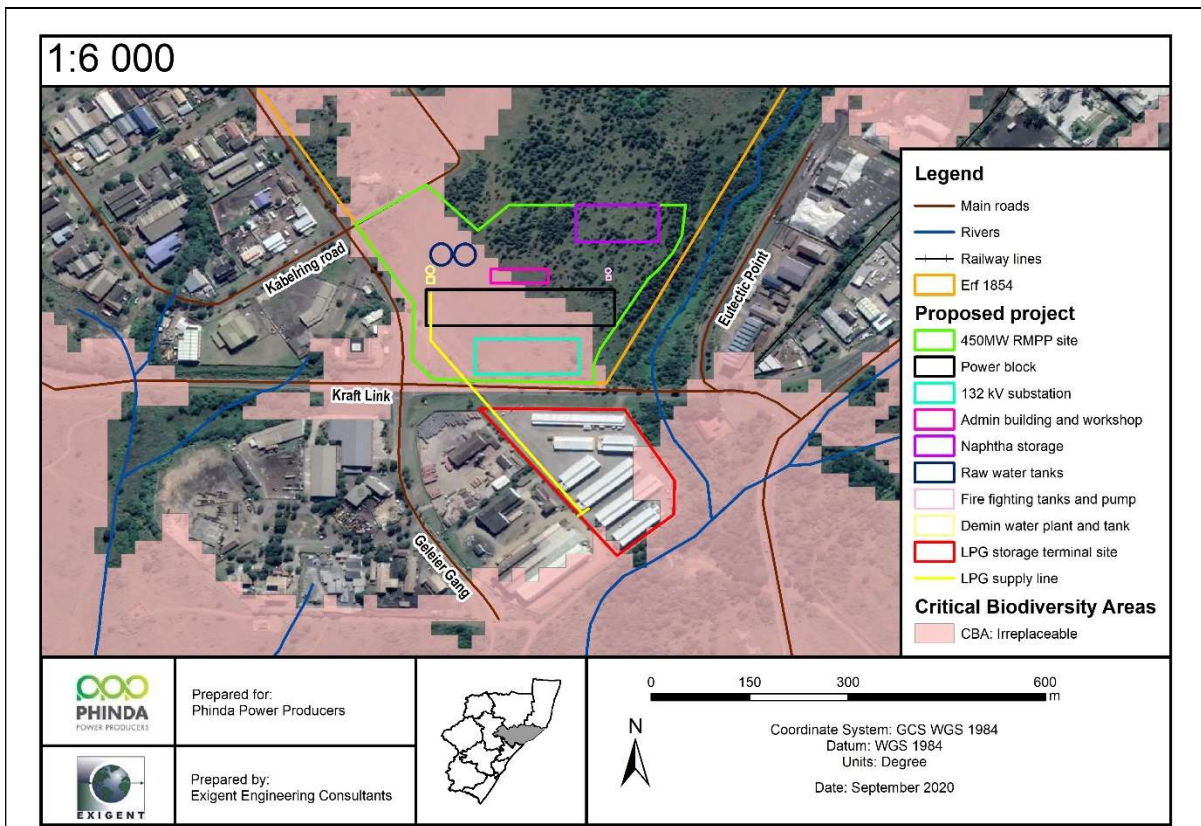


Figure 5-2. Critical Biodiversity Areas present in the study area.

According to EKZNW (2016), the planning units (PU) identified in these CBA's represents the localities for one or more biodiversity feature for which conservation targets can be achieved. The distribution of the biodiversity features is not always applicable to the entire extent of the PU but is more often confined to a specific niche habitat e.g. a forest or wetland reflected as a portion of the PU.

As seen by the pixelated blocks and inclusion of transformed industrial areas in Figure 5-2, these CBA areas are provincially mapped at a large scale. The site may have been incorrectly classified as CBA due to an error in the land cover map, or alternatively a disturbance to the site has occurred subsequent to the development of the CBA Map. The site must be assessed for its potential to be rehabilitated and/or its role as part of a landscape corridor and the potential presence of protected species. Further, the proposed activity at the site should be investigated in terms of its potential impact on adjacent correctly classified CBA and ESA's.

Recommended mitigation such as the exclusion of the wetland and its associated buffer zone from the proposed project and implementation of specific mitigation measures, as presented in section 10.3 of this report, as well as the Aquatic Biodiversity Impact Assessment report (Exigent, 2020), may allow for sufficient conservation of this PU as well as allow for development within the proposed project footprint.

Following ground truthing, no protected species were observed during the site visit, however searches for the potential species will be continued during follow-up site visits. The relevance of the PU in the context of the CBA will be further assessed in the EIA phase of the project.

1.1.1. Local databases

The aim of the uMhlathuze Environmental Services Management Plan (ESMP) is to provide the municipality with a clear understanding of activities that need to be undertaken to protect and enhance the supply of environmental services in the area. Based on the final 2016/2017 uMhlathuze Spatial Development Framework (SDF), the two critical goals of the ESMP are:

- *'To define cohesive and functional spatial management units within the municipal area that need to be managed in order to optimise the delivery of environment services.'*
- *'To develop management plans for each management unit that identify the management activities required to secure environmental services supply.'*

The areas that provide environmental services to the City are spatially defined, and the following "Levels" of protection were determined:

Nature Reserves (Level 1): These are areas of high biodiversity and environmental significance that require a high level of legal protection. Included are unique habitats or areas that are considered important at International, National or Provincial level; estuaries, lakes, major wetlands, natural forests, coastal buffers and critically endangered habitats that are protected in terms of international or national legislation and/or treaties. It is recommended that these areas be proclaimed as nature reserves in terms of relevant legislation such as the National Environmental Management Protected Areas Act.

Conservation Zone (Level 2): Areas of biodiversity / environmental significance, which are not viable for proclamation as nature reserves, but that require some form of legal protection. Included are unique or regionally important natural habitats; wetland and forest areas that are protected in terms of national legislation; and all areas that fall within the 1:100-year flood line. No transformation of the natural assets or the development of land for purposes other than conservation should be permitted in this zone. Sustainable use of renewable resources is permitted.

Open Space Linkage Zone (Level 3): Included in the open space linkage zone are areas that provide a natural buffer for Level 1 and 2 Zones, areas that provide a natural link between Level 1 and 2 Zones and areas that supply, or ensure the supply of, significant environmental services. Transformation of natural assets and the development of land in these zones should only be permitted under controlled conditions.

Development Zone (Level 4): Includes all areas that are not included in Level 1, 2 and 3 zones. Areas in this zone are either already developed or transformed and contain land and natural assets that are not critical for environmental service supply. However, it is recognised that the development of these zones can impact on environmental services supply. As such, they should be developed in a manner that supports, or at least does not adversely impact on, the sustainability of environmental service supply in Level 1, 2 and 3 zones.

According to this finer scale local environmental plan database, the proposed development site lies within a development zone (Level 4). Areas earmarked as Municipal conservation zones (Level 2) and its associated open space linkage zones (Level 3) lies east of the proposed 450MW RMPP and LPG Storage Terminal sites. Even though portions of these zones were historically channelled to drain the Alton area, they are linked to the swamp forest and other aquatic habitats identified in the Aquatic Biodiversity Impact Assessment report (Exigent, 2020).

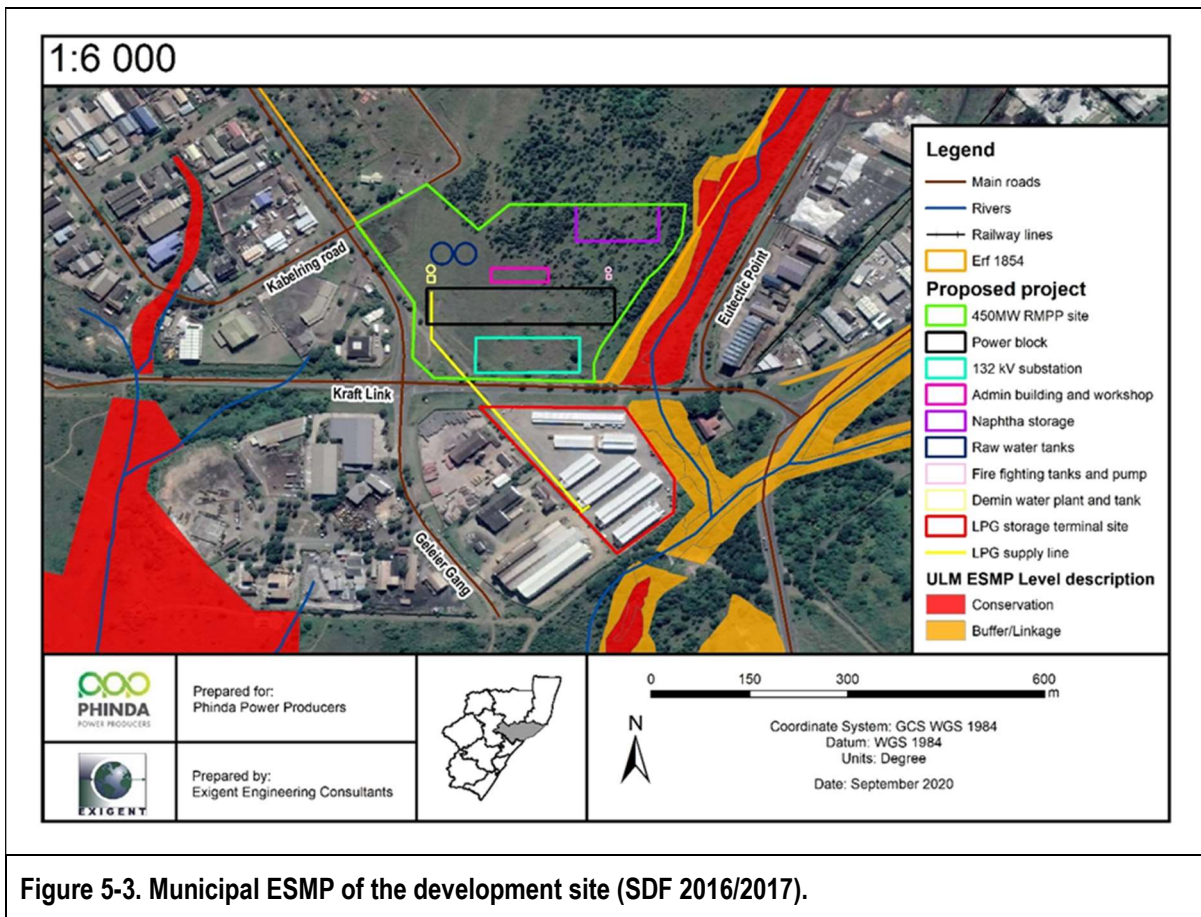


Figure 5-3. Municipal ESMP of the development site (SDF 2016/2017).

Based on Figure 5-3, the proposed development sites are located within development zones and outside the Municipal ESMP Conservation and buffer/linkage zones.

5.3. Vegetation assessment

Prior to the site investigation, the development site was stratified into relatively homogeneous vegetation/habitat units based on the morphology of the terrain and the growth-form of the vegetation. This was done with the help of 1:50 000 topographical maps and Google earth aerial photos of the development site. The actual site surveys were conducted during 18-20 September 2019 and 28 to 31 January 2020. Species lists were compiled during the site visits to ensure that representative species observed were captured. A follow-up site visit is planned prior to the submission of the Terrestrial Biodiversity Impact Assessment Report during the EIA phase of the project.

5.3.1. Protected tree species under the National Forest Act 1998 (Act 84 of 1998)

On 7 September 2014, Regulation 716 was gazetted under the National Forest Act, 1998 which stated that in terms of Section 15(1) of the National Forests Act, 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated.

Government Notice 536 of 2018 of the NFA lists several protected trees species and the various species which requires a license. Species with the potential to occur on the development site, which requires a license has been described in Section 9.3. None of these species protected in terms of the NFA were however observed on the proposed development site.

5.4. Faunal assessment

Fauna distribution data were obtained from various available databases, publications and field guides to ascertain the historical occurrence of species within 2832CC.

5.4.1. Mammal Assessment

Species specific information and mammal distribution data were primarily obtained from the following sources:

- Mammals of Southern African Subregion (Skinner and Chimimba, 2005);
- The 2016 Red List of Mammals of South Africa, Lesotho and Swaziland (www.ewt.org.za);
- ADU's MammalMap (mammalmap.adu.org.za); and

As most mammal species are secretive, nocturnal, hibernators and/or seasonal, the presence or absence of mammalian species with the development site will be determined from trapping, the visual sightings of indirect indicators such as spoor, burrows, tracks and scats or deduced from available of suitable habitat.

Small Mammal trapping

Surveys for small mammals will be conducted from 07:00 – 11:00 and 16:00 – 19:00 daily for 3 days as part of the detailed EIA investigations. Traps will be spatially representing the development site. The methodology below describes the approach used during this study:

Pitfall traps:

Equipment used:

- GPS
- Camera
- Yellow non-toxic paint
- 12 x 20L buckets (4 buckets per trap in 3 different habitat types)
- 45 Anchor poles (15 poles, 1 m apart in 3 different habitat types)
- 40 m drift fence – hessian sheeting (+-13 m per trap in 3 different habitat types)

Field work:

- Installation:
 - Buckets will be buried with the rim flush with the surrounding soil level;
 - The drift fence will be secured to the anchor poles to guide the small mammals into the buckets; and
 - GPS Coordinates of centre bucket will be recorded.
- Site visit:
 - Traps will be checked during morning and evening site visit for 3 days;
 - For each individual captured, information will be recorded including the pitfall trap location, species captured, a photograph of the individual as well as signs of previously captured.
 - A hair clipping will be done prior to release, starting at the left shoulder, if already clipped, clip the right shoulder, then left hip followed by the right hip, as necessary.

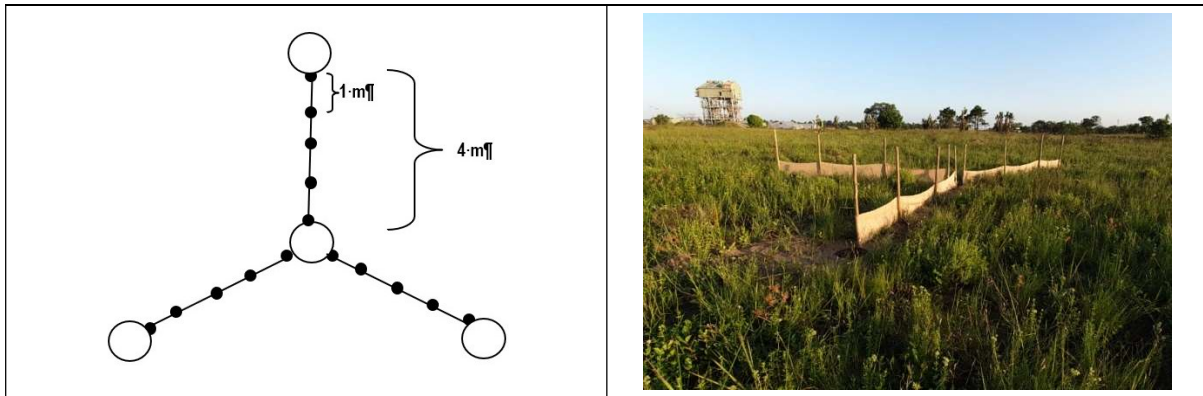


Figure 5-4. Pitfall traps to be used to trap small mammals where a) represents a schematic drawing and b) example of installed pitfall traps on a site.

Live rodent traps

Equipment used:

- Camera
- 30 rodent traps
- Sharp scissors
- Hessian bag
- Leather gloves
- Peanut butter and oats as bait

Fieldwork:

- Installation:
 - 10 numbered live rodent traps will be placed in a transect, approximate 10 m apart.
 - GPS Coordinates of each trap will be recorded.
- Site visit:
 - Traps will be checked during morning and evening site visit for 3 consecutive days.
 - For each individual captured, information recorded will include the trap number, species captured, a photograph of the individual as well as signs of previously captured.
 - A hair clipping will be done prior to release, starting at the left shoulder, if already clipped, clip the right shoulder, then left hip followed by the right hip, as necessary.
 - Peanut butter and oats balls will be replaced inside the traps as bait and replaced as necessary.

5.4.2. Avifaunal Assessment

Flight enables larger distribution ranges for birds, therefore it is critical to consider areas broader than the development site. In this study, distribution data from pentads 2840_3200 and 2845_3200 were included. Pentads are 5-minute x 5-minute coordinate grid super-imposed over the continent for spatial reference (SABAP2). Principal avifaunal distribution sources and information were obtained from:

- The First and Second South African Bird Atlas Project (SABAP1 and SABAP2, Harrison *et al.*, 1997, <http://sabap2.adu.org.za>);
- Bird Life South Africa Area (IBA) Directory (Barnes, 1998);
- The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland (Taylor *et al.*, 2015);
- Newmans Birds of Southern Africa (Newman, 2010); and
- Roberts Birds of Southern Africa (Hockey *et al.*, 2005).

Birds will be identified through direct observation in all areas of the proposed development site. Scanning for soaring birds will take place sporadically during the field investigation.

5.4.3. Herpetofauna Assessment

Herpetofauna distribution data was primarily obtained from:

- SARCA (sarca.adu.org.za);
- A Guide to the Reptiles of Southern Africa (Alexander and Marais, 2007);
- A Complete guide to snakes of Southern Africa (Marais, 2004);
- Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland (Bates *et al.* 2014);
- A Complete guide to the Frogs of Southern Africa (du Preez & Carruthers, 2009);
- FrogMAP (frogmap.adu.org.za); and
- Atlas and Red Data Book of Frogs of South Africa, Lesotho and Swaziland (Mintnet *et al.*, 2004).

As herpetofaunal animals are ectotherms (moves in and out of the sun to control their body temperature), secretive, nocturnal and/or seasonal, the presence of suitable habitats within their distribution ranges were used to determine the probability of occurrence of species.

Diurnal surveys for reptiles and frogs will include upturning of rocks, stones, toppled trees and other retreats such as wooded and moist areas.

5.5. Red data species/CITES assessment

The available habitat on the development site was compared to the habitat requirements of all Red Data flora and fauna species potentially occurring in the area. Based on this assessment, Red Data species with a probability of occurring on the development site were identified.

6. RESULTS

The EKZNW Guideline for Biodiversity Impact Assessments (2013) requires that specialist studies be conducted during the summer season (beginning of November to end of April). The initial biodiversity field investigation took place in spring and summer during 18-20 September 2019 and 28-31 January 2020 within the preferred sampling period.

During the field investigations in September 2019, a veld fire raged through a large portion of the development site. The veld recovered sufficiently after good rains to conclude the investigations in January and gain an understanding of the dynamics of the biodiversity of the proposed development site. A follow-up site visit is planned prior to the submission of the Terrestrial Biodiversity Impact Assessment Report during the EIA phase of the project.

6.1. Vegetation assessment

Following ground truthing, the vegetation was broadly classified into two vegetation communities, namely *Helichrysum - Chrysanthemoides* coastal grasslands (Figure 6-1), and a small portion of the site consisted of *Eucalyptus* plantations. A *Phragmites - Typha* channelled valley bottom wetland community was observed on the eastern border of the site, and the Closed coastal woodland vegetation community was identified south of the proposed LPG Storage Terminal but does also not impede into the site. The wetland vegetation community and its functionalities are described in the Aquatic Biodiversity Impact Assessment report (Exigent, 2020).

The LPG Storage Terminal comprise of hard surface and is completely transformed.

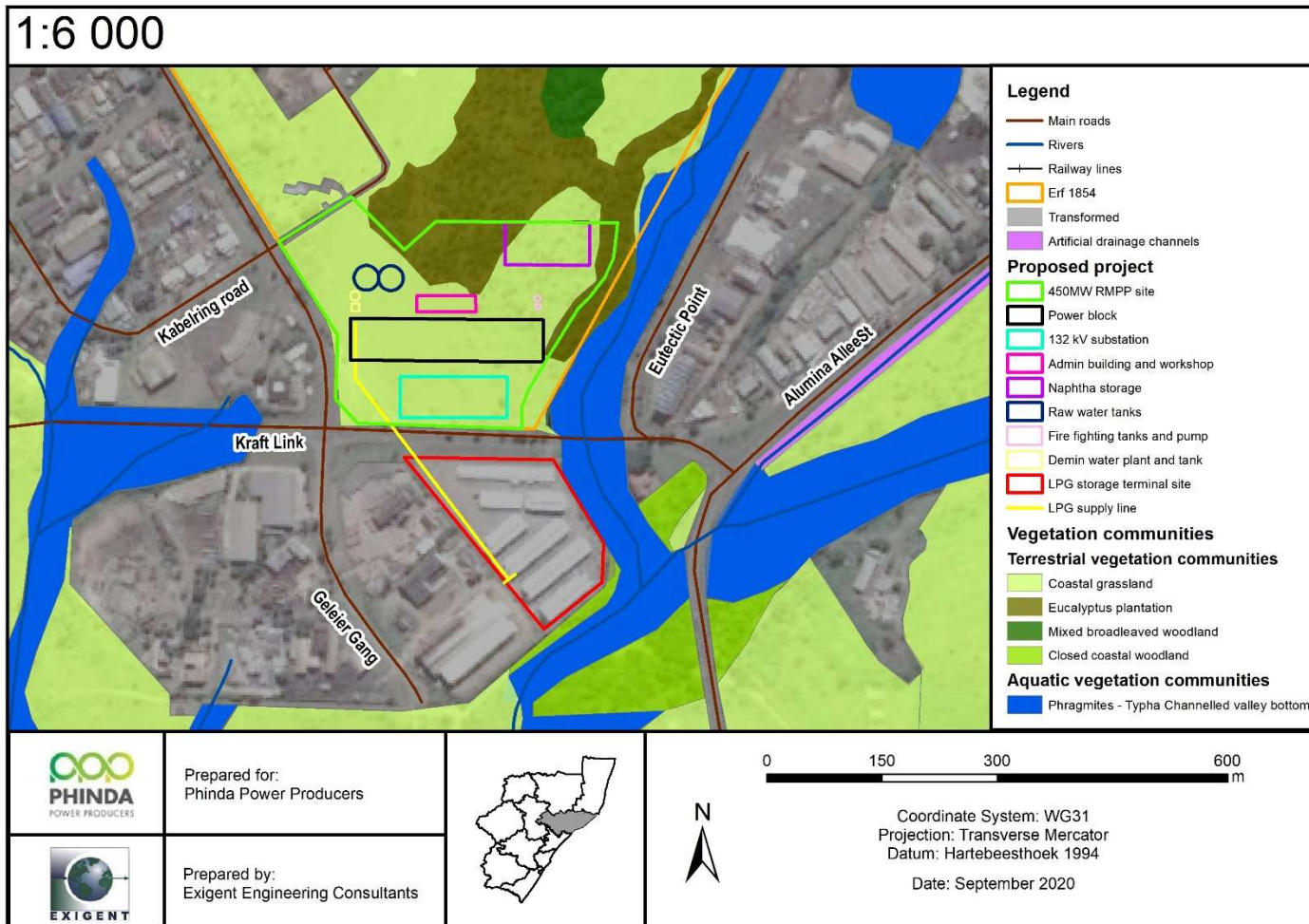


Figure 6-1. Vegetation communities identified within the development site following ground truthing.

6.1.1. Helichrysum - Chrysanthemoides coastal grasslands

Approximately 6,99 hectares of the 11,4 hectare development site consists of *Helichrysum - Chrysanthemoides* coastal grasslands. It is dominated by shrubs such as *Helichrysum krausii* and *Chrysanthemoides monolifera* subspecies *rotundata* and invaders such as *Psidium guajava*, *Cuscuta campestris*, *Chromolaena odorata* and *Lantana camara* were only recorded in close proximity to and along tracks and road edges. Several *Crinum stuhlmannii* individuals, protected in terms of the KZN Nature Conservation Ordinance, were located in this vegetation community outside of the proposed development footprint. None were recorded in the proposed development footprint, however searches for this species will be continued during follow-up site visits in the EIA phase of the project. A list of species recorded is presented in Table 7-1 below.

The proposed development site has a long history of transformation, from being surveyed in 1909 as Reserve No. 6 surrounded by Crown Land, 1937 used for agriculture with the presence of human settlement and confirmation of these settlements on maps from 1964. The topographic map of 1984 shows the area as an industrial zone (HIA, Anderson, 2019) with plantations. Aerial imagery from 2004 indicates that this area has been transformed through the process of succession from *Eucalyptus* plantations to the good condition secondary coastal grassland present on site today. Cattle was observed grazing the site daily (Figure 6-2).

Table 6-1. Helichrysum - Chrysanthemoides coastal grasslands

Status:	Good condition secondary coastal grasslands.	
Red List and Declining species:	None were recorded in the proposed development footprint. Several <i>Crinum stuhlmannii</i> individuals were recorded outside the proposed development footprint. Searches for this species will be continued inside the development footprint during follow-up site visits in the EIA phase of the project.	
Conservation importance:	Medium.	
Species:		
Trees	Shrubs and Herbs	Shrubs and Herbs
<i>Annona senegalensis</i>	<i>Amaranthus spinosus</i>	<i>Lantana camara</i>
<i>Erythrina caffra</i>	<i>Bidens pilosa</i>	<i>Lobelia coronopifolia</i>
<i>Eucalyptus</i> species	<i>Bidens bipinata</i>	<i>Smilax anceps</i>
<i>Parinari capensis</i> subspecies <i>incohata</i>	<i>Catharanthus roseus</i>	<i>Solanum mauritianum</i> *
<i>Psidium guajava</i> *	<i>Chamaecrista mimosoides</i>	<i>Sonchus oleraceus</i>
<i>Syzygium cordatum</i>	<i>Crinum stuhlmannii</i>	<i>Pachycarpus concolor</i>
<i>Vachellia natalitia</i>	<i>Chrysanthemoides</i> subspecies <i>rotundata</i>	<i>Parthenium hysterophorus</i> *
Grasses and sedges	<i>Chromolaena odorata</i>	<i>Pentanisia prunelloides</i>
<i>Aristida stipitata</i>	<i>Conyza bonariensis</i>	<i>Pteridium aquilinum</i>
<i>Cynodon dactylon</i>	<i>Cuscuta campestris</i>	<i>Richardia brasiliensis</i>
<i>Cyperus esculentus</i>	<i>Gomphocarpus fruticosus</i>	<i>Tagetes minuta</i>
<i>Cyperus obtusiflorus</i>	<i>Gomphrena celosioides</i>	<i>Taraxacum officinale</i>
<i>Digitaria eriantha</i>	<i>Helichrysum krausii</i>	<i>Tephrosia lupinifolia</i>
<i>Diheteropogon amplexans</i>	<i>Helichrysum setulosum</i>	<i>Verbena bonariensis</i>
<i>Eragrostis racemosa</i>	<i>Hibiscus trionum</i>	<i>Wahlenbergia grandiflora</i>
<i>Imperata cylindrica</i>	<i>Hypoxis hemerocallidea</i>	
<i>Ischaemum fasciculatum</i>	*	
<i>Melinis repens</i>		
<i>Pennisetum clandestinum</i>		
<i>Perotis patens</i>		
<i>Stenotaphrum secundatum</i>		
<i>Themeda triandra</i>		

* Alien/invasive species



Figure 6-2. Photographic evidence of the *Helichrysum - Chrysanthemoides* coastal grasslands present in the development site.

6.1.2. Closed coastal Woodland community

A Closed coastal woodland vegetation community was identified south of the proposed LPG Storage Terminal and therefore will not be directly impacted through the proposed construction activities. This community's natural vegetation is mostly replaced by an alien, invasive and ruderal species undergrowth. Species such as *Brachylaena discolor*, *Bridelia micrantha*, *Salacia kraussii*, *Phoenix reclinata*, *Rhus natalensis*, *Trema orientalis* and *Ziziphus mucronata* were recorded. The edges of this community comprise of dense thickets of *Chromolaena odorata* and *Lantana camara*. Other dominant alien species include *Melia azedarach*, *Solanum mauritianum* and *Ricinus communis*. Footpaths traverse this area and numerous informal structures were observed. A servitude with a gravel track bisects this vegetation. A list of species recorded is presented in Table 6-2 below.

Table 6-2. Closed Coastal Woodland

Status:	Degraded closed coastal woodland.	
Red List and Declining species:	None observed	
Conservation importance:	Medium	
Species:		
Trees	Shrubs and Herbs	Shrubs and Herbs
<i>Annona senegalensis</i>	<i>Amaranthus spinosus</i>	<i>Lantana camara</i>
<i>Diospyros natalensis</i>	<i>Bidens pilosa</i>	<i>Lobelia coronopifolia</i>
<i>Erythrina caffra</i>	<i>Bidens bipinata</i>	<i>Smilax anceps</i>
<i>Eucalyptus</i> species	<i>Catharanthus roseus</i>	<i>Solanum mauritianum</i> *
<i>Hyphaene coriacea</i>	<i>Chamaecrista mimosoides</i>	<i>Sonchus oleraceus</i>
<i>Melia azedarach</i>	<i>Chromolaena odorata</i>	<i>Parthenium hysterophorus</i> *
<i>Phoenix reclinata</i>	<i>Conyza bonariensis</i>	<i>Pentanisia prunelloides</i>
<i>Psidium guajava</i> *	<i>Gomphrena celosioides</i>	<i>Richardia brasiliensis</i>
<i>Rhus natalensis</i>	<i>Helichrysum kraussii</i>	<i>Tagetes minuta</i>
<i>Strelitzia nicolai</i>	<i>Hibiscus trionum</i>	<i>Taraxacum officinale</i>
<i>Syzygium cordatum</i>	Grasses and sedges	<i>Tephrosia lupinifolia</i>
<i>Trichillia emetica</i>	<i>Aristida stipitata</i>	<i>Verbena bonariensis</i>
<i>Vachellia natalitia</i>	<i>Cynodon dactylon</i>	
<i>Ziziphus mucronata</i>	<i>Digitaria eriantha</i>	

	<i>Eragrostis racemosa</i>	
	<i>Imperata cylindrica</i>	
	<i>Ischaemum fasciculatum</i>	
	<i>Melinis repens</i>	
	<i>Pennisetum clandestinum</i>	

* Alien/invasive species

6.1.3. *Eucalyptus* Plantations

Eucalyptus plantations occupy approximately 1,29 hectares of the development site. It is remnants of a historical plantation (Figure 6-3).

Table 6-3. *Eucalyptus* Plantations

Status:	Transformed	
Red List and Declining species:	None observed.	
Conservation importance:	Low	
Species:		
Trees	Grasses	Shrubs and Herbs
<i>Eucalyptus</i> species*	<i>Cynodon dactylon</i>	
	<i>Imperata cylindrica</i>	

* Alien invasive species



Figure 6-3. *Eucalyptus* plantation after the veldfire in September 2019.

6.2. Fauna assessment

6.2.1. Small - Mammal Assessment

Generally, mammal distribution correlates with vegetation biomes defined by VEGMAP (2018), Mucina and Rutherford (2006) and those authors preceding but local occurrences are more dependent on broad-scale habitat types such as terrestrial, arboreal and aquatic. Terrestrial habitat is the most abundant and provides habitat to a vast variety of small mammals such as rodents, shrews, mongooses etc. At present, large mammals are only expected in protected and privately owned reserves therefore generally excluded in mammal assessments for urban developments. Arboreal habitat is represented by trees, often used by bats while shrews occasionally find refuge in vegetation associated with water bodies of aquatic habitats.

Approximately 48 species have the potential to use the development site and its surrounding areas (Addendum A). Fourteen species previously observed in the Degree Grid 2832CC and recorded on the MammalMap is provided in Table 6-4.

Table 6-4. Mammal species previously recorded in Degree Grid 2832CC (MammalMAP).

Group name	Group species	Species name	Observation
Monkey	Vervet Monkey	<i>Chlorocebus pygerythrus</i>	MammalMap (2012, 2013, 2015, 2016, 2018, 2019)
Leopard	Leopard	<i>Panthera pardus</i>	MammalMap (2016)
Hippopotamus	Common Hippopotamus	<i>Hippopotamus amphibius</i>	MammalMap (2016)
Otter	African Clawless Otter	<i>Aonyx capensis</i>	MammalMap (2016)
Mongoose	Marsh Mongoose	<i>Atilax paludinosus</i>	MammalMap (2015, 2018)
Mongoose	Slender Mongoose	<i>Herpestes sanguineus</i>	MammalMap (2017)
Mongoose	Banded Mongoose	<i>Mungos mungo</i>	MammalMap (2015, 2016, 2017, 2018, 2019)
Mouse	Natal Multimammate mouse	<i>Mastomys natalensis</i>	MammalMap (2016) <i>Helichrysum - Chrysanthemoides coastal grasslands</i>
Mouse	South African pygmy mouse	<i>Mus (Nannomys) minutoides</i>	MammalMap (2003) <i>Phragmites – Typha channelled valley bottom wetland</i>
Mouse	South Africa pouched mouse	<i>Saccostomus campestris</i>	MammalMap (2016)
Shrew	Reddish-grey musk shrew	<i>Crocidura cyanea</i>	MammalMap (2016)
Rat	Greater cane rat	<i>Thryonomys swinderianus</i>	MammalMap (2011)
Genet	Cape large spotted genet	<i>Genetta tigrina</i>	MammalMap (2016)
Bat	Epauletted fruit bats	<i>Epomophorus sp.</i>	MammalMap (2015)
Bat	Egyptian free-tailed bat	<i>Tadarida aegyptiaca</i>	<i>Phragmites – Typha channelled valley bottom wetland</i>

6.2.2. Avifauna Assessment

Approximately 358 bird species have been recorded in pentads 2840_3200 and 2845_3200 (Addendum A, SABAP2) of which 12 were observed during this study's site investigation (Table 7-6). None are protected or species of concern. The diversity is expected to be high due to the Richards Bay Game Reserve Important Bird Area (IBA) located approximately 3,4 km south of the development site. The proposed development is however unlikely to impact on any individuals of the area.

Table 6-5. Bird species observed in the development site.

Group name	Group species	Species name	Observation
Barbet	Black-collared	<i>Lybius torquatus</i>	<i>Phragmites – Typha channelled valley bottom wetland</i>
Barbet	White-eared	<i>Stactolaema leucotis</i>	<i>Phragmites – Typha channelled valley bottom wetland</i>
Bishop	Southern Red	<i>Euplectes orix</i>	<i>Phragmites – Typha channelled valley bottom wetland</i>
Bulbul	Dark-capped	<i>Pycnonotus tricolor</i>	All habitats
Buzzard	Steppe	<i>Buteo vulpinus</i>	<i>Helichrysum - Chrysanthemoides coastal grasslands</i>
Crow	Pied	<i>Corvus albus</i>	<i>Helichrysum - Chrysanthemoides coastal grasslands</i>
Ibis	Hageda	<i>Bostrychia hagedash</i>	<i>Helichrysum - Chrysanthemoides coastal grasslands</i>
Lark	Rufous-naped	<i>Mirafra africana</i>	<i>Helichrysum - Chrysanthemoides coastal grasslands</i>
Long-claw	Yellow throated	<i>Macronyx croceus</i>	<i>Helichrysum - Chrysanthemoides coastal grasslands</i>
Mousebird	Speckled	<i>Colius striatus</i>	<i>Phragmites – Typha channelled valley bottom wetland</i>
Nightjar	Fiery-necked	<i>Caprimulgus pectoralis</i>	<i>Phragmites – Typha channelled valley bottom wetland</i>
White-eye	Cape	<i>Zosterops capensis</i>	<i>Phragmites – Typha channelled valley bottom wetland</i>

6.2.3. Herpetofauna Assessment

Several herpetofauna species have a distribution range in the area (Addendum A). 23 reptile species and 53 frog species were previously observed in the grid cell 2832CC and recorded on the South African Reptile Conservation Assessment (SARCA) and South African Frog Atlas databases respectively.

7. MEDICINAL PLANT SPECIES

Table 7-1 below indicate the medicinal species that were found in the development site (Van Wyk et al. 2000; Van Wyk & Gericke 2003). These species are common and are widespread in their distribution.

Table 7-1. Medicinal species observed on the development site.

Species name	Common name	Use
<i>Catharanthus roseus</i>	Madagascar periwinkle	Used to treat diabetes, rheumatism and various forms of cancer including breast cancer, urine cancer, as well as Hodgkin's and non-Hodgkin's lymphoma.
<i>Gomphocarpus fruticosus</i> .	Milkweed	Leaves are used as snuff and as a sedative in the treatment of headache and tuberculosis. Roots are used to relieve stomach pain and general aches in the body. The floss is sometimes used for stuffing
<i>Helichrysum</i> species	Daisy family	Tea is prepared or the leaves boiled in milk to treat coughs and colds. The smoke from burning the leaves are inhaled for pain relief while the leaves are used on wounds to prevent infection.
<i>Psidium guajava</i>	Guava	The crushed leaves are boiled in water and the infusion is taken orally, as a tea or as an enema for diarrhoea. The leaves are often also used to treat ailments such as diabetes, coughs, cols, ulcers, boils and wounds.

8. INVASIVE PLANT SPECIES

Any plant that occurs in an area where it is not indigenous is referred to as an alien (exotic, foreign, introduced, non-native and non-indigenous) plant. If these plants can maintain populations without human help they can be referred to as naturalised plants. If such naturalised plants are also able to spread over considerable distances into new, undisturbed, natural areas and replace the indigenous vegetation, they are regarded as alien invasive plants, or invaders (Klein 2002).

Alien invasive plants are like pioneer plants in that they rapidly colonise disturbed areas but differ from pioneer plants in having the additional ability to encroach upon undisturbed, pristine areas. They usually grow vigorously and disperse rapidly, and instead of being outcompeted by better-adapted plants, the invasive plants actively displace the indigenous vegetation and often transform the plant community (Klein 2002).

Alien plant invasions can cause:

- A decline in biological diversity;
- Local extinction of indigenous species;
- Decrease in productivity of agriculture and rangeland;
- Increased agricultural input costs;
- Reduced streamflow in rivers;
- Choking of watercourses;
- A decline in animal species; and
- Respiration by submerged weeds can cause oxygen deficiencies in water.

The control of invasive plant species is addressed under the Conservation of Agricultural Resources Act (CARA), Act 43 of 1983 Regulations 15 and 16 and the National Environmental Management: Biodiversity Act (NEMBA), Act 10 of 2004. CARA classifies invasive species under three categories while NEMBA identifies four categories per the invasiveness and threat to the environment (Table 8-1).

Table 9-2 contains a list of invasive species observed during the site investigation. Not all species are classified as CARA or NEMBA species, although they may be recognised as typical ruderal species and problem plants within South Africa (Bromilow, 2001).

Table 8-1. Invasive plant species categories (Landcare South Africa, no date; NEMBA, 2004)

CARA categories		NEMBA categories	
1	Invaders are species that will no longer be allowed to occur on any property in South Africa because their harmful properties outweigh their useful qualities.	1a	These invader species must be controlled. The landowner must take immediate to control and maintain the control of the listed invasive species and allow an authorised official from the Department onto the land to monitor, assist or implement the control of the listed invasive species.
2	Plants are species proven to have a potential of becoming invasive, but with commercial value. Provision is made in CARA in Regulations 15 and 16 for the species to occur in certain demarcated areas, but the species requires removal from all areas outside the demarcated areas. Category 2 plants may never occur within 30 m of the 1:50 year floodline of any wetlands or watercourses.	1b	The plant invasive species must be contained. The landowner must control the listed invasive species in accordance with the Invasive Species Management Programme if it has been developed in terms of Regulation 7. The landowner must allow an authorised official from the Department onto the land to monitor, assist or implement the containment of the listed invasive species or compliance with the Invasive Species Management Programme contemplated in Regulation 7.
3	Invaders are plants that are proven to have the potential of becoming invasive. These plants are, however, popular garden plants (ornamentals or shade trees) and it will take a long time to replace these species. Category 3 plants are not allowed to occur anywhere, unless the plants were already in existence when the regulations came into effect. None of the plants may occur within 30 m of the 1:50 year flood zone of any wetlands or water courses.	2	These species require a permit to carry out a restricted activity within an area specified in the Notice, within National Parks, Provincial Reserves, mountain catchment areas or Forestry Reserves specified in the Protected Areas Act, or in the Permit. Landowners must ensure that the specimens do not spread outside the land or area specified in the permit. Any species listed as Category 2 Invasive Species outside the specified area must be considered as Category 1B Listed Invasive Species and must managed accordingly.
		3	These invasive species are subject to exemptions and prohibitions. However, any plant invasive listed in Category 3 that occurs in riparian areas, must be considered as Category 1b Listed Invasive Species and must be managed accordingly.

Table 8-2. List of alien and invasive and weed species observed in the development site.

Species name	Type	CARA Category	NEMBA Category
<i>Catharanthus roseus</i>	Alien and invasive	-	1b
<i>Chromolaena odorata</i>	Alien and invasive	1	1b
<i>Cuscuta campestris</i>	Alien and invasive	1	1b
<i>Lantana camara</i>	Alien and invasive	1	1b
<i>Parthenium hysterophorus</i>	Alien and invasive	1	1b
<i>Pennisetum clandestinum</i>	Alien and invasive	-	1b in protected areas and wetlands
<i>Schinus terebinthifolius</i>	Alien and invasive	1	1b in KZN
<i>Solanum mauritianum</i>	Alien and invasive	1	1b
<i>Verbena bonariensis</i>	Alien and invasive	-	1b
<i>Psidium guajava</i>	Alien and invasive	2	2 in plantations in KZN 3 elsewhere in KZN
<i>Amaranthus spinosus</i>	Weed	Not categorised	
<i>Bidens bipinata</i>	Weed	Not categorised	

Species name	Type	CARA Category	NEMBA Category
<i>Bidens pilosa</i>	Weed		Not categorised
<i>Conyza bonariensis</i>	Weed		Not categorised
<i>Hibiscus trionum</i>	Weed		Not categorised
<i>Richardia brasiliensis</i>	Weed		Not categorised
<i>Pteridium aquilinum</i>	Weed		Not categorised
<i>Sonchus oleraceus</i>	Weed		Not categorised
<i>Sorgum bicolor</i>	Weed		Not categorised
<i>Tagetes minuta</i>	Weed		Not categorised
<i>Taraxacum officinale</i>	Weed		Not categorised

Failure of the owner to remove CARA Category 1 and contain NEMBA Category 1b invaders from his/her property may result in prosecution under CARA and NEMBA legislation. It is recommended that the species present in the proposed development portions be removed during construction.

9. PROTECTED SPECIES

Various species are protected by legislation, namely:

1. KZN Nature Conservation Ordinance No. 15 of 1974;
2. National Forest Act, 1998 (Act 84 of 1998);
3. NEMBA, 2004 (Act 10 of 2004); and
4. CITES.

The distribution ranges of all species were assessed and a list compiled of species with a distribution range within the site. No protected species were observed during the site visit, however searches for the potential species will be continued during follow-up site visits.

A search and rescue operation will be required confirming those species that have a high probability of occurrence which and will be impacted by the proposed plant. This operation must be undertaken by a qualified ecologist or botanist based on a rescue and relocation plan approved by the relevant competent authority prior to the commencement of construction.

9.1. KZN Nature Conservation Ordinance No. 15 of 1974

KZN Nature Conservation Ordinance No.15 of 1974 lists the species specially protected in the province. Schedule 2 list protected game, Schedule 3 lists specially protected game, Schedule 7 protected amphibians and reptiles and Schedule 9 specially protected birds. Schedule 12 lists specially protected indigenous plants. The species with a distribution range in 2832CC is listed in Table 9-1.

No fauna of flora species protected in terms of the KZN Ordinance were confirmed on the proposed development site.

9.2. Red data listed species

South Africa is a signatory to the United Nations Convention on Biological Diversity (1992) and, as such, needs to conserve biological diversity, promote the sustainable use of biological diversity, and ensure the fair and equitable sharing of benefits arising out of the utilisation of genetic resources. Principle 4(a) of the NEMA states that disturbance to ecosystems and loss of biodiversity should be avoided, minimised and remedied.

To promote the conservation of biodiversity, species of concern have been identified by the World Conservation Organisation (IUCN) Red Data lists which they feel require protection. The World Conservation Organisation (IUCN) has three threatened categories, namely Critically Endangered, Endangered and Vulnerable. Species that

have been evaluated according to the IUCN criteria and do not fall into one of the threatened categories can be classified as Least Concern, Near Threatened or Data Deficient (Minter *et al.*, 2004; Hilton-Taylor, 1996):

Extinct (EX): The species are presumed extinct when extensive surveys have failed to record an individual. Surveys should be in known and expected habitat, at appropriate times and throughout its historic range.

Extinct in the Wild (EXW): Exhaustive surveys in known and expected habitat, at appropriate times and throughout its historic range have failed to record an individual. Populations occur well outside the past range, in cultivation or in captivity.

Critically Endangered (CR): Species facing an extremely high risk of extinction in the wild.

Endangered (EN): These taxa are in danger of extinction and are unlikely to survive if the current situation continues.

Vulnerable (VU): Vulnerable species are facing a high risk of extinction in the wild. Vulnerable species are taxa that are likely to move into the Endangered category in the near future if the factors causing the decline to continue to be present.

Near Threatened (NT): Species are classified as Near Threatened when they do not meet the criteria for the threatened categories but are close to classifying as Threatened or will likely classify as Threatened in the near future.

Data Deficient (DD): A species is classified as a Data Deficient when there is a lack of appropriate data on the distribution and/or population status of the species. The species may be well studied, and the biology known, but data on the abundance and/or distribution are not available. The category indicates that more data are required and that there is a possibility that the species may be classified into one of the threat categories in the future.

Least Concern (LC): Species that are widespread and abundant are normally included in this category.

Numerous species of conservation concern are listed for the degree grid 2832CC (Table 10-1). *Zoothera guttata* (spotted ground thrush) is listed on the DEA Screening tool with a high potential to occur on the proposed development site. **None of these red listed species were observed on the proposed plant site however searches for the potential species will be continued during follow-up site visits.**

Table 9-1. Protected fauna and flora with a distribution range in 2832CC.

Family / Species Name	Common names	KZN Ordinance (1974) Schedule	NEMBA (TOPS)	CITES Schedule	IUCN
FAUNA					
Mammals					
<i>Galago crassicaudatus</i>	Bushbaby	II		II	
<i>Hippopotamus amphibius</i>	Hippopotamus	II		II	VU
<i>Manis temminckii</i>	Pangolin	III	VU	II	VU
Amphibians and Reptiles					
<i>Bitis gabonica</i>	Gaboon adder	VII			
<i>Crocodylus niloticus</i>	Nile crocodile	VII	VU	I	
<i>Dendroaspis angusticeps</i>	Eastern Green Mamba		VU		
Family Testudinidae	All indigenous tortoises	VII			
<i>Varanus niloticus</i>	Nile monitor lizard	VII		II	
<i>Varanus exanthematicus</i>	Tree monitor lizard	VII		II	
<i>Python sebae</i>	Python	VII		II	
Avifauna					
<i>Aegypius tracheliotos</i>	Lappet-faced Vulture		EN		
<i>Anas smithii</i>	Cape Shoveler	II			
<i>Anas sparsa</i>	African Black Duck	II			
<i>Balearica regulorum</i>	Grey Crowned Crane	IX	EN	II	EN
<i>Bucorvus leadbeateri</i>	Southern Ground Hornbill	IX	EN		VU
<i>Ciconia ciconia</i>	White Stork	IX			
<i>Dendrocygna bicolor</i>	Fulvous Whistling Duck	II		III	
<i>Falco peregrinus</i>	Peregrine Falcon	IX		I	
<i>Guttera pucherani</i>	Crested Guineafowl	II			
<i>Gyps africanus</i>	White-backed vulture		EN		
<i>Gypohierax angolensis</i>	Palmnut Vulture	IX		II	
<i>Hypargos margaritatus</i>	Pinkthroated Twinspot	IX			
<i>Mandingoa nitidula</i>	Green Twinspot	IX			
<i>Mycteria ibis</i>	Yellowbilled Stork	IX			
<i>Neotis denhami</i>	Stanley Bustard	IX	VU	II	NT
<i>Netta erythrophthalma</i>	Southern Pochard	II			

Family / Species Name	Common names	KZN Ordinance (1974) Schedule	NEMBA (TOPS)	CITES Schedule	IUCN
<i>Nettapus auritus</i>	Pygmygoose	II			
<i>Oxyura maccoa</i>	Maccoa Duck	II			VU
<i>Pandion haliaetus</i>	Osprey	IX		II	
<i>Pelecanus rufescens</i>	Pinkbacked Pelican	IX			
<i>Phoenicopterus minor</i>	Lesser Flamingo	IX		II	NT
<i>Phoenicopterus ruber</i>	Greater Flamingo	IX		II	
<i>Polemaetus bellicosus</i>	Martial Eagle		EN	II	VU
<i>Sagittarius serpentarius</i>	Secretary Bird	IX		II	VU
<i>Sardidiornis melanotos</i>	Knobbilled Duck	II		II	
<i>Tadorna cana</i>	South African Shelduck	II			
<i>Thalassornis leucononus</i>	Whitebacked Duck	II			
FLORA					
All Adenium	impala lilies	XII			
All Amaryllidaceae	christmas bells, climbing bells, crinums, haworthias, gladioli	XII			
All Brachystelma	succulent asclepiads	XII			
All Caralluma	succulent asclepiads	XII			
All Ceropegia	ceropegias	XII			
All Cyathea	tree ferns	XII			
All Duvalia	succulent asclepiads	XII			
All Huernia	succulent asclepiads	XII			
All Iridaceae	brunsvigias (candelabra flowers), dieramas (fairy bells), fire lilies, catherine wheels, wind balls, spider lilies, butter lilies, pineapple flowers, red hot pokers, chinkerinchees, squills, ifafa lilies, tulps, harebells, grassbells, chinese lanterns	XII			
All Liliaceae	lilies, irises, watsonias, aloes, blood flowers, clivias (bush lilies)	XII			
All Nymphaeaceae	water lilies	XII			
All Orchidaceae	orchids	XII			

Family / Species Name	Common names	KZN Ordinance (1974) Schedule	NEMBA (TOPS)	CITES Schedule	IUCN
All Stapelia		XII			
All Stultitia	succulent asclepiads	XII			
All Velloziaceae	blackstick lilies, monkeys' tails	XII			
All Zamiaceae	cycads	XII			
All Zantedeschia	arum lilies	XII			
<i>Asclepias gordon-grayae</i>					EN
<i>Bonatea lamprophylla</i>					VU
<i>Cineraria atriplicifolia</i>					VU
<i>Cyperus sensilis</i>					NT
<i>Disperis johnstonii</i>					NT
<i>Freesia laxa</i> subsp. <i>azurea</i>					VU
<i>Gerbera aurantiaca</i>	Hilton daisy	XII			
<i>Kniphofia leucocephala</i>					CR
<i>Kniphofia littoralis</i>					NT
<i>Millettia grandis</i>	umzimbeet	XII			
<i>Nidorella tongensis</i>					NT
<i>Ocotea bullata</i>	black stinkwood	XII			
<i>Pachypodium saundersii</i>	spiny impala lily	XII			
<i>Protea dracomontana</i>	protea	XII			
<i>P. gagedi</i>	protea	XII			
<i>P. roupelliae</i>	protea	XII			
<i>P. simplex</i>	protea	XII			
<i>P. subvestita</i>	protea	XII			
<i>P. welwitschii</i> subsp. <i>hirta</i>	protea	XII			
<i>Raphionacme lucens</i>					NT
<i>Restio zuluensis</i>					VU
<i>Stangeria eriopus</i>	stangeria	XII			
<i>Sisyranthus franksiae</i>					NT

9.3. National Forest Act (1998)

Based on an assessment of the list of protected tree species, as identified Government Notice 536 of 2018 of the NFA, there are 17 species with a distribution range in the area (Table 9-2).

Table 9-2. DAFF Protected tree species with a distribution range in the study area. No species were observed on site.

Species name	Common name
<i>Ficus trichopoda</i>	Swamp fig
<i>Mimusops caffra</i>	Coastal red milk wood
<i>Sideroxylon inerme</i>	White milk wood
<i>Boscia albitrunca</i>	Shepard's tree
<i>Cleistanthus schlechteri</i>	False tamboti
<i>Ocotea bullata</i>	Stink wood
<i>Barringtonia racemosa</i>	Powder-puff tree
<i>Pittosporum viridiflorum</i>	Cheese wood
<i>Podocarpus falcatus</i>	Outeniqua yellow wood
<i>Podocarpus latifolius</i>	Red yellow wood
<i>Bruguiera gymnorhiza</i>	Black mangrove
<i>Rhizophora mucronata</i>	Red mangrove
<i>Cerrop tagal</i>	Kirkiri
<i>Catha edulis</i>	Bushman's tea
<i>Cassipourea swaziensis</i>	Swazi onion wood
<i>Balanites maughamii</i>	Green thorn
<i>Sclerocarya birrea</i> subspecies <i>caffra</i>	Marula

No species protected in terms of the NFA were observed on the proposed development site.

10. IMPACT ASSESSMENT

The methodology, as prescribed by Savannah, to assess the impacts of the proposed 450MW RMPP and associated infrastructure is described below. This methodology will be used in the EIA Phase to determine significance of impacts.

10.1. Impact Assessment Methodology

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high).
- The **duration**, wherein it will be indicated whether:
 - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - medium-term (5–15 years) – assigned a score of 3;
 - long term (> 15 years) - assigned a score of 4; or
 - permanent - assigned a score of 5;
- The **magnitude**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes,

6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

- The **probability** of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high.
- The **status**, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

$$S=(E+D+M)P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area)
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated)
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

10.2. Assessment of Cumulative Impact

The role of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact).

This section should address whether the construction of the proposed development will result in:

- Unacceptable risk
- Unacceptable loss
- Complete or whole-scale changes to the environment or sense of place
- Unacceptable increase in impact

A conclusion on whether the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area.

10.3. Project Impact and Cumulative Assessment

The following key issues have been identified and assessed during this ecological biodiversity scoping assessment:

- Loss of vegetation and terrestrial habitat;
- Potential loss of faunal species;
- Potential loss of species of special concern;
- Habitat fragmentation (loss of corridors); and
- Infestation of alien species.

10.3.1. Loss of vegetation and terrestrial habitat

Vegetation plays an important part in the functioning of ecosystems, as well as maintaining biological processes in the soil, reducing the loss of topsoil and nutrients, and recycling of nutrients. The removal of natural vegetation results in a loss of habitat for fauna and flora species. The proposed development site is however surrounded by Industrial development and is an isolated patch of terrestrial habitat.

Nature:			
The vegetation on site was broadly classified into two vegetation communities, namely <i>Helichrysum - Chrysanthemoides</i> coastal grasslands (Figure 6-1), and a small portion (only approximately 1,29 hectares) of the site consisted of <i>Eucalyptus</i> plantations. A <i>Phragmites - Typha</i> channelled valley bottom wetland community was observed on the eastern border of the site, and the Closed coastal woodland vegetation community was identified south of the proposed LPG Storage Terminal. but does also not impede into the site.			
	Overall impact of proposed project		Cumulative impact
	Without mitigation	With mitigation	
Extent	Low (1)	Low (1)	Medium (3)
Duration	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Definite (5)	Definite (5)	Highly probable (4)
Significance	Medium (60)	Medium (60)	Medium (54)
Status (positive or negative)	Negative	Negative	Negative
Reversibility	Low	Low	Low
Irreplaceable loss of resources?	Yes	No	Yes
Can impact be mitigated?	Yes		Yes

Mitigation:

- A minimum impact approach must be adopted. Only vegetation in the project footprint, outside the buffer must be removed, leaving adjacent buffer vegetation intact.
- No indigenous vegetation may be collected or used for firewood.
- Where construction occurs close to any plants of high conservation value, these must be suitably and visibly demarcated and cordoned off by the ECO prior to, and during the construction phase.
- A search and rescue operation will be required prior to construction for *Crinum stuhlmannii* and any other protected species that have a high probability of occurrence. This operation must be undertaken by a qualified ecologist or botanist based on a rescue relocation plan approved by the relevant competent authority.
- Where clearing is required outside of permanent infrastructure areas, vegetation should be brush-cut rather than cleared to speed re-establishment following site closure.

Residual impacts:

- Impact on fauna migration corridors due to change in land use; and
- Loss of habitat for terrestrial fauna and flora species.

10.3.2. Potential loss of faunal species.

The removal of natural vegetation results in a loss of habitat for faunal species. Species typically resident in and around urban and industrial areas are commonly generalists with a wide range of habitat types. It is therefore unlikely that the proposed development will have lasting adverse impact on the faunal species of the area.

Nature:

Terrestrial habitat is the most abundant and provide habitat to a vast variety of small mammals such as rodents, shrews, mongooses etc. Approximately 48 mammal species, 23 reptile species and 53 frog species have the potential to use the development site and its surrounding areas and approximately 358 bird species have been recorded in the area. The proposed development is however unlikely to impact on any avifauna individuals of the area.

	Overall impact of proposed project		Cumulative impact
	Without mitigation	With mitigation	
Extent	Low-medium (2)	Low-medium (2)	Medium (3)
Duration	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Low (4)	Moderate (6)
Probability	Probable (3)	Improbable (2)	Probable (3)
Significance	Medium (33)	Low (22)	Medium (42)
Status (positive or negative)	Negative	Negative	Negative
Reversibility	Low	Low	Low
Irreplaceable loss of resources?	Yes	No	Yes
Can impact be mitigated?	Yes		Yes

Mitigation:

- A minimum impact approach must be adopted. Only vegetation in the project footprint, outside the buffer must be removed, leaving adjacent buffer vegetation intact as faunal habitat.
- Intentional killing of any faunal species (including snakes) should be avoided by means of awareness programs and toolbox talks presented to construction labourers. Any person found deliberately harassing any animal in any way must face disciplinary measures;
- If any faunal species is recovered during the construction phase, this species must be relocated to the nearest natural open space with suitable habitat for the particular species to survive; and

<ul style="list-style-type: none"> All construction activities must be limited to daylight hours.
<p>Residual impacts:</p> <ul style="list-style-type: none"> Impact on fauna migration corridors due to change in land use; and Loss of habitat for terrestrial fauna and flora species.

10.3.3. Potential loss of species of special concern

Species of special concern could potentially occur on the proposed plant site, such as *Crinum stuhlmannii* in the *Helichrysum – Chrysanthemoides* coastal grasslands. *Zoothra guttata* (spotted ground thrush) is listed on the DEA Screening tool with a high potential to occur on the proposed development site. No protected species were observed during the site visit, however searches for the potential species will be continued during follow-up site visits.

<p>Nature: Potential loss of protected species and species of special concern within the terrestrial biodiversity habitats in the development site.</p>			
	Overall impact of proposed project		Cumulative impact
	Without mitigation	With mitigation	
Extent	Low (1)	Low (1)	Medium (3)
Duration	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	High (8)	High (8)	High (8)
Probability	Improbable (1)	Improbable (1)	Probable (3)
Significance	Low (14)	Low (14)	Medium (48)
Status (positive or negative)	Negative	Negative	Negative
Reversibility	Low	Low	Low
Irreplaceable loss of resources?	Yes	Yes	Yes
Can impact be mitigated?	Yes, but no mitigation required		Yes
<p>Mitigation:</p> <ul style="list-style-type: none"> A search and rescue operation will be required for all protected species confirmed on the broader <i>Helichrysum – Chrysanthemoides</i> coastal grassland as well as those species that have a high probability of occurrence which will be impacted by the proposed development. This operation must be undertaken by a qualified ecologist or botanist based on a rescue and relocation plan approved by the relevant competent authority. The necessary permit applications must be obtained prior to removal of any species of concern. Should any of these species of concern be identified during construction, the ECO should be informed and appropriate action taken. 			
<p>Residual impacts:</p> <ul style="list-style-type: none"> None 			

10.3.4. Habitat fragmentation (loss of corridors)

Even though the surrounding land use is industrial, a portion of proposed site is currently undeveloped and is connected to the adjacent *Pragmites – Typha* channelled valley bottom wetland and does provide habitat for species. The change of land use of the undeveloped portion of the site will impact on migration corridors of small mammals and reptiles.

Nature: Loss of migration corridors for terrestrial fauna and flora species.			
	Overall impact of proposed project		Cumulative impact
	Without mitigation	With mitigation	
Extent	Medium (3)	Medium (3)	Medium (3)
Duration	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Probable (3)	Improbable (2)	Probable (3)
Significance	Medium (42)	Low (28)	Medium (42)
Status (positive or negative)	Negative	Negative	Negative
Reversibility	Medium	Medium	Medium
Irreplaceable loss of resources?	Yes	No	Yes
Can impact be mitigated?	Yes		Yes
Mitigation:			
<ul style="list-style-type: none"> The wetland and associated buffer zone areas must be rehabilitated and managed as natural open space, retaining the connectivity with adjacent natural open spaces. The management must facilitate natural processes, provide habitat for pollinators and reduce edge effects. 			
Residual impacts:			
<ul style="list-style-type: none"> Edge effects resulting in loss of habitat for terrestrial species. 			

10.3.5. Infestation of alien invasive species

The disturbance of the natural vegetation by the proposed activities may accelerate exotic species growth. Utmost care should be taken manage disperse and colonisation of these species.

Nature: Increase in the invasions by alien and invasive species through loss of natural vegetation and disturbance soil.			
	Overall impact of proposed project		Cumulative impact
	Without mitigation	With mitigation	
Extent	High (5)	Medium (3)	High (5)
Duration	Medium-term (3)	Short-term (2)	Medium-term (3)
Magnitude	Moderate (6)	Low (4)	Moderate (6)
Probability	Highly - probable (4)	Probable (3)	Highly – probable (4)
Significance	Medium (56)	Low (17)	Medium (56)

Status (positive or negative)	Negative	Negative	Negative
Reversibility	Medium	High	Medium
Irreplaceable loss of resources?	Yes	No	Yes
Can impact be mitigated?	Yes		Yes
Mitigation:			
<ul style="list-style-type: none"> • Natural open spaces outside the development footprint should be left in their undeveloped state. • Any existing or new exotic vegetation within the proposed development site must be eradicated. • A monitoring program should be put in place to remove exotic vegetation and maintain areas free from exotic invasions during construction. • Within, and in proximity to the <i>Phragmites – Typha</i> channelled valley bottom wetland, successful re-vegetation is crucial to stabilise soils and limit infestation by invasive alien plant species. Rehabilitation should be undertaken on a progressive basis in these areas. 			
Residual impacts:			
<ul style="list-style-type: none"> • Invasion and replacement of natural vegetation by ruderal weed species, hence a loss of in loss of habitat for terrestrial species. 			

11. PLAN OF STUDY FOR EIA PHASE

The purpose of this Plan of Study for the EIA phase of the project is to ensure that the Terrestrial Biodiversity Impact Assessment Report produced satisfies the requirements of the DEFF, by ensuring that the Department is satisfied with the aspects discussed in this document, before the study is finalised.

11.1. Key issues identified during the scoping process

The key issues and impact of the proposed project are included in section 10.3 above and summarised in Table 11-1 below.

Table 11-1. Summary of key issues and impacts identified during the scoping phase of the proposed project.

Impact			
Potential impacts on the terrestrial biodiversity is related to the loss of vegetation and terrestrial habitat. Potentially, this results in a loss of fauna and flora species, migration corridors and the potential loss of protected species and species of special concern. Disturbance of the natural vegetation by the proposed activities may furthermore accelerate the growth of exotic species.			
<i>Crinum stuhlmannii</i> has been recorded in the <i>Helichrysum – Chrysanthemoides</i> coastal grasslands, outside the proposed development footprint. <i>Zoothera guttata</i> (spotted ground thrush) is listed on the DEA Screening tool with a high potential to occur on the proposed development site. No protected species were observed during the site visit, however searches for the potential species will be continued during follow-up site visits.			
The habitat present at the proposed development site has been degraded through historical land uses and alien plant infestations but have recovered through successional processes to the good condition coastal grassland present on site.			
Issue	Nature of Impact	Extent of impact	No-Go areas
Loss of vegetation and terrestrial habitat	Direct impacts: <ul style="list-style-type: none"> • Loss of biological processes in the soil • Loss of topsoil and nutrients • Loss recycling of nutrients 	Regional	None identified at this stage

	<ul style="list-style-type: none"> The removal of natural vegetation results in a loss of habitat for fauna and flora species <p>Indirect impacts:</p> <ul style="list-style-type: none"> Edge effects to leading to loss of habitat outside development site 		
Potential loss of faunal species	<p>Direct impacts:</p> <ul style="list-style-type: none"> Loss of habitat will potentially lead to a loss faunal species <p>Indirect impacts:</p> <ul style="list-style-type: none"> Edge effects to leading to loss of habitat outside development site, thus loss of faunal species 	Regional	None identified at this stage
Potential loss of Species of Special Concern	<p>Direct impacts:</p> <ul style="list-style-type: none"> None <p>Indirect impacts:</p> <ul style="list-style-type: none"> Loss of protected species in terrestrial habitat 	National	None identified at this stage
Habitat fragmentation (loss of corridors)	<p>Direct impacts:</p> <ul style="list-style-type: none"> Loss of habitat for terrestrial species Potential loss of migration of terrestrial fauna Potential decrease in dispersal of flora seeds <p>Indirect impacts:</p> <ul style="list-style-type: none"> Edge effects to lead to potential loss of habitat for terrestrial species Potential loss of migration of terrestrial fauna 	Regional	29 m wetland buffer zone.
Infestation of alien species	<p>Direct impacts:</p> <ul style="list-style-type: none"> Increase in the invasions by alien and invasive species through loss of natural vegetation and disturbance soil <p>Indirect impacts:</p> <ul style="list-style-type: none"> Loss of habitat for terrestrial species Potential loss of protected species in terrestrial habitat 	Regional	None identified at this stage

Description of expected significance of impact

The proposed development site has a long history of transformation therefore the impacts on the terrestrial environment are likely to be limited as the species typically resident in and around urban and industrial areas are commonly generalists with a wide range of habitat types. Protected species such as *Crinum stuhlmannii* and *Zoothera guttata* have potential to occur on the proposed development site. However, no protected species were observed during the previously conducted site visits. Impacts can be minimised through the implementation of appropriate mitigation measures.

Gaps in knowledge and recommendations for further study

- Mapping of all protected species and species of special concern.
- Mapping of known and potential habitats used in breeding, foraging, roosting, aestivation and hibernation
- Describing the condition of all habitats and clearly indicate it on an Ecological sensitivity map.
- Indication of the potential of protected species to occur on the proposed development site.

Recommendations with regards to general field surveys

- Field surveys must include the proposed development site and adjacent surrounding areas with indigenous vegetation within a 500 m radius of the project footprint.

- In season (November to April) follow-up terrestrial site visits to determine the diversity of resident fauna species
- In season follow-up terrestrial site visits to determine the diversity of vegetation species.
- Active search will be required for the protected species and species of concern that have a high probability of occurrence which and will be impacted by the proposed plant.

12. CONCLUSION

This Terrestrial Biodiversity Scoping Impact Assessment report considers and reports on the environmental impacts that the proposed development may have and will form part of the submissions to the DEFF in terms NEMA and the 2014 EIA Regulations, as amended in April 2017.

The proposed development site is surrounded by industries and has a long history of transformation. Three vegetation communities were classified and are in varying ecological condition.

Preliminary fieldwork has been conducted and indicates a limited opportunity of species of special concern being prevalent. However it is the opinion of the specialist that further fieldwork for faunal species should be conducted. In line with this, should be fieldwork for confirmation of occurrence of faunal and flora Red Data Species. A search and rescue operation will be required for all protected species confirmed and those species that have a high probability of occurrence which will be impacted by the proposed development. Relevant permits must be obtained for all required species in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) and the KwaZulu-Natal Nature Conservation Ordinance (15 of 1974). No protected species were observed during the site visit, however searches for the potential species will be continued during follow-up site visits.

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Addendum A: Fauna Species Lists.

No	Common group	Common species	Genus	Species
MAMMALS				
1	Bat	Angolan free-tailed bat	<i>Mops</i>	<i>condylurus</i>
2	Bat	Banana bat	<i>Neoromicia</i>	<i>nana</i>
3	Bat	Botswana long-eared bat	<i>Laephotis</i>	<i>botswanae</i>
4	Bat	Egyptian free-tailed bat	<i>Tadarida</i>	<i>aegyptiaca</i>
5	Bat	Egyptian slit-faced bat	<i>Nycteris</i>	<i>thebaica</i>
6	Bat	Green house bat	<i>Scotophilus</i>	<i>viridis</i>
7	Bat	Hairy slit-faced bat	<i>Nycteris</i>	<i>hispida</i>
8	Bat	Large-eared slit-faced bat	<i>Nycteris</i>	<i>macrotis</i>
9	Bat	Little free-tailed bat	<i>Chaerephon</i>	<i>pumilus</i>
10	Bat	Mauritian tomb bat	<i>Taphozous</i>	<i>mauritanus</i>
11	Bat	Percival's short-eared trident bat	<i>Cloeotis</i>	<i>percivali</i>
12	Bat	Peters's epauletted fruit bat	<i>Epomophorus</i>	<i>crypturus</i>
13	Bat	Thomas's house bat	<i>Scotoecus</i>	<i>albofuscus</i>
14	Bat	Variegated butterfly bat	<i>Glauconycteris</i>	<i>variegata</i>
15	Bat	Wahlberg's epauletted fruit bat	<i>Pomophorus</i>	<i>wahlbergi</i>
16	Bat	Yellow-bellied house bat	<i>Scotophilus</i>	<i>dinganii</i>
17	Dormouse	Woodland dormouse	<i>Graphiurus</i>	<i>murinus</i>
18	Genet	Large-spotted genet	<i>Genetta</i>	<i>tigrina</i>
19	Gerbil	Highveld gerbil	<i>Gerbilliscus</i>	<i>brantsii</i>
20	Hare	Scrub hare	<i>Lepus</i>	<i>saxatillis</i>
21	Mole	Hottentot golden mole	<i>Amblysomus</i>	<i>hottentotus</i>
22	Mole-rat	African mole-rat	<i>Cryptomys</i>	<i>hottentotus</i>
23	Mongoose	Banded mongoose	<i>Mungos</i>	<i>mungo</i>
24	Mongoose	Marsh mongoose	<i>Atilax</i>	<i>paludinosus</i>
25	Mongoose	Slender mongoose	<i>Herpestes</i>	<i>sanguineus</i>
26	Monkey	Vervet monkey	<i>Chlorocebus</i>	<i>pygerythrus</i>
27	Mouse	Brants'climbing mouse	<i>Dendromus</i>	<i>mesomelas</i>
28	Mouse	Chestnut climbing mouse	<i>Dendromus</i>	<i>mystacalis</i>
29	Mouse	Grey climbing mouse	<i>Dendromus</i>	<i>melanotis</i>
30	Mouse	Krebs's fat mouse	<i>Steatomys</i>	<i>krebsii</i>
31	Mouse	Natal multimammate mouse	<i>Mastomys</i>	<i>natalensis</i>
32	Mouse	Pygmy mouse	<i>Mus</i>	<i>minutoides</i>
33	Mouse	White-tailed mouse	<i>Mystromys</i>	<i>albicaudatus</i>
34	Pipistrelle	Dusky pipistrelle	<i>Pipistrellus</i>	<i>hesperidus</i>
35	Rat	Laminate vlei rat	<i>Otomys</i>	<i>laminatus</i>
36	Rat	Tete veld rat	<i>Aethomys</i>	<i>ineptus</i>
37	Rat	Vlei rat	<i>Otomys</i>	<i>irroratus</i>
38	Serotine	Cape serotine	<i>Neoromicia</i>	<i>capensis</i>

No	Common group	Common species	Genus	Species
39	Shrew	Greater dwarf shrew	<i>Suncus</i>	<i>lixus</i>
40	Shrew	Greater red musk shrew	<i>Crocidura</i>	<i>flavescens</i>
41	Shrew	Least dwarf shrew	<i>Suncus</i>	<i>infinitesimus</i>
42	Shrew	Lesser dwarf shrew	<i>Suncus</i>	<i>varilla</i>
43	Shrew	Lesser grey-brown musk shrew	<i>Crocidura</i>	<i>silacea</i>
44	Shrew	Lesser red musk shrew	<i>Crocidura</i>	<i>hirta</i>
45	Shrew	Reddish-grey musk shrew	<i>Crocidura</i>	<i>cyanea</i>
46	Shrew	Sclater's forest shrew	<i>Myosorex</i>	<i>sclateri</i>
47	Shrew	Swamp musk shrew	<i>Crocidura</i>	<i>mariquensis</i>
48	Weasels	African striped weasel	<i>Poecilogale</i>	<i>albinucha</i>

No	Common group	Common species	Genus	Species
AVIFAUNA				
1	Apalis	Bar-throated	<i>Apalis</i>	<i>thoracica</i>
2	Apalis	Rudd's	<i>Apalis</i>	<i>ruddi</i>
3	Apalis	Yellow-breasted	<i>Apalis</i>	<i>flavida</i>
4	Avocet	Pied	<i>Recurvirostra</i>	<i>avosetta</i>
5	Barbet	Acacia Pied	<i>Tricholaema</i>	<i>leucomelas</i>
6	Barbet	Black-collared	<i>Lybius</i>	<i>torquatus</i>
7	Barbet	Crested	<i>Trachyphonus</i>	<i>vallantii</i>
8	Barbet	White-eared	<i>Stactolaema</i>	<i>leucotis</i>
9	Batis	Chin-spot	<i>Batis</i>	<i>molitor</i>
10	Bee-eater	Blue-cheeked	<i>Merops</i>	<i>persicus</i>
11	Bee-eater	European	<i>Merops</i>	<i>apiaster</i>
12	Bee-eater	Little	<i>Merops</i>	<i>pusillus</i>
13	Bee-eater	White-fronted	<i>Merops</i>	<i>bullockoides</i>
14	Bishop	Southern Red	<i>Euplectes</i>	<i>orix</i>
15	Bittern	Little	<i>Ixobrychus</i>	<i>minutus</i>
16	Boubou	Southern	<i>Laniarius</i>	<i>ferrugineus</i>
17	Brownbul	Terrestrial	<i>Phyllastrephus</i>	<i>terrestris</i>
18	Brubru	Brubru	<i>Nilaus</i>	<i>afer</i>
19	Bulbul	Dark-capped	<i>Pycnonotus</i>	<i>tricolor</i>
20	Bunting	Cinnamon-breasted	<i>Emberiza</i>	<i>tahapisi</i>
21	Bunting	Golden-breasted	<i>Emberiza</i>	<i>flaviventris</i>
22	Bush-shrike	Gorgeous	<i>Telophorus</i>	<i>quadricolor</i>
23	Bush-shrike	Grey-headed	<i>Malaconotus</i>	<i>blanchoti</i>
24	Bush-shrike	Olive	<i>Telophorus</i>	<i>olivaceus</i>
25	Bush-shrike	Orange-breasted	<i>Telophorus</i>	<i>sulfureopectus</i>
26	Bustard	Black-bellied	<i>Lissotis</i>	<i>melanogaster</i>
27	Bustard	Denham's	<i>Neotis</i>	<i>denhami</i>
28	Buttonquail	Kurrichane	<i>Turnix</i>	<i>sylvaticus</i>
29	Buzzard	Jackal	<i>Buteo</i>	<i>rufofuscus</i>
30	Buzzard	Lizard	<i>Kaupifalco</i>	<i>monogrammicus</i>
31	Buzzard	Steppe	<i>Buteo</i>	<i>vulpinus</i>
32	Camaroptera	Green-backed	<i>Camaroptera</i>	<i>brachyura</i>
33	Canary	Brimstone	<i>Crithagra</i>	<i>sulphuratus</i>
34	Canary	Cape	<i>Serinus</i>	<i>canicollis</i>
35	Canary	Yellow-fronted	<i>Crithagra</i>	<i>mozambicus</i>
36	Chat	Familiar	<i>Cercomela</i>	<i>familiaris</i>
37	Cisticola	Croaking	<i>Cisticola</i>	<i>natalensis</i>
38	Cisticola	Lazy	<i>Cisticola</i>	<i>aberrans</i>
39	Cisticola	Pale-crowned	<i>Cisticola</i>	<i>cinnamomeus</i>
40	Cisticola	Rattling	<i>Cisticola</i>	<i>chiniana</i>

No	Common group	Common species	Genus	Species
41	Cisticola	Red-faced	<i>Cisticola</i>	<i>erythroptus</i>
42	Cisticola	Rufous-winged	<i>Cisticola</i>	<i>galactotes</i>
43	Cisticola	Zitting	<i>Cisticola</i>	<i>juncidis</i>
44	Coot	Red-knobbed	<i>Fulica</i>	<i>cristata</i>
45	Cormorant	Cape	<i>Phalacrocorax</i>	<i>capensis</i>
46	Cormorant	Reed	<i>Phalacrocorax</i>	<i>africanus</i>
47	Cormorant	White-breasted	<i>Phalacrocorax</i>	<i>carbo</i>
48	Coucal	Burchell's	<i>Centropus</i>	<i>burchellii</i>
49	Coucal	White-browed	<i>Centropus</i>	<i>superciliosus</i>
50	Courser	Bronze-winged	<i>Rhinoptilus</i>	<i>chalconotus</i>
51	Crake	African	<i>Crecopsis</i>	<i>egregia</i>
52	Crake	Baillon's	<i>Porzana</i>	<i>pusilla</i>
53	Crake	Black	<i>Amaurornis</i>	<i>flavirostris</i>
54	Crane	Grey Crowned	<i>Balearica</i>	<i>regulorum</i>
55	Crested-flycatcher	Blue-mantled	<i>Trochocercus</i>	<i>cyanomelas</i>
56	Crombec	Long-billed	<i>Sylvietta</i>	<i>rufescens</i>
57	Crow	Cape	<i>Corvus</i>	<i>capensis</i>
58	Crow	House	<i>Corvus</i>	<i>splendens</i>
59	Crow	Pied	<i>Corvus</i>	<i>albus</i>
60	Cuckoo	African Emerald	<i>Chrysococcyx</i>	<i>cupreus</i>
61	Cuckoo	Black	<i>Cuculus</i>	<i>clamosus</i>
62	Cuckoo	Diderick	<i>Chrysococcyx</i>	<i>caprius</i>
63	Cuckoo	Jacobin	<i>Clamator</i>	<i>jacobinus</i>
64	Cuckoo	Klaas's	<i>Chrysococcyx</i>	<i>klaas</i>
65	Cuckoo	Red-chested	<i>Cuculus</i>	<i>solitarius</i>
66	Cuckoo-shrike	Black	<i>Campephaga</i>	<i>flava</i>
67	Cuckoo-shrike	Grey	<i>Coracina</i>	<i>caesia</i>
68	Curlew	Eurasian	<i>Numenius</i>	<i>arquata</i>
69	Darter	African	<i>Anhinga</i>	<i>rufa</i>
70	Dove	Laughing	<i>Streptopelia</i>	<i>senegalensis</i>
71	Dove	Lemon	<i>Aplopelia</i>	<i>larvata</i>
72	Dove	Namaqua	<i>Oena</i>	<i>capensis</i>
73	Dove	Red-eyed	<i>Streptopelia</i>	<i>semitorquata</i>
74	Dove	Rock	<i>Columba</i>	<i>livia</i>
75	Dove	Tambourine	<i>Turtur</i>	<i>tympanistris</i>
76	Drongo	Fork-tailed	<i>Dicrurus</i>	<i>adsimilis</i>
77	Drongo	Square-tailed	<i>Dicrurus</i>	<i>ludwigii</i>
78	Duck	African Black	<i>Anas</i>	<i>sparsa</i>
79	Duck	Fulvous	<i>Dendrocygna</i>	<i>bicolor</i>
80	Duck	White-backed	<i>Thalassornis</i>	<i>leuconotus</i>
81	Duck	White-faced	<i>Dendrocygna</i>	<i>viduata</i>

No	Common group	Common species	Genus	Species
82	Duck	Yellow-billed	<i>Anas</i>	<i>undulata</i>
83	Eagle	African Crowned	<i>Stephanoaetus</i>	<i>coronatus</i>
84	Eagle	Long-crested	<i>Lophaetus</i>	<i>occipitalis</i>
85	Eagle	Tawny	<i>Aquila</i>	<i>rapax</i>
86	Eagle	Martial	<i>Polemaetus</i>	<i>bellicosus</i>
87	Eagle	Wahlberg's	<i>Aquila</i>	<i>wahlbergi</i>
88	Eagle-owl	Spotted	<i>Bubo</i>	<i>africanus</i>
89	Egret	Cattle	<i>Bubulcus</i>	<i>ibis</i>
90	Egret	Great	<i>Egretta</i>	<i>alba</i>
91	Egret	Little	<i>Egretta</i>	<i>garzetta</i>
92	Egret	Yellow-billed	<i>Egretta</i>	<i>intermedia</i>
93	Falcon	Amur	<i>Falco</i>	<i>amurensis</i>
94	Falcon	Lanner	<i>Falco</i>	<i>biarmicus</i>
95	Falcon	Peregrine	<i>Falco</i>	<i>peregrinus</i>
96	Finfoot	African	<i>Podica</i>	<i>senegalensis</i>
97	Firefinch	African	<i>Lagonosticta</i>	<i>rubricata</i>
98	Firefinch	Red-billed	<i>Lagonosticta</i>	<i>senegala</i>
99	Fiscal	Common (Southern)	<i>Lanius</i>	<i>collaris</i>
100	Fish-eagle	African	<i>Haliaeetus</i>	<i>vocifer</i>
101	Flamingo	Greater	<i>Phoenicopterus</i>	<i>ruber</i>
102	Flamingo	Lesser	<i>Phoenicopterus</i>	<i>minor</i>
103	Flufftail	Buff-spotted	<i>Sarothrura</i>	<i>elegans</i>
104	Flufftail	Red-chested	<i>Sarothrura</i>	<i>rufa</i>
105	Flycatcher	African Dusky	<i>Muscicapa</i>	<i>adusta</i>
106	Flycatcher	Ashy	<i>Muscicapa</i>	<i>caerulescens</i>
107	Flycatcher	Fiscal	<i>Sigelus</i>	<i>silens</i>
108	Flycatcher	Pale	<i>Bradornis</i>	<i>pallidus</i>
109	Flycatcher	Southern Black	<i>Melaenornis</i>	<i>pammelaina</i>
110	Flycatcher	Spotted	<i>Muscicapa</i>	<i>striata</i>
111	Frigatebird	Lesser	<i>Fregata</i>	<i>ariel</i>
112	Gallinule	Allen's	<i>Porphyrio</i>	<i>alleni</i>
113	Gannet	Cape	<i>Morus</i>	<i>capensis</i>
114	Godwit	Bar-tailed	<i>Limosa</i>	<i>lapponica</i>
115	Goose	Egyptian	<i>Alopochen</i>	<i>aegyptiacus</i>
116	Goose	Spur-winged	<i>Plectropterus</i>	<i>gambensis</i>
117	Goshawk	African	<i>Accipiter</i>	<i>tachiro</i>
118	Grebe	Little	<i>Tachybaptus</i>	<i>ruficollis</i>
119	Green-pigeon	African	<i>Treron</i>	<i>calvus</i>
120	Greenbul	Sombre	<i>Andropadus</i>	<i>importunus</i>
121	Greenbul	Yellow-bellied	<i>Chlorocichla</i>	<i>flaviventris</i>
122	Greenshank	Common	<i>Tringa</i>	<i>nebularia</i>

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123	Ground-thrush	Spotted	<i>Zoothera</i>	<i>guttata</i>
124	Guineafowl	Crested	<i>Guttera</i>	<i>edouardi</i>
125	Guineafowl	Helmeted	<i>Numida</i>	<i>meleagris</i>
126	Gull	Grey-headed	<i>Larus</i>	<i>cirrocephalus</i>
127	Gull	Hartlaub's	<i>Larus</i>	<i>hartlaubii</i>
128	Gull	Kelp	<i>Larus</i>	<i>dominicanus</i>
129	Hamerkop	Hamerkop	<i>Scopus</i>	<i>umbretta</i>
130	Harrier-Hawk	African	<i>Polyboroides</i>	<i>typus</i>
131	Hawk	African Cuckoo	<i>Aviceda</i>	<i>cuculoides</i>
132	Hawk-eagle	Ayres's	<i>Aquila</i>	<i>ayresii</i>
133	Heron	Black	<i>Egretta</i>	<i>ardesiaca</i>
134	Heron	Black-headed	<i>Ardea</i>	<i>melanocephala</i>
135	Heron	Goliath	<i>Ardea</i>	<i>goliath</i>
136	Heron	Green-backed	<i>Butorides</i>	<i>striata</i>
137	Heron	Grey	<i>Ardea</i>	<i>cinerea</i>
138	Heron	Purple	<i>Ardea</i>	<i>purpurea</i>
139	Heron	Rufous-bellied	<i>Ardeola</i>	<i>rufiventris</i>
140	Heron	Squacco	<i>Ardeola</i>	<i>ralloides</i>
141	Hobby	Eurasian	<i>Falco</i>	<i>subbuteo</i>
142	Honey-buzzard	European	<i>Pernis</i>	<i>apivorus</i>
143	Honeybird	Brown-backed	<i>Prodotiscus</i>	<i>regulus</i>
144	Honeyguide	Greater	<i>Indicator</i>	<i>indicator</i>
145	Honeyguide	Lesser	<i>Indicator</i>	<i>minor</i>
146	Honeyguide	Scaly-throated	<i>Indicator</i>	<i>variegatus</i>
147	Hoopoe	African	<i>Upupa</i>	<i>africana</i>
148	Hornbill	Crowned	<i>Tockus</i>	<i>alboterminatus</i>
149	Hornbill	Trumpeter	<i>Bycanistes</i>	<i>bucinator</i>
150	House-martin	Common	<i>Delichon</i>	<i>urbicum</i>
151	Ibis	African Sacred	<i>Threskiornis</i>	<i>aethiopicus</i>
152	Ibis	Glossy	<i>Plegadis</i>	<i>falcinellus</i>
153	Ibis	Hadedda	<i>Bostrychia</i>	<i>hagedash</i>
154	Indigobird	Dusky	<i>Vidua</i>	<i>funerea</i>
155	Indigobird	Village	<i>Vidua</i>	<i>chalybeata</i>
156	Jacana	African	<i>Actophilornis</i>	<i>africanus</i>
157	Jacana	Lesser	<i>Microparra</i>	<i>capensis</i>
158	Kingfisher	Brown-hooded	<i>Halcyon</i>	<i>albiventris</i>
159	Kingfisher	Giant	<i>Megaceryle</i>	<i>maximus</i>
160	Kingfisher	Half-collared	<i>Alcedo</i>	<i>semitorquata</i>
161	Kingfisher	Malachite	<i>Alcedo</i>	<i>crystata</i>
162	Kingfisher	Mangrove	<i>Halcyon</i>	<i>senegaloides</i>
163	Kingfisher	Pied	<i>Ceryle</i>	<i>rudis</i>

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164	Kingfisher	Striped	<i>Halcyon</i>	<i>chelicuti</i>
165	Kingfisher	Woodland	<i>Halcyon</i>	<i>senegalensis</i>
166	Kite	Black	<i>Milvus</i>	<i>migrans</i>
167	Kite	Black-shouldered	<i>Elanus</i>	<i>caeruleus</i>
168	Kite	Yellow-billed	<i>Milvus</i>	<i>aegyptius</i>
169	Knot	Red	<i>Calidris</i>	<i>canutus</i>
170	Lapwing	African Wattled	<i>Vanellus</i>	<i>senegallus</i>
171	Lapwing	Black-winged	<i>Vanellus</i>	<i>melanopterus</i>
172	Lapwing	Blacksmith	<i>Vanellus</i>	<i>armatus</i>
173	Lapwing	Crowned	<i>Vanellus</i>	<i>coronatus</i>
174	Lark	Rufous-naped	<i>Mirafr</i>	<i>africana</i>
175	Lark	Sabota	<i>Calendulauda</i>	<i>sabota</i>
176	Longclaw	Cape	<i>Macronyx</i>	<i>capensis</i>
177	Longclaw	Yellow-throated	<i>Macronyx</i>	<i>croceus</i>
178	Malkoha	Green	<i>Ceuthmochares</i>	<i>australis</i>
179	Mannikin	Bronze	<i>Spermestes</i>	<i>cucullatus</i>
180	Mannikin	Red-backed	<i>Spermestes</i>	<i>nigriceps</i>
181	Marsh-harrier	African	<i>Circus</i>	<i>ranivorus</i>
182	Martin	Banded	<i>Riparia</i>	<i>cincta</i>
183	Martin	Brown-throated	<i>Riparia</i>	<i>paludicola</i>
184	Martin	Rock	<i>Hirundo</i>	<i>fuligula</i>
185	Martin	Sand	<i>Riparia</i>	<i>riparia</i>
186	Masked-weaver	Lesser	<i>Ploceus</i>	<i>intermedius</i>
187	Masked-weaver	Southern	<i>Ploceus</i>	<i>velatus</i>
188	Moorhen	Common	<i>Gallinula</i>	<i>chloropus</i>
189	Mousebird	Red-faced	<i>Urocolius</i>	<i>indicus</i>
190	Mousebird	Speckled	<i>Colius</i>	<i>striatus</i>
191	Myna	Common	<i>Acridotheres</i>	<i>tristis</i>
192	Neddicky	Neddicky	<i>Cisticola</i>	<i>fulvicapilla</i>
193	Nicator	Eastern	<i>Nicator</i>	<i>gularis</i>
194	Night-Heron	Black-crowned	<i>Nycticorax</i>	<i>nycticorax</i>
195	Nightjar	European	<i>Caprimulgus</i>	<i>europaeus</i>
196	Nightjar	Fiery-necked	<i>Caprimulgus</i>	<i>pectoralis</i>
197	Nightjar	Square-tailed	<i>Caprimulgus</i>	<i>fossii</i>
198	Olive-pigeon	African	<i>Columba</i>	<i>arquatrix</i>
199	Openbill	African	<i>Anastomus</i>	<i>lamelligerus</i>
200	Oriole	Black-headed	<i>Oriolus</i>	<i>larvatus</i>
201	Oriole	Eurasian Golden	<i>Oriolus</i>	<i>oriolus</i>
202	Osprey	Osprey	<i>Pandion</i>	<i>haliaetus</i>
203	Owl	Barn	<i>Tyto</i>	<i>alba</i>
204	Owl	Marsh	<i>Asio</i>	<i>capensis</i>

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205	Oystercatcher	Eurasian	<i>Haematopus</i>	<i>ostralegus</i>
206	Painted-snipe	Greater	<i>Rostratula</i>	<i>benghalensis</i>
207	Palm-swift	African	<i>Cypsiurus</i>	<i>parvus</i>
208	Paradise-flycatcher	African	<i>Terpsiphone</i>	<i>viridis</i>
209	Pelican	Great White	<i>Pelecanus</i>	<i>onocrotalus</i>
210	Pelican	Pink-backed	<i>Pelecanus</i>	<i>rufescens</i>
211	Petronia	Yellow-throated	<i>Petronia</i>	<i>superciliaris</i>
212	Pigeon	Speckled	<i>Columba</i>	<i>guinea</i>
213	Pipit	African	<i>Anthus</i>	<i>cinnamomeus</i>
214	Plover	Common Ringed	<i>Charadrius</i>	<i>hiaticula</i>
215	Plover	Greater Sand	<i>Charadrius</i>	<i>leschenaultii</i>
216	Plover	Grey	<i>Pluvialis</i>	<i>squatarola</i>
217	Plover	Kittlitz's	<i>Charadrius</i>	<i>pecuarius</i>
218	Plover	Lesser Sand	<i>Charadrius</i>	<i>mongolus</i>
219	Plover	Three-banded	<i>Charadrius</i>	<i>tricoloris</i>
220	Plover	White-fronted	<i>Charadrius</i>	<i>marginatus</i>
221	Pratincole	Collared	<i>Glareola</i>	<i>pratincola</i>
222	Prinia	Tawny-flanked	<i>Prinia</i>	<i>subflava</i>
223	Puffback	Black-backed	<i>Dryoscopus</i>	<i>cubla</i>
224	Pygmy-Goose	African	<i>Nettapus</i>	<i>auritus</i>
225	Pygmy-Kingfisher	African	<i>Ispidina</i>	<i>picta</i>
226	Quail	Common	<i>Coturnix</i>	<i>coturnix</i>
227	Quelea	Red-billed	<i>Quelea</i>	<i>quelea</i>
228	Quelea	Red-headed	<i>Quelea</i>	<i>erythroptera</i>
229	Rail	African	<i>Rallus</i>	<i>caerulescens</i>
230	Reed-warbler	African	<i>Acrocephalus</i>	<i>baeticatus</i>
231	Reed-warbler	Great	<i>Acrocephalus</i>	<i>arundinaceus</i>
232	Robin-chat	Cape	<i>Cossypha</i>	<i>caffra</i>
233	Robin-chat	Chorister	<i>Cossypha</i>	<i>dichroa</i>
234	Robin-chat	Red-capped	<i>Cossypha</i>	<i>natalensis</i>
235	Roller	Broad-billed	<i>Eurystomus</i>	<i>glaucus</i>
236	Roller	European	<i>Coracias</i>	<i>garrulus</i>
237	Ruff	Ruff	<i>Philomachus</i>	<i>pugnax</i>
238	Rush-warbler	Little	<i>Bradypterus</i>	<i>baboecala</i>
239	Sanderling	Sanderling	<i>Calidris</i>	<i>alba</i>
240	Sandpiper	Common	<i>Actitis</i>	<i>hypoleucos</i>
241	Sandpiper	Curlew	<i>Calidris</i>	<i>ferruginea</i>
242	Sandpiper	Marsh	<i>Tringa</i>	<i>stagnatilis</i>
243	Sandpiper	Terek	<i>Xenus</i>	<i>cinereus</i>
244	Sandpiper	Wood	<i>Tringa</i>	<i>glareola</i>
245	Saw-wing	Black (Southern race)	<i>Psolidoprocne</i>	<i>holomelaena</i>

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246	Scimitarbill	Common	<i>Rhinopomastus</i>	<i>cyanomelas</i>
247	Scrub-robin	Brown	<i>Cercotrichas</i>	<i>signata</i>
248	Scrub-robin	Bearded	<i>Cercotrichas</i>	<i>quadrivirgata</i>
249	Scrub-robin	White-browed	<i>Cercotrichas</i>	<i>leucophrys</i>
250	Shoveler	Cape	<i>Anas</i>	<i>smithii</i>
251	Shrike	Lesser Grey	<i>Lanius</i>	<i>minor</i>
252	Shrike	Red-backed	<i>Lanius</i>	<i>collurio</i>
253	Snake-eagle	Black-chested	<i>Circaetus</i>	<i>pectoralis</i>
254	Snake-eagle	Brown	<i>Circaetus</i>	<i>cinereus</i>
255	Snake-eagle	Southern Banded	<i>Circaetus</i>	<i>fasciolatus</i>
256	Snipe	African	<i>Gallinago</i>	<i>nigripennis</i>
257	Sparrow	House	<i>Passer</i>	<i>domesticus</i>
258	Sparrow	Southern Grey-headed	<i>Passer</i>	<i>diffusus</i>
259	Sparrowhawk	Black	<i>Accipiter</i>	<i>melanoleucus</i>
260	Sparrowhawk	Little	<i>Accipiter</i>	<i>minullus</i>
261	Spoonbill	African	<i>Platalea</i>	<i>alba</i>
262	Spurfowl	Natal	<i>Pternistis</i>	<i>natalensis</i>
263	Spurfowl	Swainson's	<i>Pternistis</i>	<i>swainsonii</i>
264	Starling	Black-bellied	<i>Lamprotornis</i>	<i>corruscus</i>
265	Starling	Cape Glossy	<i>Lamprotornis</i>	<i>nitens</i>
266	Starling	Common	<i>Sturnus</i>	<i>vulgaris</i>
267	Starling	Red-winged	<i>Onychognathus</i>	<i>morio</i>
268	Starling	Violet-backed	<i>Cinnyricinclus</i>	<i>leucogaster</i>
269	Starling	Wattled	<i>Creatophora</i>	<i>cinerea</i>
270	Stilt	Black-winged	<i>Himantopus</i>	<i>himantopus</i>
271	Stint	Little	<i>Calidris</i>	<i>minuta</i>
272	Stonechat	African	<i>Saxicola</i>	<i>torquatus</i>
273	Stork	Saddle-billed	<i>Ephippiorhynchus</i>	<i>senegalensis</i>
274	Stork	White	<i>Ciconia</i>	<i>ciconia</i>
275	Stork	Woolly-necked	<i>Ciconia</i>	<i>episcopus</i>
276	Stork	Yellow-billed	<i>Mycteria</i>	<i>ibis</i>
277	Sunbird	Amethyst	<i>Chalcomitra</i>	<i>amethystina</i>
278	Sunbird	Collared	<i>Hedydipna</i>	<i>collaris</i>
279	Sunbird	Grey	<i>Cyanomitra</i>	<i>veroxii</i>
280	Sunbird	Olive	<i>Cyanomitra</i>	<i>olivacea</i>
281	Sunbird	Purple-banded	<i>Cinnyris</i>	<i>bifasciatus</i>
282	Sunbird	Scarlet-chested	<i>Chalcomitra</i>	<i>senegalensis</i>
283	Sunbird	White-bellied	<i>Cinnyris</i>	<i>talatala</i>
284	Swallow	Barn	<i>Hirundo</i>	<i>rustica</i>
285	Swallow	Greater Striped	<i>Hirundo</i>	<i>cucullata</i>
286	Swallow	Grey-rumped	<i>Pseudhirundo</i>	<i>griseopyga</i>

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287	Swallow	Lesser Striped	<i>Hirundo</i>	<i>abyssinica</i>
288	Swallow	Red-breasted	<i>Hirundo</i>	<i>semirufa</i>
289	Swallow	White-throated	<i>Hirundo</i>	<i>albigularis</i>
290	Swallow	Wire-tailed	<i>Hirundo</i>	<i>smithii</i>
291	Swamp-warbler	Lesser	<i>Acrocephalus</i>	<i>gracilirostris</i>
292	Swamphen	African Purple	<i>Porphyrio</i>	<i>madagascariensis</i>
293	Swift	African Black	<i>Apus</i>	<i>barbatus</i>
294	Swift	Alpine	<i>Tachymarptis</i>	<i>melba</i>
295	Swift	Little	<i>Apus</i>	<i>affinis</i>
296	Swift	White-rumped	<i>Apus</i>	<i>caffer</i>
297	Tchagra	Black-crowned	<i>Tchagra</i>	<i>senegalus</i>
298	Teal	Cape	<i>Anas</i>	<i>capensis</i>
299	Teal	Hottentot	<i>Anas</i>	<i>hottentota</i>
300	Teal	Red-billed	<i>Anas</i>	<i>erythrorhyncha</i>
301	Tern	Black	<i>Chlidonias</i>	<i>niger</i>
302	Tern	Caspian	<i>Sterna</i>	<i>caspia</i>
303	Tern	Common	<i>Sterna</i>	<i>hirundo</i>
304	Tern	Lesser Crested	<i>Sterna</i>	<i>bengalensis</i>
305	Tern	Little	<i>Sterna</i>	<i>albigrons</i>
306	Tern	Sandwich	<i>Sterna</i>	<i>sandvicensis</i>
307	Tern	Swift	<i>Sterna</i>	<i>bergii</i>
308	Tern	Whiskered	<i>Chlidonias</i>	<i>hybrida</i>
309	Tern	White-winged	<i>Chlidonias</i>	<i>leucopterus</i>
310	Thick-knee	Spotted	<i>Burhinus</i>	<i>capensis</i>
311	Thick-knee	Water	<i>Burhinus</i>	<i>vermiculatus</i>
312	Thrush	Groundscraper	<i>Psophocichla</i>	<i>litsipsirupa</i>
313	Thrush	Kurrichane	<i>Turdus</i>	<i>libyanus</i>
314	Tinkerbird	Red-fronted	<i>Pogoniulus</i>	<i>pusillus</i>
315	Tinkerbird	Yellow-rumped	<i>Pogoniulus</i>	<i>bilineatus</i>
316	Tit	Southern Black	<i>Parus</i>	<i>niger</i>
317	Tit-flycatcher	Grey	<i>Myioparus</i>	<i>plumbeus</i>
318	Trogon	Narina	<i>Apaloderma</i>	<i>narina</i>
319	Turaco	Livingstone's	<i>Tauraco</i>	<i>livingstonii</i>
320	Turaco	Purple-crested	<i>Gallirex</i>	<i>porphyreolophus</i>
321	Turnstone	Ruddy	<i>Arenaria</i>	<i>interpres</i>
322	Turtle-dove	Cape	<i>Streptopelia</i>	<i>capicola</i>
323	Twinspot	Green	<i>Mandingoa</i>	<i>nitidula</i>
324	Vulture	Palm-nut	<i>Gypohierax</i>	<i>angolensis</i>
325	Wagtail	African Pied	<i>Motacilla</i>	<i>aguimp</i>
326	Wagtail	Cape	<i>Motacilla</i>	<i>capensis</i>
327	Wagtail	Mountain	<i>Motacilla</i>	<i>clara</i>

No	Common group	Common species	Genus	Species
328	Wagtail	Yellow	<i>Motacilla</i>	<i>flava</i>
329	Warbler	Broad-tailed	<i>Schoenicola</i>	<i>brevirostris</i>
330	Warbler	Dark-capped Yellow	<i>Chloropeta</i>	<i>natalensis</i>
331	Warbler	Garden	<i>Sylvia</i>	<i>borin</i>
332	Warbler	Marsh	<i>Acrocephalus</i>	<i>palustris</i>
333	Warbler	Sedge	<i>Acrocephalus</i>	<i>schoenobaenus</i>
334	Warbler	Willow	<i>Phylloscopus</i>	<i>trochilus</i>
335	Wattle-eye	Black-throated	<i>Platysteira</i>	<i>peltata</i>
336	Waxbill	Blue	<i>Uraeginthus</i>	<i>angolensis</i>
337	Waxbill	Common	<i>Estrilda</i>	<i>astrild</i>
338	Waxbill	Grey	<i>Estrilda</i>	<i>perreini</i>
339	Waxbill	Orange-breasted	<i>Amandava</i>	<i>subflava</i>
340	Weaver	Cape	<i>Ploceus</i>	<i>capensis</i>
341	Weaver	Dark-backed	<i>Ploceus</i>	<i>bicolor</i>
342	Weaver	Golden	<i>Ploceus</i>	<i>xanthops</i>
343	Weaver	Southern Brown-throated	<i>Ploceus</i>	<i>xanthopterus</i>
344	Weaver	Spectacled	<i>Ploceus</i>	<i>ocularis</i>
345	Weaver	Thick-billed	<i>Amblyospiza</i>	<i>albifrons</i>
346	Weaver	Village	<i>Ploceus</i>	<i>cucullatus</i>
347	Weaver	Yellow	<i>Ploceus</i>	<i>subaureus</i>
348	Whimbrel	Common	<i>Numenius</i>	<i>phaeopus</i>
349	White-eye	Cape	<i>Zosterops</i>	<i>virens</i>
350	Whydah	Pin-tailed	<i>Vidua</i>	<i>macroura</i>
351	Widowbird	Fan-tailed	<i>Euplectes</i>	<i>axillaris</i>
352	Widowbird	Red-collared	<i>Euplectes</i>	<i>ardens</i>
353	Widowbird	White-winged	<i>Euplectes</i>	<i>albonotatus</i>
354	Wood-dove	Emerald-spotted	<i>Turtur</i>	<i>chalcospilos</i>
355	Wood-owl	African	<i>Strix</i>	<i>woodfordii</i>
356	Woodpecker	Cardinal	<i>Dendropicos</i>	<i>fuscescens</i>
357	Woodpecker	Golden-tailed	<i>Campethera</i>	<i>abingoni</i>
358	Woodpecker	Olive	<i>Dendropicos</i>	<i>griseocephalus</i>

No	Common group	Common species	Genus	Species
HERPETOFAUNA				
Reptiles				
1	Agama	Southern tree agama	<i>Acanthocercus</i>	<i>atricollis</i>
2	Agama	Distant's ground agama	<i>Agama</i>	<i>aculeata distanti</i>
3	Centipede -eater	Black-headed Centipede-eater	<i>Aparallactus</i>	<i>capensis</i>
4	Chameleon	Common Flap-neck Chameleon	<i>Chamaeleo</i>	<i>dilepis</i>
5	Chameleon	Umlalazi dwarf chameleon	<i>Bradypodion</i>	<i>caeruleogula</i>
6	Crocodile	Nile crocodile	<i>Crocodylus</i>	<i>niloticus</i>
7	Gecko	Common dwarf gecko	<i>Lygodactylus</i>	<i>capensis</i>
8	Gecko	Common tropical house gecko	<i>Hemidactylus</i>	<i>mabouia</i>
9	Gecko	Pondo flat gecko	<i>Afroedura</i>	<i>pondolia</i>
10	Gecko	Wahlberg's velvet gecko	<i>Homopholis</i>	<i>wahlbergii</i>
11	Gecko	Spotted gecko	<i>Pachydactylus</i>	<i>maculatus</i>
12	Gecko	Van Son's thick-toed gecko	<i>Pachydactylus</i>	<i>vansonii</i>
13	Lizard	Delalande's sandveld lizard	<i>Nucras</i>	<i>lalandii</i>
14	Lizard	Cape grass lizard	<i>Chamaesaura</i>	<i>anguina</i>
15	Lizard	Large-scaled grass lizard	<i>Chamaesaura</i>	<i>macrolepis</i>
16	Lizard	Common girdled lizard	<i>Cordylus</i>	<i>vittifer</i>
17	Lizard	Yellow-throated plated lizard	<i>Gerrhosaurus</i>	<i>flavigularis</i>
18	Monitor	Water monitor	<i>Varanus</i>	<i>niloticus</i>
19	Monitor	Southern rock monitor	<i>Varanus</i>	<i>albigularis</i>
20	Seps	Eastern long-tailed seps	<i>Tetradactylus</i>	<i>africanus</i>
21	Skink	Eastern coastal skink	<i>Trachylepis</i>	<i>depressa</i>
22	Skink	Giant legless skink	<i>Acontias</i>	<i>plumbeus</i>
23	Skink	Striped skink	<i>Trachylepis</i>	<i>striata</i>
24	Skink	Variable skink	<i>Trachylepis</i>	<i>varia</i>
25	Skink	Wahlberg's Snake-eyed Skink	<i>Panaspis</i>	<i>wahlbergii</i>
26	Skink	Cape skink	<i>Trachylepis</i>	<i>capensis</i>
27	Skink	Rainbow skink	<i>Trachylepis</i>	<i>margaritifer</i>
28	Skink	Mozambique dwarf burrowing skink	<i>Scelotes</i>	<i>mossambicus</i>
29	Slug-eater	Variiegated Slug-eater	<i>Duberria</i>	<i>variegata</i>
30	Snake	Black file snake	<i>Gonionotophis</i>	<i>nyassae</i>
31	Snake	Boomslang	<i>Dispholidus</i>	<i>typus typus</i>
32	Snake	Brown house snake	<i>Boaedon</i>	<i>capensis</i>
33	Snake	Brown water snake	<i>Lycodonomorphus</i>	<i>rufulus</i>
34	Snake	Cape wolf snake	<i>Lycophidion</i>	<i>capense</i>
35	Snake	Common file snake	<i>Gonionotophis</i>	<i>capensis</i>
36	Snake	Common Purple-glossed Snake	<i>Amblyodipsas</i>	<i>polylepis</i>
37	Snake	Eastern natal green snake	<i>Philothamnus</i>	<i>natalensis</i>
38	Snake	Mozambique spitting cobra	<i>Naja</i>	<i>mossambica</i>
39	Snake	Olive grass snake	<i>Psammophis</i>	<i>mossambicus</i>

No	Common group	Common species	Genus	Species
40	Snake	Olive house snake	<i>Lycodonomorphus</i>	<i>inornatus</i>
41	Snake	Red-lipped Snake	<i>Crotaphopeltis</i>	<i>hotamboeia</i>
42	Snake	Rhombic Egg-eater	<i>Dasypeltis</i>	<i>scabra</i>
43	Snake	Rhombic night adder	<i>Causus</i>	<i>rhombeatus</i>
44	Snake	Snouted cobra	<i>Naja</i>	<i>annulifera</i>
45	Snake	South eastern green snake	<i>Philothamnus</i>	<i>hoplogaster</i>
46	Snake	Southern twig snake	<i>Thelotornis</i>	<i>capensis</i>
47	Snake	Spotted bush snake	<i>Philothamnus</i>	<i>semivariiegatus</i>
48	Terrapin	Variable hinged terrapin	<i>Pelusios</i>	<i>rhodesianus</i>
Frogs				
1	Bull frog	African bull frog	<i>Pyxicephalus</i>	<i>edulis</i>
2	Caco	Stiped caco	<i>Cacosternum</i>	<i>striatum</i>
3	Folding Frog	Delicate Leaf-folding Frog	<i>Afrivalus</i>	<i>delicates</i>
4	Folding Frog	Greater Leaf-folding Frog	<i>Afrivalus</i>	<i>fornasinii</i>
5	Folding Frog	Natal Leaf-folding Frog	<i>Afrivalus</i>	<i>spinifrons</i>
6	Grass frog	Broadbanded grass frog	<i>Ptychadena</i>	<i>mossambica</i>
7	Grass frog	Plain grass frog	<i>Ptychadena</i>	<i>anchietae</i>
8	Grass frog	Sharpnosed grass frog	<i>Ptychadena</i>	<i>oxyrhynchus</i>
9	Grass frog	Striped grass frog	<i>Ptychadena</i>	<i>porosissima</i>
10	Kassina	Bubbling kassina	<i>Kassina</i>	<i>senegalensis</i>
11	Kassina	Redlegged kassina	<i>Kassina</i>	<i>maculate</i>
12	Lily frog	Water lily frog	<i>Hyperolius</i>	<i>pusillus</i>
13	Nest frog	Southern foam nest frog	<i>Chiromantis</i>	<i>xerampelina</i>
14	Nosed Frog	Spotted Shovel-nosed Frog	<i>Hemisus</i>	<i>guttatus</i>
15	Platanna	Common platanna	<i>Xenopus</i>	<i>laevis</i>
16	Puddle frog	Dwarf puddle frog	<i>Phrynobatrachus</i>	<i>mababiensis</i>
17	Puddle frog	Snoring puddle frog	<i>Phrynobatrachus</i>	<i>natalensis</i>
18	Rain frog	Bushveld rain frog	<i>Breviceps</i>	<i>adspersus</i>
19	Rain frog	Mozambique rain frog	<i>Breviceps</i>	<i>mossambicus</i>
20	Rain frog	Whistling rain frog	<i>Breviceps</i>	<i>sopranus</i>
21	Reed frog	Argus reed frog	<i>Hyperolius</i>	<i>argus</i>
22	Reed frog	Painted reed frog	<i>Hyperolius</i>	<i>marmoratus</i>
23	Reed frog	Pickersgill's reed frog	<i>Hyperolius</i>	<i>pickersgilli</i>
24	Reed Frog	Sharp-headed Long Reed Frog	<i>Hyperolius</i>	<i>microps</i>
25	Reed frog	Tinker reed frog	<i>Hyperolius</i>	<i>tuberilinguis</i>
26	Reed frog	Yellowstriped reed frog	<i>Hyperolius</i>	<i>semidiscus</i>
27	River frog	Delalande's river frog	<i>Amietia</i>	<i>delalandii</i>
28	Rubber frog	Banded rubber frog	<i>Phrynomantis</i>	<i>bifasciatus</i>
29	Sand frog	Natal sand frog	<i>Tomopterna</i>	<i>natalensis</i>
30	Sand frog	Tremelo sand frog	<i>Tomopterna</i>	<i>cryptotis</i>
31	Squeaker	Bush squeaker	<i>Arthroleptis</i>	<i>wahlbergi</i>

No	Common group	Common species	Genus	Species
32	Squeaker	Shovel-footed Squeaker	<i>Arthroleptis</i>	<i>stenodactylus</i>
33	Stream frog	Clicking stream frog	<i>Strongylopus</i>	<i>grayii</i>
34	Stream frog	Striped stream frog	<i>Strongylopus</i>	<i>fasciatus</i>
35	Toad	Guttural toad	<i>Sclerophrys</i>	<i>gutturalis</i>
36	Toad	Olive toad	<i>Sclerophrys</i>	<i>garmani</i>
37	Toad	Red toad	<i>Schismaderma</i>	<i>carens</i>
38	Tree frog	Brownbacked tree frog	<i>Leptopelis</i>	<i>mossambicus</i>

Addendum B: Curriculum Vitae



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CURRICULUM VITAE

SURNAME	ADAM (Weiermans)
FIRST NAMES	JACOLETTE
IDENTITY NUMBER	7407190109082
DEGREES	MSc; LLM (Environmental Law)
PROFESSIONAL REGISTRATION	Professional Natural Scientist (400088/02) Environmental Assessment Practitioner of South Africa (2019/1040) EAPASA Assessor
NATIONALITY	South African
CONTACT NUMBER	+27 82 852 6417
YEARS OF PROFESSIONAL EXPERIENCE	20

CAREER HISTORY:

Jacolette obtained a Master of Science in Zoology from the University of Pretoria, South Africa in 2000. Her thesis, *Roads as Ecological Edges for Rehabilitating Coastal Dune Assemblages in Norther Kwa-Zulu-Natal, South Africa* (published in *Restoration Ecology* Vol 11, Issue 1, p: 43-46) was based on field work conducted in the rehabilitating forests of Richards Bay Minerals, north of Richards Bay. In 2019 she also obtained a LLM degree in Environmental Law. For this degree, her dissertation assessed the 'Legislative challenges with wetland mitigation banking in South Africa'. This included aspects such as the available and required policy, tools and frameworks required for implementing wetland banking, specifically also addressing the finance options, such as BIOFIN and debating the business aspects of wetland banking.

Since 2016, Jacolette has been the Director of WETREST (Centre for Wetland Research and Training). WETREST is a Public Benefit Organisation (PBO) with the following objectives:

1. Identify research gaps/needs in wetland conservation, and raise funds to address these with scientific based research;
2. Establish a series of university accredited wetland training modules, and develop a series of practical/technical training courses to support wetland practitioners;
3. Render free expertise and support to Interested and Affected Parties where wetlands are threatened by development (mining, infrastructure, damming, pollution, draining etc); and
4. Develop a wise-use centre to support sustainable wetland utilization.

This PBO has been involved in various research projects within South Africa and on an international scale.

Jacolette has gained 20 years of professional experience in the environmental sector and has been a certified Professional Natural Scientist with the South African Council for Natural and Scientific Professionals (SACNASP) since 2002. In 2019 she was awarded the KZN Regional Business Women of the Year 2019 award in the Environmental Entrepreneur category. She is registered with the Environmental Assessment Practitioners of South African (2019/1040) and is also an EAPASA Assessor. She has been a Fellow member of the Water Institute of South Africa (WISA) since 2012.

Since 2002, she has led and completed numerous environmental assessments in terms of various legislated processes throughout South Africa and Africa, for a wide range of clients, including the mining sector, large-scale housing developments, private lodge developments, telecommunication industry, various engineering projects including linear projects such as pipelines, road construction, road upgrades as well as site based engineering services. She has also been responsible for various strategic

projects such as Integrated Environmental Management Programmes for municipalities as well as Provincial State of the Environment Reports. Her expert skill of environmental legislative knowledge provides value to the environmental applications and review of peer reviews of environmental legal matters.

Jacquette has proven the capability to complete environmental assessments of challenging projects with various approvals required from different authorities, including Department of Environmental Affairs, Department of Agriculture, Forestry and Fisheries, Department of Water and Sanitation and Department of Mineral Resources. Her expertise is in managing these complex projects with the wide range of specialists and identifying the key risks which needs to be mitigated.

As part of her specialist expertise, she has conducted ecological and wetland assessments throughout South Africa, for various different types of projects, including the challenges of linear and large-scale infrastructure. Linked to these ecological and wetland assessments, lies her passion for successfully implementing biodiversity offsets with relevant government Departments and related authorities. She has also been responsible and part of teams to conduct ecological cost benefit analysis for projects such as the Richards Bay Port Expansion Programme.

Her knowledge of statistical analysis was developed during her MSc studies, and further evolved during the years of assessing field work data. She has proven experience in time series analysis, linear and non-linear modelling, classification and clustering.

Being the managing member of Exigent, an environmental and engineering consultancy firm, since 2002, her responsibility has included on-time delivery, finance management and client liaison of the overall project, specifically focussing on management of the Environmental Impact Assessment (EIA) process, especially the interdisciplinary team of specialists, both in-house and contracted - thereby including all specialist studies, the EIA application process, the Integrated Water Use License Application and Environmental Management Programme Reporting process, ecological and/or wetland specialist studies, Red Data Species application, water quality assessments, biodiversity offsets, other related permits e.g. heritage and archaeological, protected species removal permits and Environmental Control Officer duties, where required.

As part of the environmental services to various mining houses, financial closure calculations have been assessed based on the previous and the more recently promulgated South African regulations. Furthermore, as part of her project manager responsibilities, was compiling the first draft of the Mining and Biodiversity Guidelines for the Chamber of Mines in 2008.

Jacquette has been involved in compilation of various strategic Environmental Management Documents, e.g. the Umhlathuze Integrated Environmental Management Plan, Environmental Aspects of the Mbonambi Nodal Framework Plans, Interim Report on Sustainable Development for the Department of Environmental Affairs in Northern Province as well as Strategic Business Plans for Johannesburg Water.

In 2008, she compiled an environmental awareness training course for a large Consulting Engineering firm, and it was presented to all their branches country-wide. Throughout the years, she introduced the value of an environmental feasibility studies to various clients by assisting with initial site screenings for Red Data species, sensitive ecological habitats, such as watercourses and wetlands and their related buffers. This also involves an initial assessment of the environmental legal and physical site constraints. Numerous of these studies were conducted to a range of clients, which assists in decision-making early in the project development phase, reducing the risk to the client.

Since 2002, she has been appointed as the environmental specialist on various Public Private Partnership projects, as regulated by the Public Finance Management Act. This included strategic environmental input to various phases of the project, ranging from between different levels of detail of environmental contribution throughout the process.

During the 20 years, she has proven herself in a broad range of environmental expertise which includes the following: *Strategic Biodiversity Planning; Biodiversity Offset Plans; Red Data Species Evaluation,*

Environmental project management of large scale project; Environmental Impact Assessments (EIA); Environmental Management Programmes and Plan; State of Environment Reporting; Environmental license audits; Public Private Partnerships; Geographic Information Systems (GIS) based analysis; Applicability of Environmental Legislation; Environmental Control officers during project implementation; Specialist studies such as Wetland Assessments, Ecological Assessments, Water Quality Assessments, Wildlife Management Plans; Management Plans such as Mine Rehabilitation Plans, Ecosystem rehabilitation plans; Water Services Development Plan; Environmental management legal and implementation course compilation and training and Environmental feasibility studies.

EMPLOYMENT HISTORY:

Date	Employer	Position
2002 – currently	Exigent	Managing member
2001 – 2002	Dynacon Technologies	Environmental Project Manager
2000 – 2001	VKE Engineers	Environmental Scientist
1999	University of Pretoria	Conservation Researcher

2002 – Currently Exigent

In 2002 Jacolette took the step to exit corporate employment and became the Manager of the Environmental Business Unit. She is thus responsible for all project deliverables from within the Environmental Business Unit of Exigent. Exigent grew from 2002 being only herself, to 16 staff members in 2008, of which 14 were professional scientists. Exigent provides the full spectrum of all environmental services from the two offices, located in Richards Bay and Pretoria, and conducts projects throughout South Africa, and selected countries within Africa.

In December 2008, the Environmental Business Unit downscaled for a few years whilst circumnavigating on their yacht as a family. During this period of downscaling, Jacolette was responsible for an environmental assessment process for a large international mining company in Kwa-ZuluNatal. The legislated environmental assessment process started in 2009, and included 14 specialists with various expertise. This was a very sensitive and challenging project in terms of the surrounding ecosystems in close proximity to protected environments, Red Data species, as well as socio-economic aspects such as neighbouring communities and job opportunities. All three required environmental authorisations were successfully obtained.

Since 2013, the projects of Exigent has grown and are currently involved in a variety of projects for local and District level Municipalities, Richards Bay Minerals, Richards Bay Industrial Development Zone, Gautrain Management Agency, TRANSNET, Mpact, SMEC, Aurecon, Cosmopolitan Projects, SASOL and various private developers. The offices have since 2013 again grown into an entity of 5 professional environmental personnel.

PREVIOUS EMPLOYMENT:

2001 – 2002 Dynacon Technologies (VKE Engineers merging company) – Environmental Project Manager

After the merge of Dynacon Technologies with VKE Engineers, Jacolette was appointed as the Manager of the Environmental Impact Assessment section and had to manage all phases of the project process, client liaison, compiling proposals, financial management, specialist appointments and scope of works, compiling EIA reports, public meetings and public participation processes.

2000 – 2001 VKE Engineers - Environmental scientist

Jacolette joined the Environmental Department at the Johannesburg offices of VKE Engineers in 2000. Various EIAs and environmental management projects were conducted throughout South Africa and she was responsible for contacting specialists, client liaison and overall management of the projects as well as financial project flows and estimates. Specifically related to the project duties, her duties included compilation of the environmental assessment reports, ecological field assessments and specialist studies, as well as conducting the public participation processes and facilitation of public meetings.

1999 - University of Pretoria, Dr. Albert van Jaarsveld (for the Peregrine fund - Research position)

Jacquette conducted a GIS research project on the distribution of birds of prey in Madagascar for the Peregrine Fund. This project included making contact with various research organisations in South Africa as well as Madagascar in order to obtain sighting and other data of the various birds included in the study. All available information contained in atlases and research papers were included in the dataset and distribution maps.

Her responsibilities included the final report including maps on the distribution status of endangered raptors of Madagascar, as well as an electronic GIS database.

QUALIFICATIONS OBTAINED AND COURSES ATTENDED:

Date	Institution	Qualification Obtained
2020	UNDP Global Programme on Nature for Development. Learning for Nature.	Welcome to Climate Change course (<i>in process</i>)
		Protected Area Law (certificate course, May 2020)
		Biodiversity Finance (certificate course, May 2020)
		Ecosystem Services Valuation (<i>in process</i>)
2019	University of KwaZulu-Natal	LLM (Environmental Law)
2018	Alliance for Water Stewardship	AWS accreditation as a Water Stewardship Service Provider
2017	Water Institute of South Africa, KZN Branch	Water Use Licensing Workshop
2016	Department of Water and Sanitation	General Authorisation (GA) 509 training workshop
2017	Shepstone and Wiley	Environmental Law Breakfast Seminar, 2017 EIA Regulations
2015	Terra Firma Academy	Carbon Footprint Analyst (certificate course)
2015	Shepstone and Wiley	Environmental Law Half-Day Seminar, EIA Regulations
2015	WetRest – Centre for Wetland Research and Training	Wetlands – The basics: Identification, function and delineation (certificate course)
2004	The Directorate of Professional Programmes of the Geological Society of South Africa	Groundwater in South Africa: Our most valuable future resource (Certificate Course)
2003	Working for Wetlands	Wetland Rehabilitation Certificate Course
	Shangoni Management	Environmental Auditing Certificate Course-ISO 14001
	Rhodes University	Environmental and Resource Economics (Certificate Course)
2002	University of South Africa	Certificate course on Advanced Business Communication (1 year)
	DEA	Project Developer's Forum on Cleaner Development Mechanisms (CDM)
2001	AfriDev Consultants	SASS5 Biomonitoring Techniques Certificate
2000	VKE Engineers	Managing Projects in a Consulting Engineer's Practise Certificate
1999	University of Pretoria	GIS project Researcher - Madagascar raptors
2000	University of Pretoria	MSc Zoology (Restoration Ecology)
1996	University of Pretoria	BSc (Hons) (Zoology)
1995	University of Pretoria	BSc (Zoology)
1992	Verwoerdburg High School, Pretoria	Matriculation

SCIENTIFIC PUBLICATIONS AND CONFERENCES ATTENDED:

Date	Conference/publication
2019	IAIA SA KZN Branch Workshop on Offsets – presenter ' <i>Legislative challenges with wetland mitigation banking in South Africa</i> '.
2019	Annual Environmental Law Association Conference, KZN. Presentation: ' <i>Legislative challenges with wetland mitigation banking in South Africa</i> ' –26, 27 September 2019
2019	Wetland Forum KZN, Specialist presentation: ' <i>Legislative challenges with wetland mitigation banking in South Africa</i> '
2018	National Wetlands Indaba, Kimberley, Northern Cape. Presentation: 'Legislative challenges with wetland mitigation banking in South Africa'. Awarded 'Best presentation' at the Indaba.

Date	Conference/publication
2015	National Wetlands Indaba, Western Cape.
2012	Conservation Biology Oceania Conference, Charles Darwin University, Darwin, Australia
2000	Weermans, J. & R. J. van Aarde. The effects of habitat edges in rehabilitating coastal dune communities in Richards Bay, KwaZulu – Natal, South Africa. <i>Restoration Ecology</i> Vol 11, Issue 1, p: 43-46.
2000	Weermans, J. & R. J. van Aarde. The effects of habitat edges in rehabilitating coastal dune communities in Richards Bay, KwaZulu – natal, South Africa. Paper presented at the Wildlife Management Association of Southern Africa 2000 Symposium.
1997	Weermans, J., A. van Jaarsveld & S. Chown. A multiple scale analysis of South African bird body – size distributions. Paper presented at the Zoological Society of Southern Africa 1997 conference.

MEMBERSHIP OF OTHER PROFESSIONAL BODIES OR RELEVANT ORGANISATIONS:

Jacquette is registered as a Professional Natural Scientist (Pr. Sci. Nat., Reg number: 400088/02) since 2002, registered Environmental Assessment Practitioner of South Africa (EAPASA 2019/1040), reviewer of EAPASA applications, and a Fellow member of the Water Institute of South Africa (WISA). She is also a member of the Environmental Law Association of South Africa (ELA) (2016/224/KZN), the Wetlands Society of South Africa and Wetland Forum in Kwa-Zulu Natal, and the North Coast Region representative of the South African Affiliate of the International Association for Impact Assessment (IAIASA).

Jacquette has been Director of a Public Beneficial Organisation (WETREST) since 2016. WETREST is involved in research projects for organisations such as the Water Research Council (WRC) involved in scientific research, with specific focus on wetlands and restoration.



CURRICULUM VITAE

SURNAME : SMUTS (Coetsee)
FIRST NAMES : Charleen
IDENTITY NUMBER : 8303150185080
PROFESSIONAL REGISTRATION : Professional Natural Scientist (Pr. Sci. Nat., Reg number: 115412)
South African Affiliate of the International Association for Impact
Assessment (IAIA, Membership Number 3824)
South African Wetland Society, as well as Wetlands Forum KZN
(Member)
NATIONALITY : South African
CONTACT NUMBER : 081 398 1163
YEARS OF EXPERIENCE : 8

CAREER HISTORY:

Charleen obtained a Master of Science in Botany from the University of Pretoria in 2012. Her thesis, *The effect of vegetation on the behaviour and movements of Burchell's Zebra, Equus burchelli (Gray 1824) in the Telperion Nature Reserve, Mpumalanga, South Africa*, was based on field work conducted in the eZemvelo Nature Reserve in Bronkhorstspuit.

She has gained 8 years of professional experience in the environmental sector. She has been certified as a Professional Natural Scientist and is a member of the South African Affiliate of the International Association for Impact Assessment, the South African Wetland Society and Botanical Society of South Africa.

She has successfully conducted project management for numerous environmental assessments in terms of various legislated processes throughout South Africa for a wide range of clients, including the large-scale housing developments, private lodge developments, various engineering projects including pipelines, road construction and road upgrades. She has been responsible for strategic projects such as Integrated Environmental Management Programmes for uMhlathuze Municipality.

Due to her training as an ecologist/botanist she also provides the specialist skill of wetland and ecological assessments. Charleen has worked in six of the provinces of South Africa.

Charleen has proven the capability to complete environmental assessments of challenging projects with various approvals required from different authorities, including Department of Environmental Affairs, Department of Agriculture, Forestry and Fisheries, and Department of Water and Sanitation. Her expertise is in managing these complex projects with the wide range of specialists, and identifying the key issues which needs to be mitigated. In line with the newer developments in the environmental field, she has obtained valuable experience in compiling biodiversity offset documents and negotiating these aspects with relevant government Departments and related authorities.

She has proven expertise in a broad range of environmental expertise which includes the following:

- *Strategic Biodiversity Planning*
- *Biodiversity Offset Plans*
- *Environmental project management of large scale projects*
- *Environmental audits*

- *Environmental Impact Assessments*
- *Environmental Management Plans*
- *State of Environment Reporting (SoER)*
- *Geographic Information Systems (GIS) based analysis*
- *Applicability of Environmental Legislation*
- *Environmental Control officers during project implementation*
- *Specialist studies such as Vegetation Assessments, Wetland Assessments, Ecological Assessments, Water Quality Assessments*
- *Environmental Feasibility Studies*

EMPLOYMENT HISTORY:

Date	Employer	Position
2014 – currently	Exigent	Senior Environmental Project Manager and Ecologist
2007-2009	MSA Group Services	Project Manager/Ecologist
2006-2007	University of Pretoria	Demonstrator/Field assistant

2014 – Current Senior Environmental Project Manager and Ecologist – Exigent Engineering

Charleen joined Exigent in 2014. Together with the Managing Member, Jacolette Adam, she conducts various Environmental Impact Assessments and environmental management projects throughout South Africa. Charleen is responsible for liaison with specialists, clients, authorities and stakeholders. She is also responsible for overall management of the projects. Specifically related to the project duties - her duties included development of terms of reference, tenders and project proposals. She manages project timeframes and compiles environmental risk assessment reports, screening reports, scoping reports, impact assessment reports, basic assessment reports and environmental auditing reports. She is responsible for water use license applications and motivation reports dealing with exemptions, ecological assessments, vegetation assessments and wetland delineations and functionality assessments, well as conducting and facilitating the public participation processes.

2007 – 2009 Environmental Project Manager and Ecologist – MSA Group Services

At MSA, Charleen was responsible for overall project management and administration of various projects around KwaZulu-Natal. She managed and co-ordinated project teams and specialists, liaison with clients, authorities and stakeholders, Co-ordinated and facilitated the public participation process. In addition, she developed of terms of reference, tenders and project proposals, managed project timeframes; and compiled basic assessment reports, environmental impact assessments, scoping reports, environmental screening reports, ecological assessments and wetland delineations, and used Geographic Information Systems (ArcGIS).

2006-2007 Demonstrator and field assistant – University of Pretoria

As a postgraduate student at the University of Pretoria, Charleen marked second year botany (BOT251) semester tests and were a demonstrator for first year Molecular and Cell Biology course (MLB 111), stand-in demonstrator for the first-year Biology course (BLG 150) and a demonstrator for the first year Botany 161 course. She also assisted in fieldwork of other postgraduate students throughout South Africa.

QUALIFICATIONS OBTAINED AND COURSES ATTENDED:

Date	Institution	Qualification Obtained
2019	GroundTruth: Water, Wetlands and Environmental Engineering	SASS5 course
2018	KZN Department of Agriculture & Rural	Soil classification and land capability

Date	Institution	Qualification Obtained
2019	GroundTruth: Water, Wetlands and Environmental Engineering	SASS5 course
	Development - Cedara College of agriculture	
2017	Water Research Commission	Wetland Plant Taxonomy Training
2015	WetRest – Centre for Wetland Research and Training	Wetlands – The basics: Identification, function and delineation
2015	International Association for Impact Assessments	IAP Public Participation Mini Training Event
2012	University of Pretoria	MSc Plant Science
2006	University of Pretoria	BSc (Hons) (Botany)
2005	University of Pretoria	BSc (Ecology)
2001	Brandwag High School, Benoni	Matriculation

SCIENTIFIC RESEARCH OUTPUTS AND CONFERENCES / WORKSHOPS ATTENDED:

Date	Research Outputs
2017	National Wetlands Indaba, KwaZulu-Natal
2017	Environmental Law Breakfast Seminar, Shepstone and Wiley
2017	Water Use Licensing Workshop, Water Institute of South Africa, KZN Branch
2016	General Authorisation (GA) 509 training workshop, Department of Water and Sanitation
2015	National Training and Development – Buffer Zone Workshop, Water Research Commission
2015	Environmental Law Half-Day Seminar, Shepstone and Wiley
2015	National Wetlands Indaba, Western Cape
2012	Coetzee, C. & Bredenkamp, G.J. The effect of vegetation on the behaviour and movements of Burchell's Zebra (<i>Equus burchelli burchelli</i>) in the Telperion Nature Reserve, Mpumalanga, South Africa). Dissertation.
2008	Coetzee, C & Bredenkamp, G.J. Black or white, which habitat is right? Department of Botany, University of Pretoria, dissertation Symposium 2008.
2006	Coetzee, C. & Van Rooyen, M.W. Seed bank size and species composition in the Upland Succulent Karoo: Commercial <i>versus</i> Communal rangelands.
2005	Coetzee, C. & Van Rooyen, M.W. Seed bank size and species composition in the Upland Succulent Karoo: Commercial <i>versus</i> Communal rangelands. Department of Botany, University of Pretoria, Project Presentation Symposium 2005.
2005	Coetzee, C & Van Wyk, A.E. <i>Acacia</i> species and ants: a love-hate relationship. Department of Botany, University of Pretoria, Seminar.
2005	Coetzee, C. & Bredenkamp, G.J. <i>Themeda triandra</i> : A prominent grass of South Africa. Department of Botany, University of Pretoria, Seminar
2005	Coetzee, C., Henstock, R., Wolmarans, R., Strumpher, C. Habitat fragmentation on the University of Pretoria Main campus and its effect on the bird populations.
2004	Coetzee, C., Wolmarans, R., Henstock, R., Peacock, F., Strumpher, C. A comparative study of the vegetation in the Drakensberg along different altitudinal gradients.

MEMBERSHIP OF OTHER PROFESSIONAL BODIES OR RELEVANT ORGANISATIONS:

Charleen is a member of the South African Council for Professional Natural Scientists (Pri. Sci. Nat. Reg. No. 115412), the South African Affiliate of the International Association for Impact Assessment (IAIAsa) and a member of the South African Wetland Society (SAWS) and the KwaZulu-Natal Wetland Forum branch.

Addendum C: Declaration of Independence



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

File Reference Number:
NEAS Reference Number:
Date Received:

(For official use only)

DEA/EIA/

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Development of the 450MW Emergency Risk Mitigation Power Plant (RMPP) and associated Infrastructure on sites located in Alton, Richards Bay, KwaZulu-Natal Province

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Exigent Engineering Consultants cc		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100%
Specialist name:	Jacquette Adam		
Specialist Qualifications:	MSc. and LLM		
Professional affiliation/registration:	Pr. Sci. Nat. (400088/02). Environmental Law Association (ELA) of SA. International Association of Impact Assessment (South African Chapter). South African Institute of Ecologists and Environmental Scientists. Fellow member of the Water Institute of South Africa.		
Physical address:	10 Water Ways Estate Bridgetown road Richards Bay		
Postal address:	PO Box 9514, Richards Bay		
Postal code:	3900	Cell:	082 852 6417
Telephone:	035 788 0398	Fax:	086 614 7327
E-mail:	jacquette@exigent.co.za		

2. DECLARATION BY THE SPECIALIST

I, Jacquette Adam, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Jacquette Adam

Signature of the Specialist

Exigent Engineering Consultants

Name of Company:

29/09/2020

Date

Details of Specialist, Declaration and Undertaking Under Oath

3. UNDERTAKING UNDER OATH/ AFFIRMATION

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

Adam

Signature of the Specialist

Exigent

Name of Company

29/09/2020

Date

HP 99569-9565
HP 810729

Signature of the Commissioner of Oaths

OPERATIONAL RESPONSE SERVICE
RICHARDS BAY

2020-0720 810729

Date

COMMUNITY SERVICE CENTRE
SEA BORDER POLICE