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ECOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED 15 STRATHCONA DRIVE DEVELOPMENT, PALMCLIFF, KWAZULU-NATAL, SOUTH AFRICA.



APRIL 2020

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Declaration

I, **Leigh-Ann de Wet**, declare that -

- I act as the independent specialist in this matter;
- I do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- 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 National Environmental Management Act (Act 107 of 1998) (NEMA), regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the NEMA Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity; and
- 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 report are true and correct.

Signature of the specialist:



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Executive summary

The proposed Strathcona Drive development is located just outside of Umkomaas along the R102 in Clansthal at 15 Strathcona Drive. The planned development is residential in nature, with 40 residential units planned for development over approximately half of the site adjacent to Strathcona Drive. The site is completely covered in indigenous forest.

Vegetation of the study site is described by Mucina and Rutherford as Northern Coastal Forest and as Ezemvelo KwaZulu-Natal Wildlife as East Coast Dune Forest, which is Critically Endangered. There is one reserve, the Aliwal Shoal Marine Protected Area to the east within 10km of the site and no Protected Areas within 5km of the site. The site is not located within any CBAs, however there is a network of Irreplaceable CBAs within 5km of the site. The site is not located in any ESAs, however there is an ESA within 5km of the site. The site falls into terrestrial D'MOSS and should be conserved as far as is possible. The site is comprised of forest, which is Critically Endangered according to D'MOSS and within which no development is allowed. Communication with the Ethekwini Municipality is critical in this case prior to any development taking place and either a relaxation of the D'MOSS boundary allowed with caveats, or the prohibition of development on the site.

A site assessment was conducted on the 6th of March 2020. This date falls within the November to April wet season determine by Ezemvelo KZN Wildlife. The site was difficult to access in its entirety due to steep slopes and impenetrable, thorny vegetation. The vegetation of the study area comprises one vegetation community: indigenous coastal forest. The species composition and structure indicates that this forest approximates the Northern Coastal Forest as described by Mucina and Rutherford (2006) for the area. As such, it can be further classified as required as part of D'MOSS as well as a Critically Endangered Ecosystem (per KZN mapping). The Irreplaceable CBA extent should encompass this site. Overall, the species recorded from the site include 82 identified species, six of which are Species of Conservation Concern and eleven of which are alien invasive plants.

The site is assessed as high sensitivity as it is comprised of indigenous forest that is critically endangered. The site is also somewhat contiguous with other remaining forest along the beach at this site (separated by a railway line). Overall impacts are very high to medium, with mitigation measures resulting in the reduction to medium or low in most cases. Leaving the site as is, with no management interventions will result in impacts equal to or higher than those associated with developing the site, even if the full site is lost (Table 1).

Table 1: Summary of impacts associated with the proposed 15 Strathcona Drive development.

Impact	Without Mitigation	With mitigation	No-Go
Issue 1: Loss of vegetation communities			
1: Loss of Forest	Very high	Medium	Very high
Issue 2: Loss of Species of Conservation Concern and biodiversity			
2: Loss of flora SCC	Very high	Medium	Very high
3: Loss of fauna SCC	Medium	Low	Medium
Issue 3: Loss of ecosystem function and process			
4: Fragmentation and edge effects	Very high	Medium	Very high
5: Invasion of alien species	Very high	Low -	Very high

Recommended mitigation measures include the following:

- The construction and operational footprint of the development must not extend past the site footprint, and laydown areas should be placed outside of the forest in disturbed areas or pavements of the road;
- Forest should be kept intact as far as possible, with construction activities restricted to lower impact building such as building in the forest on stilts, creating raised walkways and decking;
- Felling of large trees should be avoided as much as possible;
- No gardens should be planted, the “garden” should comprise uninvaded indigenous forest;
- No trees should be felled to allow for a sea view;
- Fencing the site and controlling access for people but allowing full access for fauna;
- Avoidance of any and all SCC possible;

- Application for permits for the removal of listed plant SCC;
- Removal and replanting/ relocation to a nursery of existing SCC;
- Maintenance of the forest areas to ensure SCC are not damaged or destroyed going forward;
- Planting of additional individuals of specific flora SCC within the “gardens” associated with the proposed development.
- Development and application of an alien invasive management plan to prevent spread and new invasions by alien invasive plant species over the full site for both the construction and operational phases of the proposed development;
- Keeping the disturbance footprint as small as possible; and
- Rehabilitation should take place as soon as possible after construction is completed.

Impacts associated with the planned development are based on the picture/ artistic representation of a plan provided and indicate that approximately half of the site will be developed (the side adjacent to Strathcona Drive) and the remainder left as is.

This site is unique in that the impacts of developing it (without extremely stringent mitigation measures) are as high or lower than leaving the site as is. This would seem to indicate that construction should go ahead as impacts will be high later. However, the location of the site in a Critically Endangered Ecosystem and the fact that it forms part of an indigenous functional ecosystem are important to take into consideration as these functions should not be lost. It is recommended that the several options be considered by the developer in conjunction with the Ethekwini Municipality department responsible for D'MOSS. Options considered here that are beneficial to both development of the site, as well as terrestrial biodiversity include either:

- 1) Develop the site with some mitigation measures in place such as reducing the D'MOSS boundaries and conserving the remainder as part of a stewardship arrangement OR
- 2) Develop the site and offset the loss as per offset requirements for the municipality and province, provided an area in the same area (Clansthal) can be set aside and managed for conservation in perpetuity.

The specialist recommends that the development go ahead provided the following conditions are met:

- A meeting must be held with Ethekwini Municipality and a way forward agreed upon based on the recommended options above;
- Development and application of an alien invasive management plan;
- A walk through of the full site prior to construction to determine the presence and identity of any protected plants and the relevant permits applied for;
- The allowance for natural corridors within the site plan wherever practicable;
- A management plan must be drawn up for remaining natural areas; and
- The development and application of a rehabilitation plan.

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1 Introduction

1.1 Locality

The proposed Strathcona Drive development is located just outside of Umkomaas along the R102 in Clansthal at 15 Strathcona Drive (Figure 1.1). The planned development is residential in nature, with 40 small units planned to be constructed over about half of the site closest to Strathcona Drive (Figure 1.2). The remainder of the site will be left as is. The site is completely covered in indigenous forest.



Figure 1.1: Location of the 15 Strathcona Drive Development Site



Figure 1.2: Plan for the proposed development.

1.2 Aim of impact assessment

An ecological impact assessment serves to determine the current ecological state of a site, including vegetation and habitats, and then determines the likely impacts of the proposed development on that ecology. In addition, mitigation measures are recommended to reduce negative, and enhance positive impacts.

1.3 Terms of reference for the impact assessment

The Terms of Reference (ToR) for the study are as follows:

- Identify and map the main vegetation types and plant communities;
- Identify and record the main plant species that occur within the project area;
- Where possible identify any flora species of conservation concern (SCC);
- In the absence of specific information on SCC species, adopt a habitat approach by identifying areas likely to contain SCC species;
- Assess the extent of alien plant species over the site, and associated risks of alien invasion as a result of the proposed development;
- Identify any significant landscape features or rare or important vegetation/faunal associations such as wetlands or rocky areas that might support rare or important vegetation/faunal associations;
- Identify the main animal communities associated with the plant communities (mammals, amphibians and reptiles);
- Describe the likelihood of other SCC faunal species or species of conservation concern occurring in the vicinity. In the absence of specific information on SCC species, adopt a habitat approach by identifying areas likely to contain SCC species;
- Assess the condition of the site in terms of current or previous land uses;
- Provide a general overview of the project area in terms of connectivity, corridors, rivers and streams and ecological viability in relation to the surrounding region;
- Place the project area within the biodiversity context of the wider area (i.e. provide the “bigger picture”);
- Identify (as far as is possible from the data collected) the principal ecological processes evident within the project site and its relative importance in determining the biodiversity characteristics present;
- Assess the potential direct and indirect impacts resulting from the proposed development and associated infrastructure, both on the footprint and the immediate surrounding area during construction and operation; and
- Provide a description of appropriate mitigation measures that can be adopted to reduce negative impacts for each phase of the project, where required.

1.4 Assumptions and limitations

- A site visit was conducted on the 6th of March 2020 and was cut short the inaccessibility of the site (steep slopes with impenetrable vegetation).
- This constitutes a summer survey as per the requirements of Ezemvelo KZN Wildlife (November to April).
- The site was covered as far as possible however, the site is steep with large areas of impenetrable thorny vegetation which could not be passed.
- Photographs of flora species not yet identified have been posted to various social media sites for plant identification and some species may be added to the list depending on the outcome of these identifications, outstanding identifications include three plants, none of which are of conservation importance. As such, the species list presented is considered final.
- The location of the site and timing if the site visit did not allow for the trapping (camera and traps) of animals, and though there are likely several animals on site, only tracks and signs have been used to identify these.

2 Methodology

2.1 Desktop assessment

In order to correctly classify the site, a desktop assessment was undertaken. Desktop assessments are based on available information for the area, and several databases and datasets were checked. These included the following:

- Google Earth imagery was used to assess the current vegetation cover of the site.
- Mucina and Rutherford Vegetation Map and associated plant species lists. This map is the accepted vegmap for South Africa and was used to place the study site in context.
- Plants of South Africa (POSA) database was checked for expected species and Species of Conservation Concern.
- Conservation Planning Tools such as the list of Threatened Ecosystems in Need of Protection, Wetland datasets (NFEPA), and the KwaZulu Natal Systematic Conservation Plan (KZNSCP) and Biodiversity Sector Plans were checked and mapped for the study site to provide context.
- A list of Possible Species of Conservation Concern will be constructed based on the expected lists for the study site and assessed against the following:
 - National Protected Tree List (Government Gazette Vol. 593, 21 November 2014, No. 38215);
 - Provincial Protected Species List (Nature Conservation Ordinance No 15 of 1974);
 - National Protected Species List or TOPS (R 1187 of 2007);
 - The National Red List for Plants (redlist.sanbi.org); and
 - Various faunal National Red Lists.

2.2 Field assessment

Botanical

The study area was explored on foot within the footprint, with as much of the site as possible walked, and dominant, invasive or SCC species of plants found were identified and recorded. Photographs were taken for each species. Particular care was taken to identify any Species of Conservation Concern (SCC). SCC include those species that are listed on any database as rare, threatened or endangered and include international lists such as IUCN as well as national and provincial lists. Care was taken to identify any alien invasive species in the area. The site was assessed at the middle of the wet season (early March) and thus not all species may have been recorded. The results of the site assessment include the following:

- A site-specific vegetation map;
- A species list for the site;
- A list of Confirmed Species of Conservation Concern for the site.

Fauna

At this stage, fauna for the site were assessed at a desktop level primarily, and augmented by opportunistic sightings, as well as tracks and signs (such as scat, spoor and burrows). The vegetation mapping allows for the description of faunal habitats for the site, in which certain groups of species are likely to be found.

2.3 Impact assessment

The significance (quantification) of potential environmental impacts identified during the Ecological Assessment has been assessed in terms of the following criteria (Guideline Documentation on EIA Regulation, Department of Environmental Affairs and Tourism, 2014). This is the rating scale developed by Afzelia for use in our reports. To determine the significance of impacts identified for a project, there are several parameters that need to be assessed. These include four factors, which, when plugged into a formula, will give a significance score. The following four parameters were assessed:

1. **Duration**, which is the relationship of the impact to temporal scale. This parameter determines the timespan of the impact and can range from very short term (less than a year) to permanent.
2. **Extent**, which is the relationship of the impact to spatial scales. Each impact can be defined as occurring in minor extent (limited to the footprint of very small projects) to International, where an impact has global repercussions (an example could be the destruction of habitat for an IUCN CR listed species).
3. **Magnitude**, which is used to rate the severity of impacts. This is done with and without mitigation, so that the residual impact (with mitigation) can be rated. The Magnitude, although usually rated as negative, can also be positive.
4. **Probability**; which is the likelihood of impacts taking place. These include unlikely impacts (such as the rate of roadkill of frogs, for example) or definite (such as the loss of vegetation within the direct construction footprint of a development).

Each of these aspects is rated according to Table 2.1 below. Where Duration, Extent and Magnitude are assessed first, followed by Likelihood.

Table 2.1: Table of Evaluation criteria ranking

Score	Label	Criteria
Duration		
1	Very short term	0 -1 years
2	Short term	2 – 5 years
3	Medium term	5 – 15 years
4	Long term	>15 years
5	Permanent	Permanent
Extent		
1	Minor	Limited to the immediate site of the development
2	Local	Within the general area of the town, or study area, or a defined Area of Impact
3	Regional	Affecting the region, municipality, or province
4	National	Country level
5	International	International level
Magnitude		
0	Negligible	Very small to no effect on the environment
2	Minor	Slight impact on the environment
4	Low	Small impact on the environment
6	Moderate	A moderate impact on the environment
8	High	The impacts on the environment are large
10	Very high	The impacts are extremely high and could constitute a fatal flaw
Probability		
1	Very improbable	Probably will not happen
2	Improbable	Some possibility, but low likelihood
3	Probable	Distinct possibility
4	Highly probable	Most likely
5	Definite	The impact will occur

Once each of these aspects is rated, the overall significance can be scored (based on the score for Effect). The significance is calculated by combining the criteria in the following formula:

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

- S = Significance weighting
- D = Duration
- E = Extent
- M = Magnitude
- P = Probability

The explanation for each of the overall significance ratings are presented in Table 2.2, with the layout of all possible scores and their overall significance presented in Table 2.3.

Table 2.2: Significance weighting

Score	Label	Motivation
<10	Negligible	The impact is very small to absent
10-20	Low	where this impact would not have a direct influence on the decision to develop in the area
20-50	Medium	where the impact could influence the decision to develop in the area unless it is effectively mitigated
50 -70	- High	where the impact must have an influence on the decision process to develop in the area
>70	Very high	Where the impact may constitute a fatal flaw for the project

Table 2.3: Possible significance scores based on Effect x Likelihood

Likelihood	Effect																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Very improbable (1)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Improbable (2)	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
Probable (3)	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
Highly probable (4)	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
Definite (5)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Each impact was assessed based on the methodology above, and a table produced, indicating the scores and the overall significance rating both without and with mitigation. Where relevant, mitigation measures are recommended. Table 2.4 Provides an example of an impact table.

Table 2.4: Example of an impact table

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Regional	3	Short term	2	Moderate	6	Highly probable	4	44	Medium
With mitigation	Local	2	Short term	2	Low	4	Probable	3	24	Low

3 Description of the study site

3.1 Desktop data

3.1.1 Vegetation

Vegetation of the study site is described by Mucina and Rutherford (2006) (Figure 3.1 and Figure 3.2) as Northern Coastal Forest, described by Mucina and Rutherford (2006) are as follows:

Northern Coastal Forest (FOz 7)

This vegetation type occurs within KwaZulu-Natal and a small portion of the Eastern Cape Coast, with most of it occurring in Maputaland from 10 to 150m above sea level (Mucina & Rutherford 2016). This vegetation type comprises a species-rich, tall/medium-height subtropical coastal forest on stabilised sand dunes and rolling plains. Forest are typically dominated by *Drypetes natalensis*, *Englerophytum natalense*, *Albizia adianthifolia*, *Diospyros inhacaensis*. The low-tree and shrubby layers are species-rich and include common tree species such as *Mimusops caffra*, *Sideroxylon inerme*, *Dovyalis longispina*, *Acacia kosiensis* and *Psydrax obovata*. Common understory species include *Brachylaena discolor* var. *discolor*, *Chrysanthemoides monilifera*, subsp. *rotundata*, *Carissa bispinosa* subsp. *bispinosa*, *Euclea natalensis*, *Euclea racemosa*, *Eugenia capensis*, *Gymnosporia nermorosa*, *Kraussia floribunda*, *Peddiea Africana*, *Strelitzia Nicolai* and *Dracaena aletriformis*. Herbaceous species commonly include *Asystasia gangetica*, *Isoglossa woodii*, *Microsorium scolopendria*, *Zamiaculca zamiifolia* and *Oplismenus hirtellus*. Vines and climbers often include *Acacia kraussiana*, *Artabotrys monteiroae*, *Dalbergia armata*, *Landolphia kirkii*, *Monanthes caffra*, *Rhoicissus tomentosa*, *Rhus nebulosa*, *Scutia myrtina*, *Uvaria caffra*, and *Gloriosa superba* (Mucina & Rutherford 2006).

This vegetation type is considered Least Threatened in general, but still under threat on coastal dunes of KZN (Mucina & Rutherford 2006). It has a conservation target of 43% with 68% statutorily conserved. Threats include agriculture and mineral sands mining, as well as timber plantations and urban sprawl. They are additionally sensitive to invasion by alien species such as *Chromolaena odorata* (Mucina & Rutherford 2006).

East Coast Dune Forest

Ezemvelo maps the site as East Coast Dune Forest (Figure 3.3) with a status of Critically Endangered (Figure 3.4), indicating that this vegetation type must be kept natural at all costs, and is not replaceable (see Section 3.1.5 below).

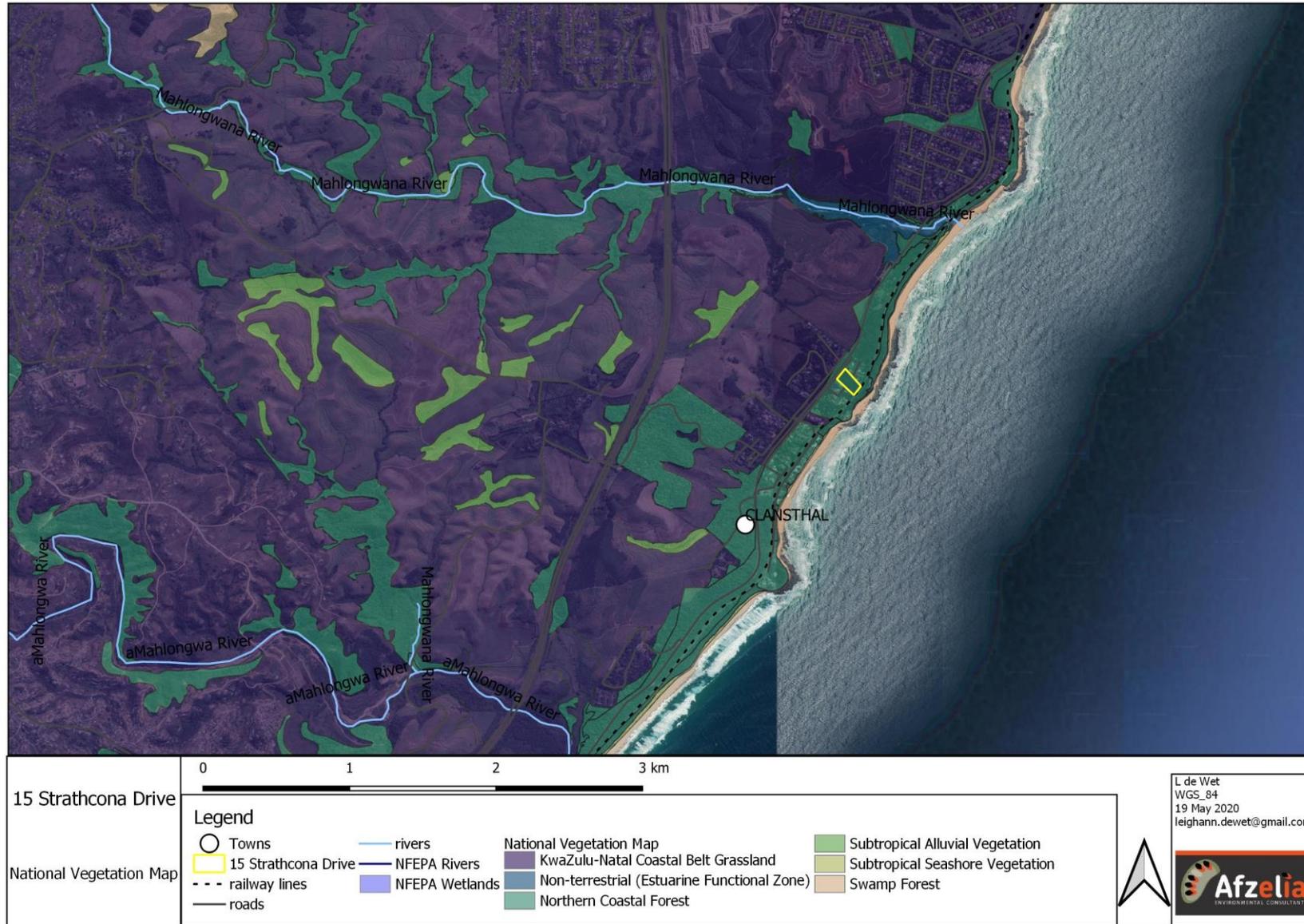


Figure 3.1: Mucina and Rutherford (2018 Beta) Vegetation map of the Project site



Figure 3.2: Mucina and Rutherford (2018 Beta) Vegetation map of the Project site (zoomed in)

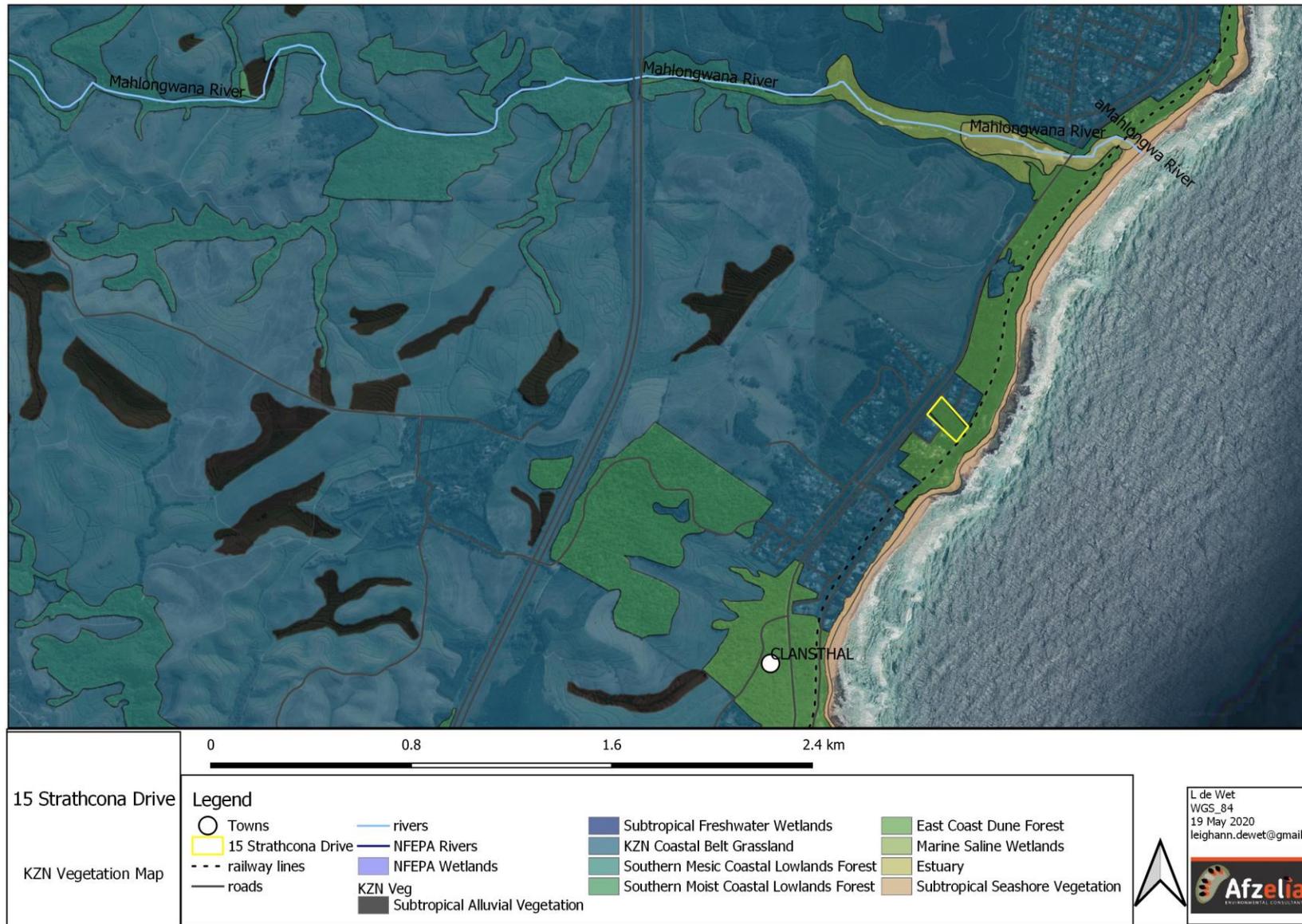


Figure 3.3: Ezemvelo KZN Wildlife Vegetation map of the Project site.

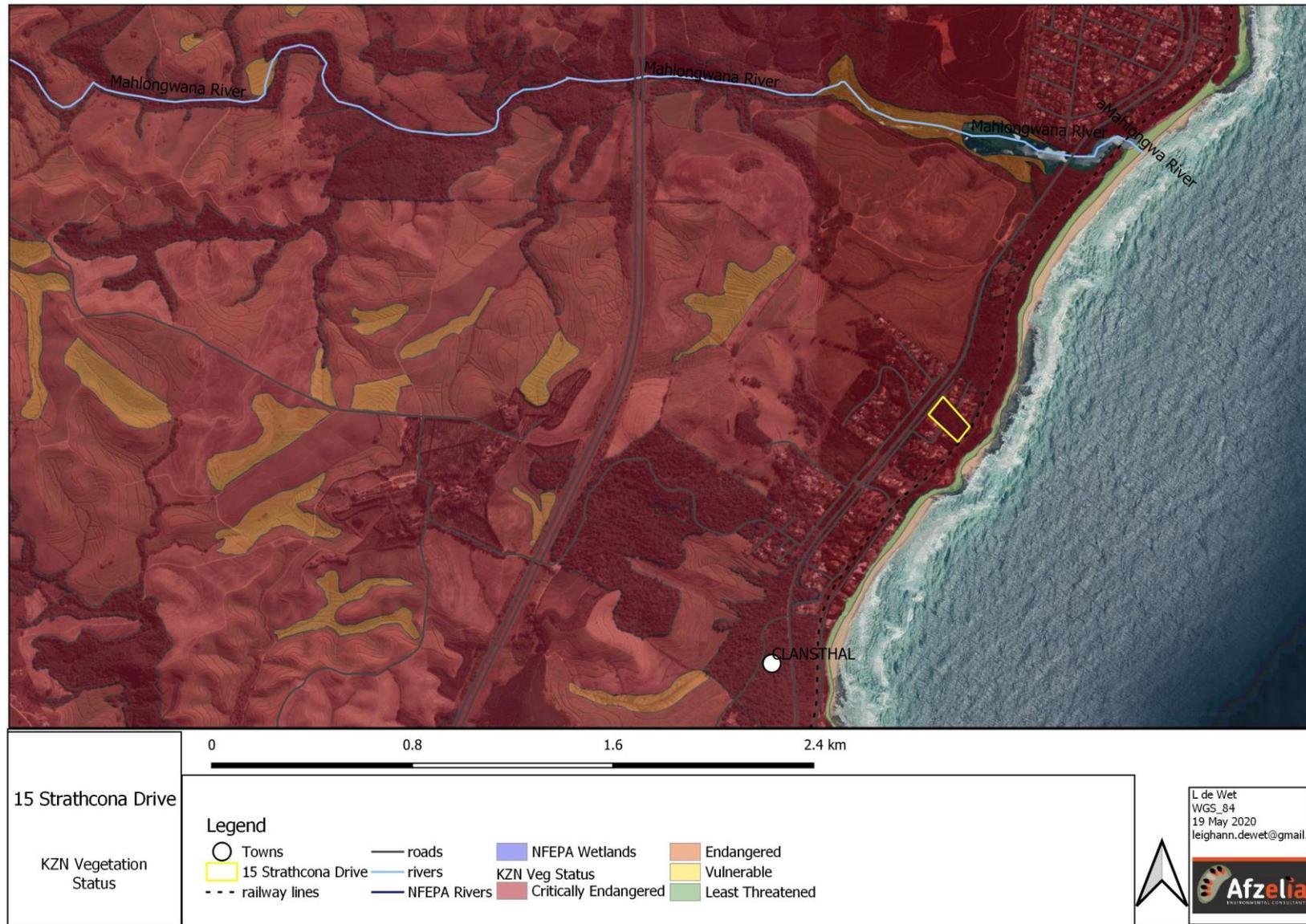


Figure 3.4: Ezemvelo KZN Wildlife Vegetation status map of the Project site.

3.1.2 Flora

Plant species

An overall species list for the project site and surrounds was generated on Plants of South Africa (POSA), a South African National Biodiversity Institute (SANBI) database of all plants collected and recorded from specific locations. In addition, the list of plants associated with the National Vegetation Map vegetation type was also added (Mucina & Rutherford 2006). This combined overall expected plant list included 227 species of plants (Appendix B). The most common plant families on this expected plant species list are as follows:

1. Asteraceae (Daisy family) – 19 species;
2. Fabaceae (Pea family) – 18 species;
3. Poaceae (Grass family) – 13 species; and
4. Cyperaceae (Sedge family) – 12 species.

Invasive species

There are also a number of alien invasive and non-indigenous species expected for the site and include those alien invasive species listed in Table 3.1. Not all non-indigenous species are problematic, and only some are alien invasive species according to legislation. It is the plants listed on either the CARA or NEM:BA lists that the landowner is mandated to control depending on their status. Both the Conservation of Agricultural Resources Act (CARA) and the National Environmental Management: Biodiversity Act (NEMBA) have lists of invasive species and regulations with regards to their control.

NEM:BA specific restrictions applicable to the site include the following:

Restricted activities as defined in the Act	Category 1b	Category 2	Category 3
b. Having in possession or exercising physical control over any specimen of a listed invasive species	Exempted	Permit required	Exempted
f. Spreading or allowing the spread of any specimen of a listed invasive species	Prohibited	Permit required	Prohibited

CARA legislation states the following:

Category 1: Invader plants must be removed & destroyed immediately. No trade in these plants.

Category 2: Invader plants may be grown under controlled conditions in permitted zones. No trade in these plants.

Category 3: Invader plants may no longer be propagated or sold. Existing plants do not need to be removed.

Table 3.1: Expected invasive and non-indigenous species for the 15 Strathcona Drive Development site

Family	Species	CARA	NEMA
Anacardiaceae	<i>Schinus terebinthifolius</i>	1	1b
Asteraceae	<i>Ageratum houstonianum</i>	1	1b
Cannaceae	<i>Canna indica</i>	1	1b
Convolvulaceae	<i>Ipomoea indica</i>	1	1b
Euphorbiaceae	<i>Ricinus communis</i>	2	2
Fabaceae	<i>Senna bicapsularis</i>	3	1b
Liliaceae	<i>Lilium formosanum</i>	3	1b
Myrtaceae	<i>Syzygium cumini</i>	3	1b
Papaveraceae	<i>Argemone mexicana</i>	1	1b
Poaceae	<i>Arundo donax</i>	1	1b
Salviniaceae	<i>Azolla filiculoides</i>	1	1b
Solanaceae	<i>Solanum mauritianum</i>	1	1b

Species of Conservation Concern (SCC)

Species of Conservation Concern (SCC) are important, as they are endemic, or listed on the RedList, Provincially or Nationally Protected. The full plant species list can be found in Appendix B, all the SCC that have been recorded from the area (Quarter degree square within which the study area falls) can be found on this list (extracted from the POSA and Mucina & Rutherford lists), in the appendices. The list of possible SCC are indicated in Table 3.2.

SCC have been previously recorded from the area and surrounds, according to the POSA list. These include species that are listed on various lists. Of these species:

- 15 are listed as endemic;
- 11 species are listed as Protected on the Provincial List for KZN (Schedule 12);
- One (1) is listed as Protected (*Encephalartos ferox*) on the National Threatened and Protected Species List (TOPS);
- Two (2) are on the National Forests Act list of Protected Trees (*Mimusops caffra* and *sideroxylon inerme*);
- 1 (*Encephalartos ferox*) is listed on the National Red List as Near Threatened;
- 3 are listed as Vulnerable on the National Red List.

It is not possible that all of these species will be found on site; however, it is likely that several SCC will be located on site. Depending on which list these species are on, permits will be required if any are to be destroyed during the construction and/or operation of the proposed development.

Table 3.2: Expected Species of Conservation Concern for the 15 Strathcona Drive Development site

Family	Species	Endemic	IUCN	KZN	TOPS	Trees
Agavaceae	<i>Chlorophytum saundersiae</i>	x	LC			
Aizoaceae	<i>Mesembryanthemum cordifolium</i>	x				
Amaryllidaceae	<i>Haemanthus deformis</i>	x	VU	Sch.12		
Apocynaceae	<i>Brachystelma sandersonii</i>	x	VU	Sch.12		
Celastraceae	<i>Mystroxyton aethiopicum</i>	x	LC			
	<i>Pristimera peglerae</i>	x				
Cyperaceae	<i>Cyperus turbatus</i>	x				
	<i>Fimbristylis variegata</i>	x	LC			
Euphorbiaceae	<i>Euphorbia flanagani</i>	x	VU			
Gesneriaceae	<i>Streptocarpus haygarthii</i>	x	LC			
Hyacinthaceae	<i>Drimia calcarata</i>		LC	Sch.12		
	<i>Ledebouria cooperi</i>		LC	Sch.12		
	<i>Ledebouria petiolata</i>		LC	Sch.12		
Iridaceae	<i>Aristea abyssinica</i>		LC	Sch.12		
	<i>Gladiolus dalenii</i>		LC	Sch.12		
	<i>Gladiolus longicollis</i>		LC	Sch.12		
Orchidaceae	<i>Eulophia speciosa</i>		LC	Sch.12		
	<i>Mystacidium venosum</i>		LC	Sch.12		
Peraceae	<i>Clutia pulchella</i>	x	LC			
Rubiaceae	<i>Pavetta bowkeri</i>	x	LC			
Salicaceae	<i>Homalium rufescens</i>	x	LC			
Sapotaceae	<i>Englerophytum natalense</i>		LC			
	<i>Mimusops caffra</i>		LC			x
	<i>Sideroxylon inerme</i>		LC			x
Solanaceae	<i>Lycium acutifolium</i>	x	LC			
Vitaceae	<i>Cissus fragilis</i>	x	LC			
Zamiaceae	<i>Encephalartos ferox</i>		NT	Sch.12	Protected	

3.1.3 Fauna

To determine the fauna likely to occur on site, the lists for the Quarter Degree Square within which the 15 Strathcona Drive Development Site is contained were obtained from the Animal Demography Unit's virtual museum. These lists include all fauna previously recorded from the area. Although it's unlikely that all of these species will be found on site, primarily due to the influx of people and other anthropogenic disturbance, there are large areas of the site which form suitable habitat for faunal species and where they are highly likely to occur. List of expected species can be found in the Appendices (Appendix C to F).

Species of Conservation Concern

SCC that are likely to be recorded from the site include birds, mammals and herpetofauna (reptiles and amphibians). Lists of bird SCC can be found in Table 3.3, mammals in Table 3.4, reptiles in Table 3.5 and amphibians in Table 3.6.

Table 3.3: Mammal Species of Conservation Concern recorded from the 15 Strathcona Drive Development site and surrounding area

Family	Scientific Name	Comon name	Red List	KZN	TOPs
Bovidae	<i>Philantomba monticola</i>	Blue Duiker	VU		VU
	<i>Tragelaphus scriptus</i>	Bushbuck	LC	Sch.1, Sch.2	
Vespertilionidae	<i>Hypsugo anchietae</i>	Anchieta's Pipistrelle	NT		

Table 3.4: Bird Species of Conservation Concern recorded from the 15 Strathcona Drive Development Site and surrounding area

Scientific name	Common name	Red List	KZN	TOPs
<i>Alcedo semitorquata</i>	Kingfisher, Half-collared	NT, LC		
<i>Alopochen aegyptiacus</i>	Goose, Egyptian		Sch.1	
<i>Anas hottentota</i>	Teal, Hottentot		Sch.2	
<i>Anas sparsa</i>	Duck, African Black		Sch.2	
<i>Anas undulata</i>	Duck, Yellow-billed		Sch.1	
<i>Ciconia nigra</i>	Stork, Black	VU, LC		VU
<i>Dendrocygna viduata</i>	Duck, White-faced		Sch.1	
<i>Falco biarmicus</i>	Falcon, Lanner	VU, LC		
<i>Falco peregrinus</i>	Falcon, Peregrine		Sch.9	VU
<i>Gypohierax angolensis</i>	Vulture, Palm-nut		Sch.9	
<i>Mandingoa nitidula</i>	Twinspot, Green		Sch.9	
<i>Morus capensis</i>	Gannet, Cape	VU, VU		
<i>Mycteria ibis</i>	Stork, Yellow-billed	EN, LC	Sch.9	
<i>Numida meleagris</i>	Guineafowl, Helmeted		Sch.1	
<i>Pandion haliaetus</i>	Osprey, Osprey		Sch.9	
<i>Pelecanus rufescens</i>	Pelican, Pink-backed	VU, LC	Sch.9	EN
<i>Phalacrocorax capensis</i>	Cormorant, Cape	EN, EN		
<i>Plectropterus gambensis</i>	Goose, Spur-winged		Sch.1	
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN, VU		VU
<i>Stephanoaetus coronatus</i>	Eagle, African Crowned	VU, NT		
<i>Sterna caspia</i>	Tern, Caspian	VU, LC		
<i>Zoothera guttata</i>	Ground-thrush, Spotted	EN, EN		

Table 3.5: Reptile Species of Conservation Concern recorded from the 15 Strathcona Drive Development Site and surrounding area

Family	Scientific name	Common name	Red List
Chamaeleonidae	<i>Bradypodion melanocephalum</i>	KwaZulu Dwarf Chameleon	VU
Scincidae	<i>Scelotes inornatus</i>	Durban Dwarf Burrowing Skink	CR

Table 3.6: Amphibian Species of Conservation Concern recorded from the 15 Strathcona Drive Development Site and surrounding area

Family	Scientific name	Common Name	Red List
Hyperoliidae	<i>Hyperolius pickersgilli</i>	Pickersgill's Reed Frog	EN
Pyxicephalidae	<i>Natalobatrachus bonebergi</i>	Kloof Frog	EN

3.1.4 Protected areas

Protected areas

Protected areas are defined by the Protected Areas Expansion Strategy as: areas of land or sea that are protected by law and managed mainly for biodiversity conservation” (Government of South Africa, 2008). Formal protected areas include those that are recognised in the National Environmental Management: Protected Areas Act (Act 57 of 2003). Several categories of Protected Area exist and include special nature reserves, national parks, nature reserves and protected environments.

The function of protected areas is to ensure ecological sustainability and adaptation to climate change (Government of South Africa, 2008). They ensure the continued provision of ecosystem services such as the provision of clean water, flood attenuation, erosion prevention, carbon sequestration and aesthetic and spiritual value.

Proximity to protected areas is important as close proximity may indicate that the area is important for biodiversity. There is one reserve, the Aliwal Shoal Marine Protected Area to the east within 10km of the site and no Protected Areas within 5km of the site (Figure 3.5).

National Protected Areas Expansion Strategy

Overall, South Africa has insufficient protected areas to ensure the conservation of different vegetation, marine and habitats. As a result, the National Protected Areas Expansion Strategy (NPAES) was developed. Overall, targets have been established for protected areas that indicate how much of an ecosystem should be included in protected area and help to focus protected area expansion on the least protected ecosystems (Government of South Africa, 2008).

The NPAES utilises biodiversity thresholds that are specific to ecosystems ensuring that the targets and areas earmarked for protected area expansion are based on science (Government of South Africa, 2008). Two factors, importance and urgency are used to determine which areas should be prioritised as protected areas. There are 42 focus areas for land-based protected area expansion. These areas are “large intact and unfragmented areas suitable for the creation or expansion of large protected areas” (Government of South Africa, 2008).

Protected areas are important to look at in relation to the study site. If there are protected areas within 10km of the study site, or PAES focus areas within 10km of the study site, this indicates that the study area may be important from a biodiversity perspective. Proximity to protected areas and expansion areas is thus important for looking at biodiversity value of a site. No focus areas occur within 10km of the study site (Figure 3.5)

Important Bird Areas

Important Bird Areas are areas internationally recognised for the bird species that occur there and are internationally important for bird conservation (BirdLife SA 2018).

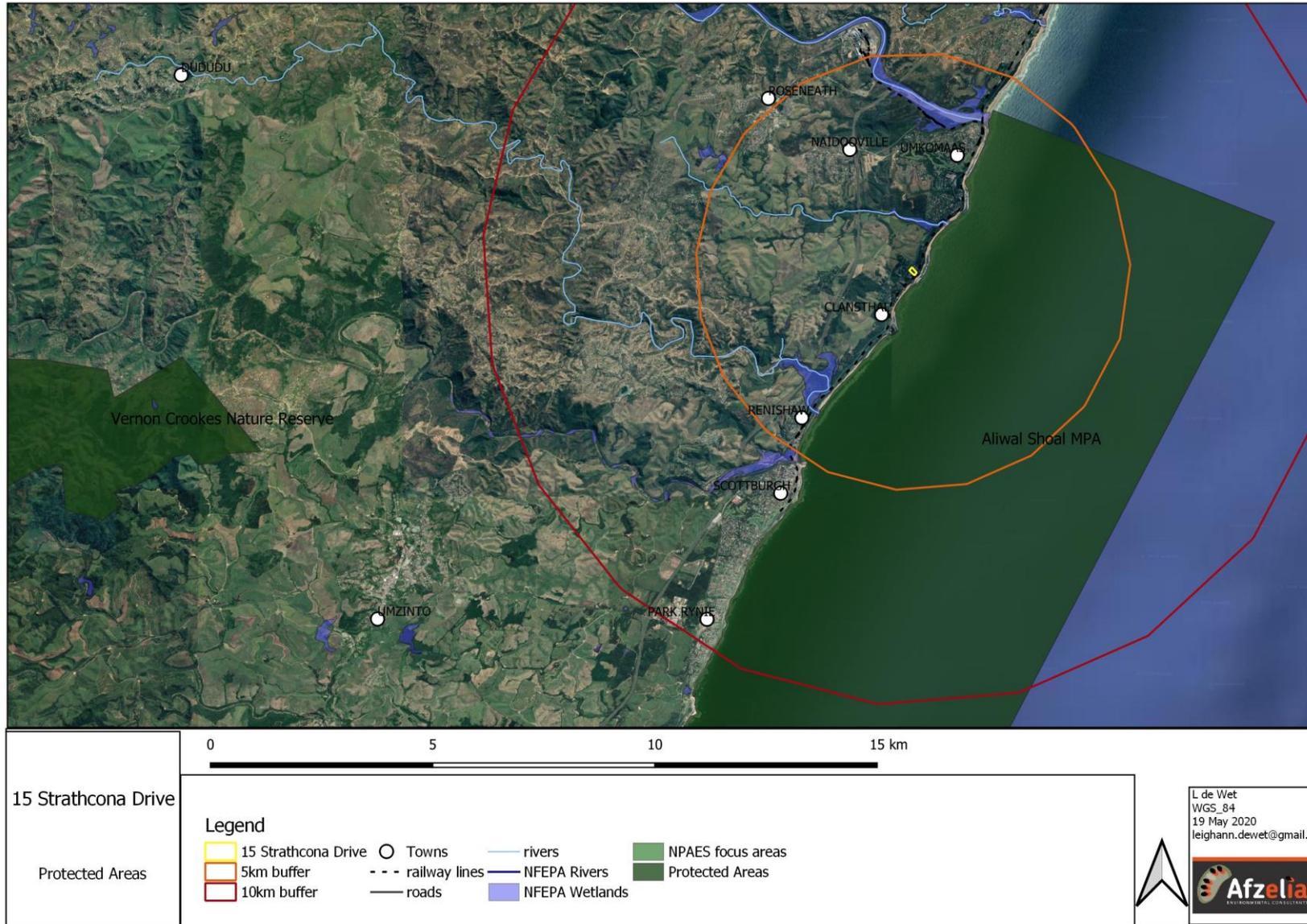


Figure 3.5: Protected areas and NPAES areas in relation to the study site.

3.1.5 Conservation guidelines

Threatened Ecosystems

According to the National List of Threatened Ecosystems in Need of Protection, the study area is located within Southern Coastal Grasslands (Figure 3.6), which is a Critically Endangered Ecosystem (Figure 3.7). The list of Threatened Ecosystems has been gazetted (National Environmental Management: Biodiversity Act: National List of ecosystems that are threatened and in need of protection, (G 34809, GoN 1002, 9 December 2011).

KwaZulu-Natal Biodiversity Plan

The KwaZulu-Natal Biodiversity Plan defines the areas of land in the form of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) required to ensure the persistence and conservation of biodiversity within the province (Ezemvelo KZN Wildlife, 2016). The spatial plan then provides a tool to guide conservation and protected area expansion as well as informing economic sectors involved in alien plant control, conservation officer priorities and guiding the nature of development (Ezemvelo Wildlife 2016).

The spatial guidelines provided by the plan outline two main categories of areas that are required to meet conservation targets for the province (Ezemvelo KZN Wildlife 2016). These two main categories include Critical Biodiversity Areas (CBAs) and Ecological Support Areas, including corridors (ESAs). These are further divided into smaller categories, which are outlined in Table 3.7. The plan then defines land-use objectives for each type of land, these are outlined in Table 3.8 (Ezemvelo KZN Wildlife 2016).

The site is not located within any CBAs, however there is a network of Irreplaceable CBAs within 5km of the site (Figure 3.8), or in any ESAs, however there is an ESA within 5km of the site (Figure 3.9).

Table 3.7: Subcategories of CBA and ESAs*.

Critical Biodiversity Areas (CBAs) – Crucial for supporting biodiversity features and ecosystem functioning and are required to meet biodiversity and/or process targets	
Critical Biodiversity Areas: Irreplaceable	Areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems.
Critical Biodiversity Areas: Optimal	Areas that represent an optimised solution to meet the required biodiversity conservation targets while avoiding high cost areas as much as possible (Category driven primarily by process, but is informed by expert input).
Ecological Support Areas (ESAs) – Functional but not necessarily entirely natural areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within Critical Biodiversity Areas.	
Ecological Support Areas	Functional but not necessarily entirely natural terrestrial or aquatic areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the Critical Biodiversity Areas. The area also contributes significantly to the maintenance of Ecosystem Services.
Ecological Support Areas: Species Specific	Terrestrial modified areas that provide a critical support function to a threatened or protected species, for example agricultural land or dams associated with nesting/roosting sites.
Ecological Support Areas: Buffers	Terrestrial areas identified as requiring land-use management guidance not necessarily due to biodiversity prioritisation, but in order to address other legislation/ agreements which the biodiversity sector is mandated to address, e.g. WHS Convention, Triggers Listing Notice criteria, etc.

*Taken from Ezemvelo KZN Wildlife, 2016)

Table 3.8: Land-Use objectives for the Terrestrial Conservation Categories*

Map Category	Guiding description of categories	Land-Use Management Objective
Protected Areas (PAs)	Protected areas as declaration under NEMPA	Maintain in a natural state with limited to no biodiversity loss
Critical Biodiversity Areas (CBAs)	Natural or near-natural landscapes that include terrestrial and aquatic areas that are considered critical for meeting biodiversity targets and thresholds, and which safeguard areas required to ensure the persistence of viable populations species, and the functionality of ecosystems and Ecological Infrastructure*.	Maintain in a natural state with limited to no biodiversity loss.
1. CBA: Irreplaceable	Areas which are required to meet biodiversity conservation targets, and where there are no alternative sites available. (Category driven by species and feature presence).	Maintain in a natural state with limited to no biodiversity loss.
2. CBA: Optimal	Areas that are the most optimal solution to meet the required biodiversity conservation targets while avoiding high cost areas as much as possible (Category driven primarily by process).	Maintain in a natural state with limited to no biodiversity loss
ESA: Buffers	Areas identified as influencing land-use management that are not derived based on biodiversity priorities alone, but also address other legislation/ agreements which the biodiversity sector is mandated to address, e.g. WHS Convention, triggers Listing Notice, etc.	Maintain or improve ecological and tourism functionality of a PA or WHS.
3. ESA: Protected Area Buffer	Unless otherwise stated, the represents an area extending 5km from the PAs or where applicable PA delineated buffers.	Maintain or improve ecological and tourism functionality of a PA.
4. ESA: World Heritage site Buffer	Unless otherwise stated, this represents an area extending 10km from the WHS or where applicable area specifically defined for WHS.	Maintain or improve ecological and tourism functionality of WHS.
Terrestrial Ecological Support Areas (ESAs)	Functional but not necessarily entirely natural terrestrial land that is largely required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the Critical Biodiversity Areas. The area also contributes significantly to Ecological Infrastructure.	Maintain ecosystem functionality and connectivity allowing for some loss of biodiversity.
Terrestrial Ecological Support Areas: Species specific	Modified but area is providing a support function to a threatened or protected species.	Maintain current land use or rehabilitate back to functional natural area.
Natural Biodiversity Areas	All natural areas not already included in the above categories	Maintain basic ecosystem functionality.
Modified	Areas with no significant natural vegetation remaining and therefore regarded as having a low biodiversity value (e.g. areas under cultivation).	Sustainable management.

*Ecological Infrastructure refers to functioning ecosystems that deliver valuable services to people and the environment. These areas were previously referred to as *Ecosystem Goods and Service Areas*.

D'MOSS

D'MOSS covers 94 000ha of interconnecting open spaces throughout the Durban Metro with the aim of conserving biodiversity and ecosystem services within the municipality (eThekweni municipality 2011). Included are nature reserves, public and private spaces. Overall, 2 400 ha of estuaries (including sand and mudbanks, mangroves and swamp forests), 14 000ha of forests, 7 500ha of wetlands, 13 000ha of grasslands and 40 000ha of valley thicket are included. If maintained as managed and protected areas, D'MOSS areas assist in maintaining the national biodiversity conservation targets. These areas are also responsible for the provision and maintenance of important ecosystem services such as soil production, erosion control, water supply and regulation, flood attenuation, climate control and cultural and recreational services among others. D'MOSS areas are defined in order to maintain:

- “as many functional ecosystems as possible;
- The widest range of open space types (e.g. grassland, forests, wetland)
- Physical links between open spaces to allow for the flow of genetic material, energy, water and nutrients
- Physical links to and between significant sources of biodiversity (e.g. Pondoland and Maputaland centres of plant diversity) to prevent local species extinctions in the eThekweni Municipal Area
- Physical links along the coast, connecting river catchments to marine sources of biodiversity.” (eThekweni Municipality 2011).

D'MOSS areas should be protected and managed for conservation. Any change to these areas should be made with discussions with the Municipality. The site falls into terrestrial D'MOSS and should be conserved as far as is possible (Figure 3.10). The site is comprised of forest, which is Critical according to D'MOSS and within which no development is allowed. Communication with the Ethekewini Municipality is critical in this case prior to any development taking place and either a relaxation of the D'MOSS boundary allowed with caveats, or the prohibition of development on the site.

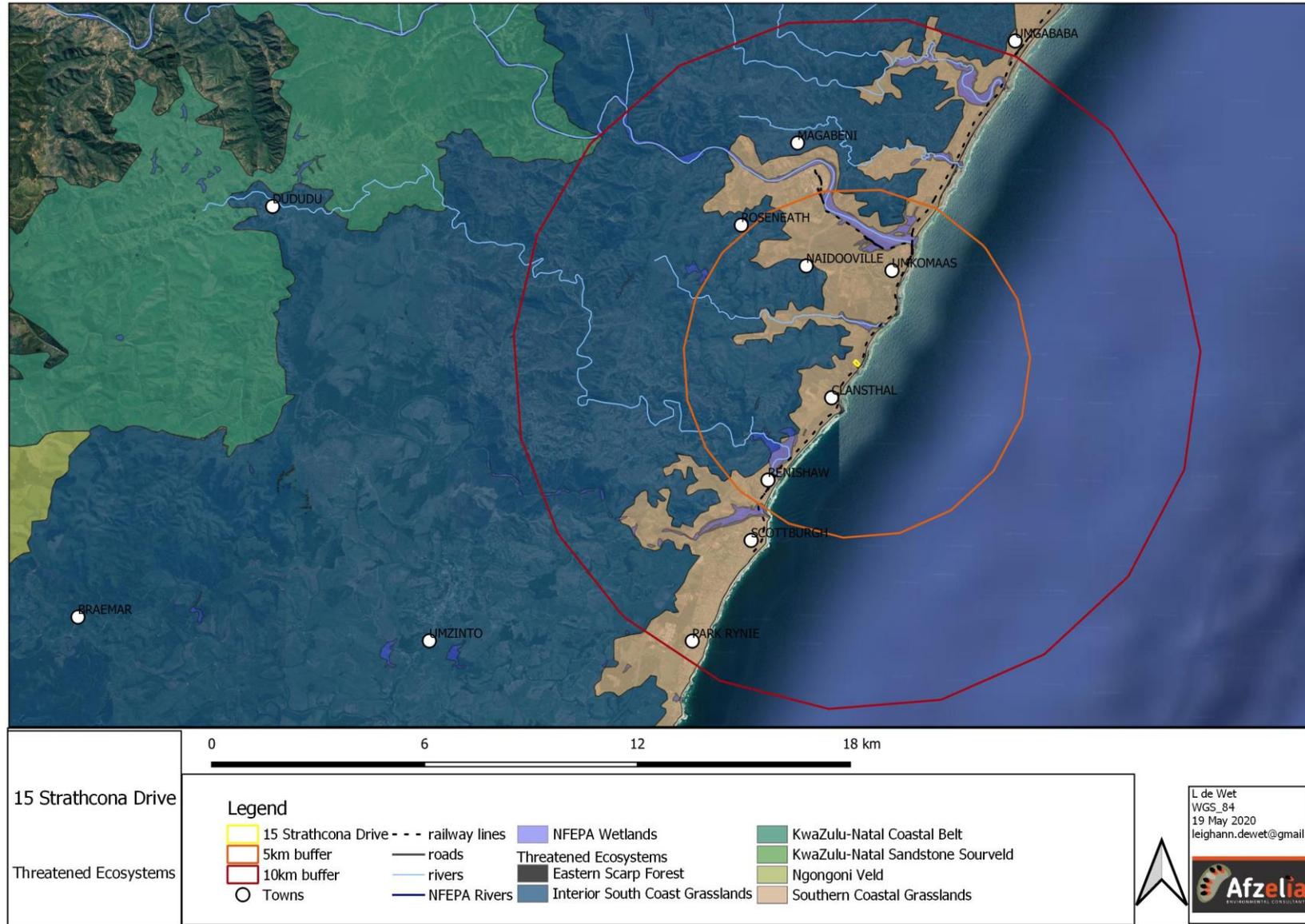


Figure 3.6: Threatened Ecosystems (type) in relation to the study area.

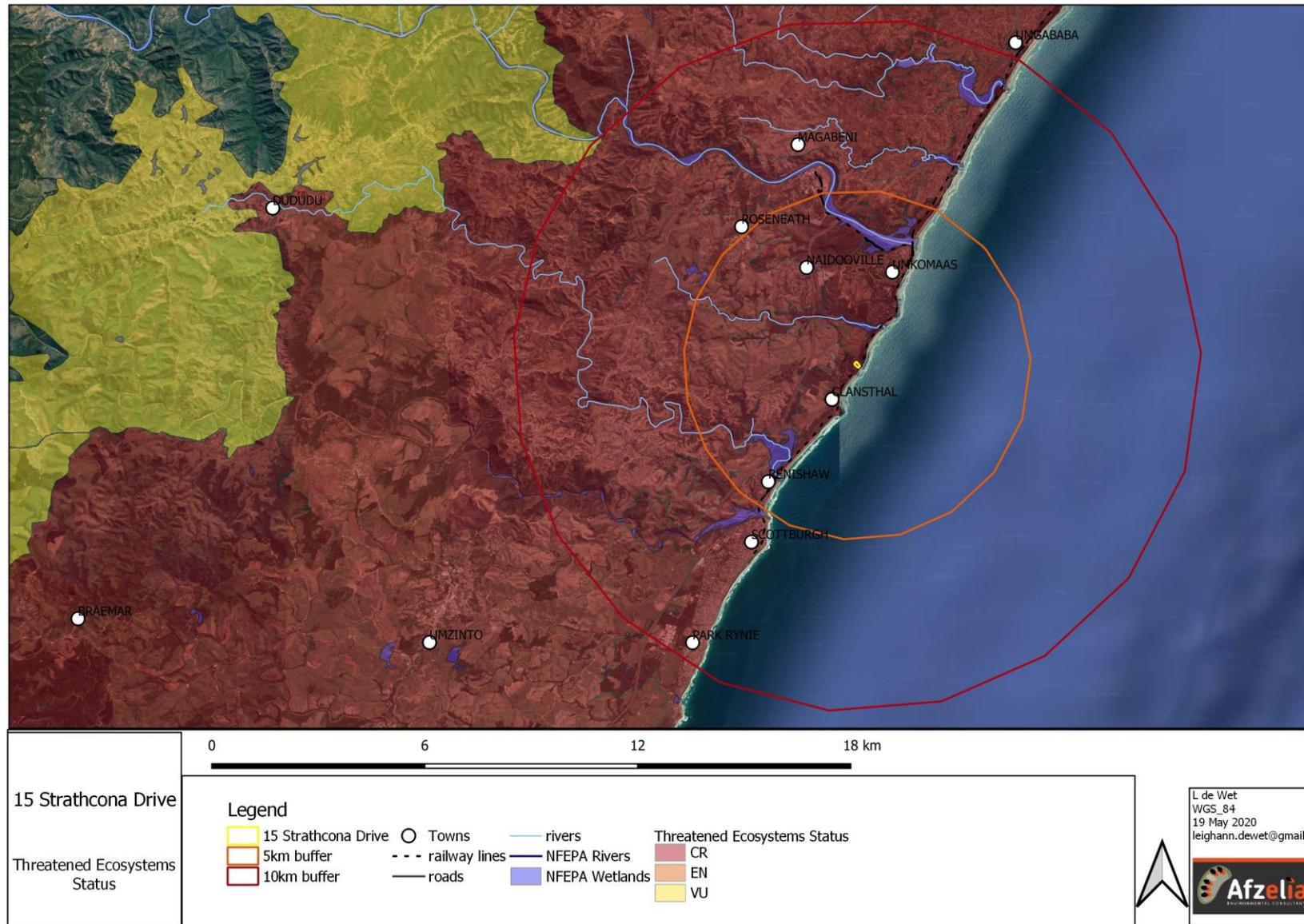


Figure 3.7: Threatened Ecosystems (status) in relation to the study area.

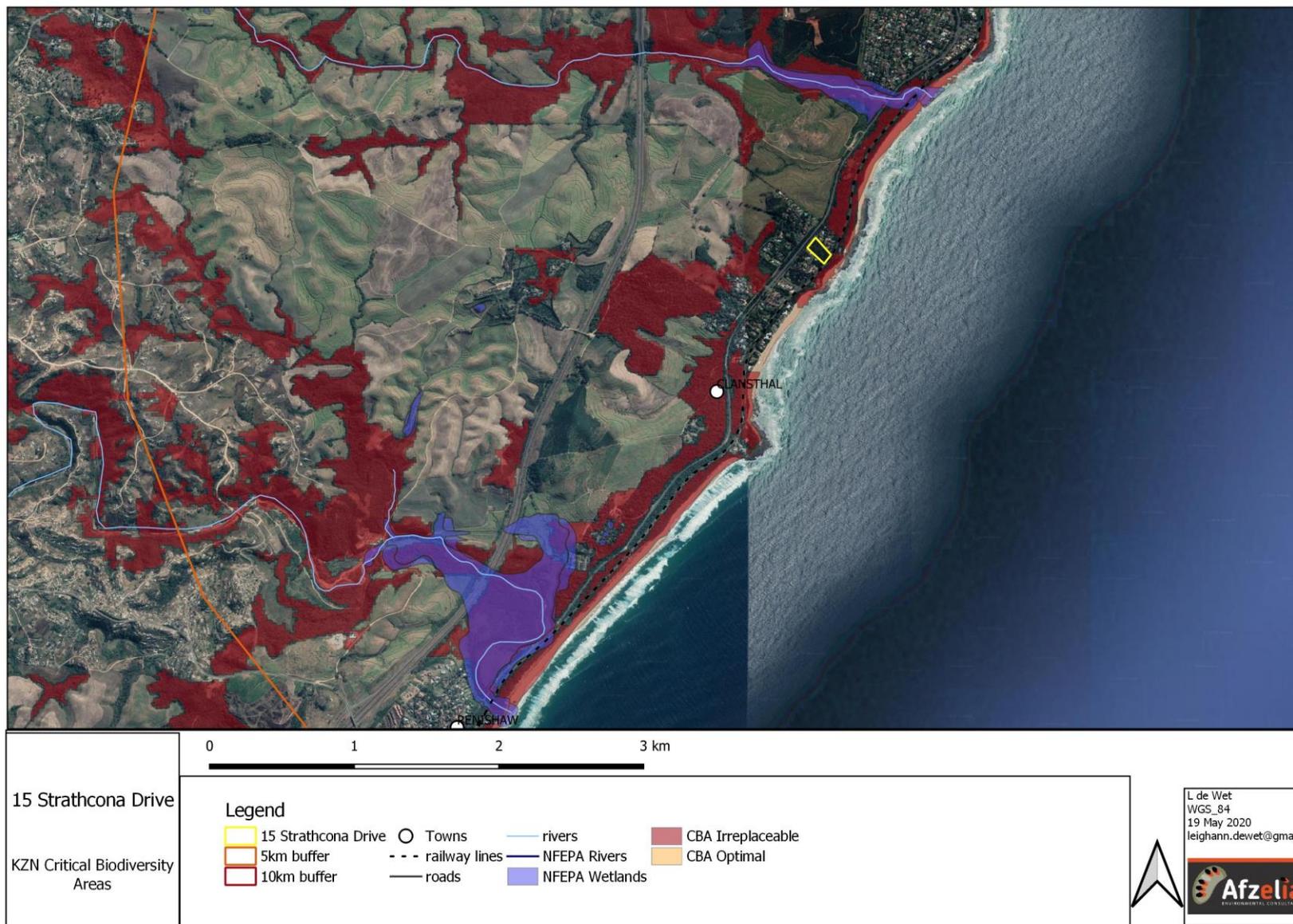


Figure 3.8: Critical Biodiversity Areas in relation to the study area



Figure 3.9: Ecological Support Areas in relation to the study area

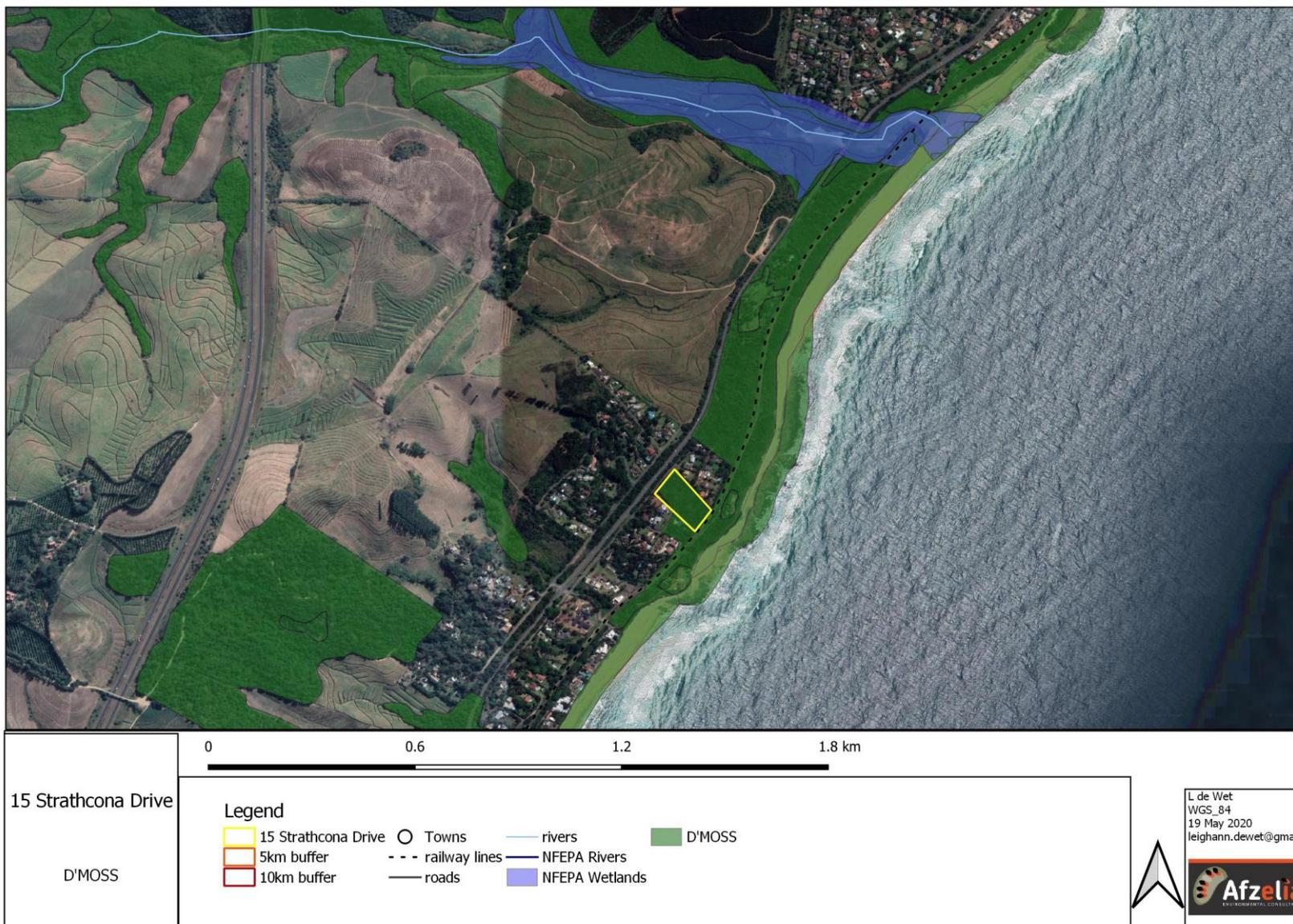


Figure 3.10: D'MOSS Areas in relation to the study area

3.2 Field assessment

A site assessment was conducted on the 6th of March 2020. This date falls within the November to April wet season determine by Ezemvelo KZN Wildlife. The site was difficult to access in its entirety due to steep slopes and impenetrable, thorny vegetation. However, at least 50% of the full site was walked and 75% of the site borders. A species list was made (see Section 3.2.2 below) and the vegetation categorised into forest.

The site is bordered on the sea side by a railway line and the opposite side onto a residential road. The other two sides are bordered by residential areas (with one bordering site currently being developed). If the railway line is not taken into consideration, the site forms contiguous forest with the remaining forest bordering the sea and occurring alongside the sea shore.

Although much of the site is typical indigenous forest of the region and thus Critically Endangered, there are several pressures on the site currently, resulting in continued disturbance and degradation (Figure 3.11). Use of the edge bordering the road is for a private toilet causing trampling of vegetation, influx of aliens and pollution. Further, the building site on one side is using the site as a dumping ground for their clearing in addition to a toilet and resting site for their workers, creating a large area of disturbance to the south west. The proximity of the site to residential areas has also resulted in the influx of aliens which are slowly progressing towards the centre of the site. All of these pressures decrease the integrity of the forest and the conservation value of the site.



Figure 3.11: General site showing notable characteristics. A and B: use of the site as a toilet, C: relatively undisturbed forest 3m from the edge of the site, D: the site borders on a residential road and E: invasion by *Chromolaena odorata* from the edges to the centre of the site.

3.2.1 Vegetation

The vegetation of the study area comprises one vegetation community: indigenous coastal forest. The species composition and structure indicates that this forest approximates the Northern Coastal Forest as described by Mucina and Rutherford (2006) for the area. As such, it can be further classified as required as part of D'MOSS as well as a Critically Endangered Ecosystem (per KZN mapping). The Irreplaceable CBA extent should encompass this site.

The forest has a clear tree canopy, shrub layer and herbaceous layer with few grasses and more forbs and numerous lianas and climbers (Figure 3.12). Edges are invaded and areas of disturbance within the forest were found. Areas of disturbance are dominated by *Phoenix reclinata* and *Strelitzia nicolai*. Other areas of forest have a mix of indigenous tree species including the protected *Mimusops caffra* and *Sideroxylon inerme*. Further details of the species can be found in section 3.2.2 below.



Figure 3.12: Forest of the study area.



Figure 3.13: Vegetation map of the project site.

3.2.2 Flora

General

Overall, the species recorded from the site include 82 identified species (Appendix G). Species are typical of coastal forest of the region, approximating the forest described by Mucina and Rutherford (2006) as Northern Coastal Forest (Figure 3.14 **Error! Reference source not found.**). Dominant tree species include *Trema orientalis*, *Mimusops caffra*, *Albizia adianthifolia*, *Strelitzia nicolai* and *Phoenix reclinata* with other notable trees common in the area including *Trichilia dregeana*, *Sideroxylon inerme* and *Protorhus longifolia*. Dominant shrubs include *Brachylaena discolor*, *Osteospermum monilifera* and *Eugenia capensis*. Dominant climbers included *Laportea peduncularis*, *Momordica balsamina*, *Dalbergia obovata* and *Rhoicissus tridentata*.

Weeds dominate all four borders of the site and include species such as *Chromolaena odorata*, *Lantana camara*, *Syngonium podophyllum*, *Centella asiatica* and many others indicating edge disturbance is high.

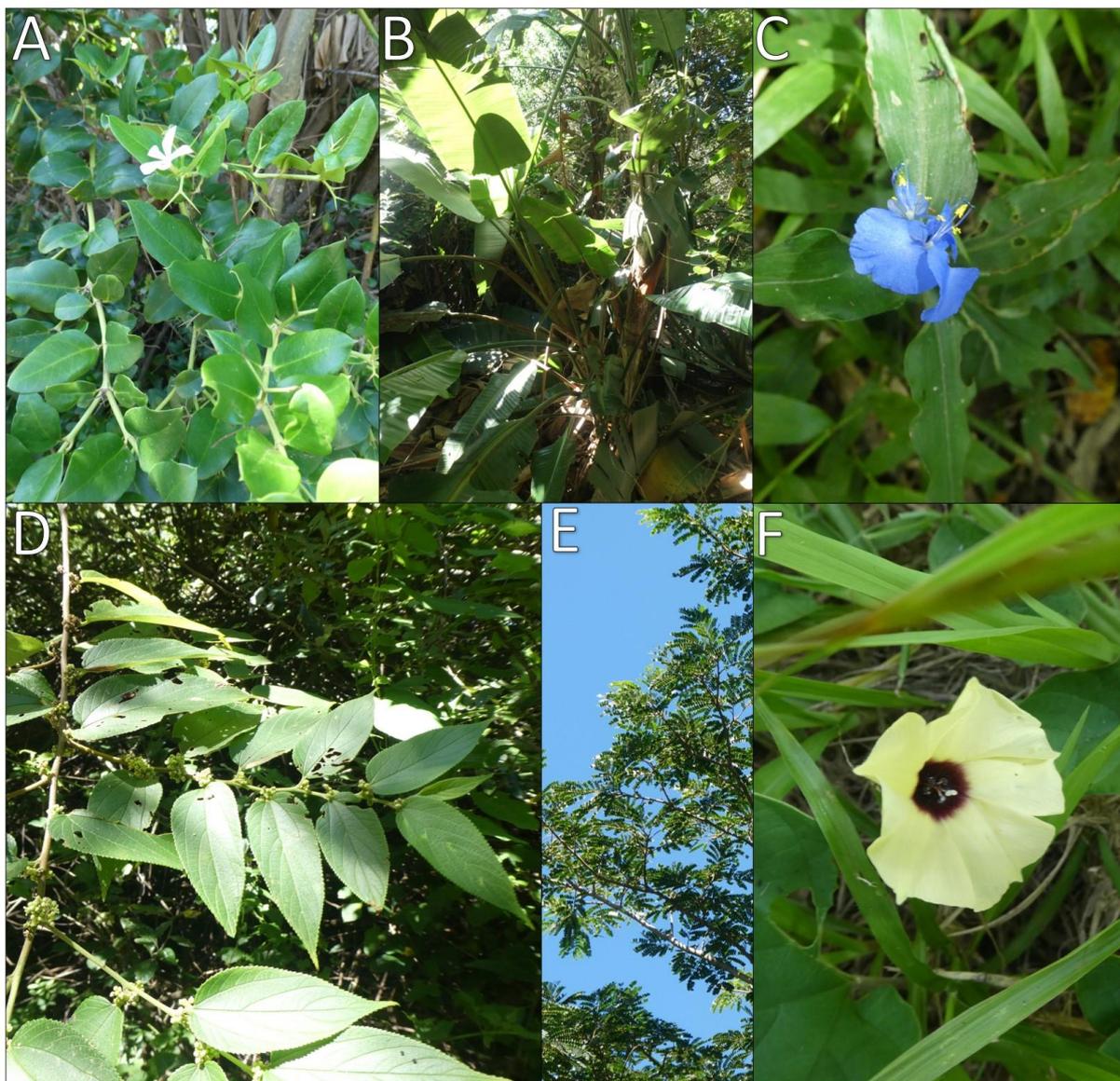


Figure 3.14: General species recorded from the site. A: *Carissa macrocarpa*, B: *Strelitzia Nicolai*, C: *Commelina erecta* D: *Trema orientalis* and D: *Albizia adianthifolia* and F: *Hewittia malabarica*.

Species of Conservation Concern

Six (6) SCC were recorded from the study site (Table 3.9, Figure 3.15) but it is possible that additional surveys would record additional species. As such, it is recommended that a full walk through of the site be conducted in the wet season (November to April) prior to any construction to make sure that none of these species lie within the footprint of the proposed development. Of the SCC found on site, all would require permits for removal, destruction or cutting prior to any of these actions occurring from either Ezemvelo KZN Wildlife or DAFF.

Table 3.9: Species of Conservation Concern found on site.

Family	Species	Endemic	IUCN	KZN	TOPS	Trees
Amaryllidaceae	<i>Scadoxus puniceus</i>		LC	Sch.12		
Colchicaceae	<i>Gloriosa superba</i>		LC	Sch.12		
Iridaceae	<i>Crocasmia aurea</i>		LC	Sch.12		
Diascoreaceae	<i>Dioscorea sp.</i>		LC	Sch.12		
Sapotaceae	<i>Mimusops caffra</i>		LC			x
	<i>Sideroxylon inerme</i>		LC			x



Figure 3.15: Species of Conservation Concern recorded from the site. A: *Gloriosa superba* and B: *Mimusops caffra*.

Alien Invasive species

Twelve (12) alien invasive species were found on site (Table 3.10, Figure 3.16), along with a few ruderal indigenous species. The most problematic aliens in this case were *Chromolaena odorata* and *Syngonium podophyllum* as these species are heavily invading the existing forest edges, outcompeting indigenous species and reducing overall species richness and available habitats. Also important to note are the large numbers of unlisted weeds that together are problematic in outcompeting indigenous forest plants.

Table 3.10: Alien invasive species found on site.

Family	Species	CARA	NEMA
Araceae	<i>Syngonium podophyllum</i>		1b
Asteraceae	<i>Chromolaena odorata</i>	1	1b
Basellaceae	<i>Anredera cordifolia</i>	1	1b
Cannaceae	<i>Canna indica</i>	1	1b
Euphorbiaceae	<i>Ricinus communis</i>	2	2
Fabaceae	<i>Senna pendula</i>	3	1b
Lauraceae	<i>Litsea glutinosa</i>	1	1b
Meliaceae	<i>Melia azedarach</i>	3	1b
Poaceae	<i>Arundo donax</i>	1	1b
Solanaceae	<i>Solanum mauritianum</i>	1	1b
	<i>Cestrum laevigatum</i>	1	1b
Verbenaceae	<i>Lantana camara</i>	1	1b

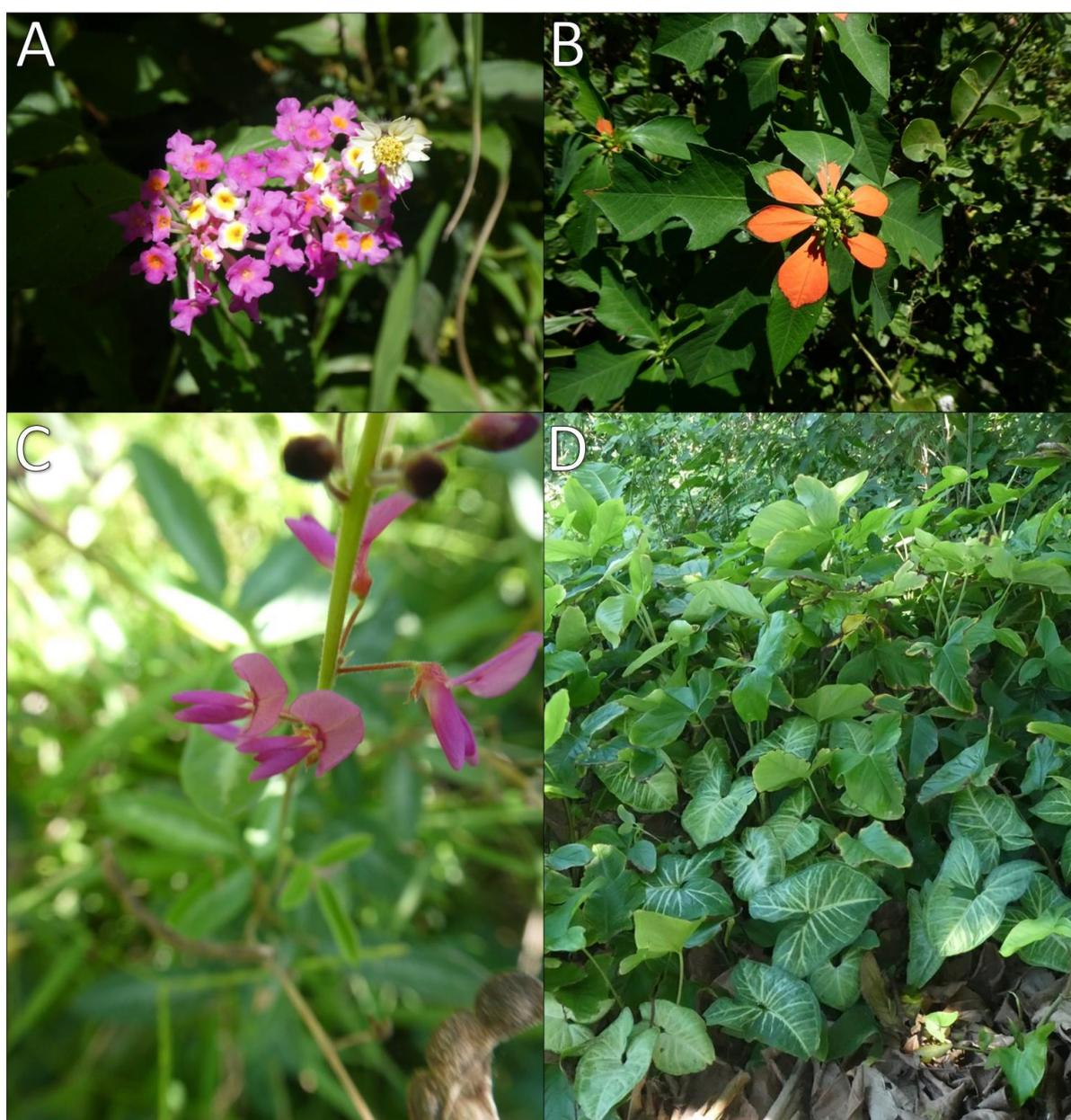


Figure 3.16: Some of the alien invasive species recorded from the study site. A: *Lantana camara*, B: *Euphorbia heterophylla* (a weed, but not a listed invasive alien plant), C: *Desmodium incanum* (also an unlisted weed), and D: *Syngonium podophyllum*.

3.2.3 Fauna

Although not a focus of the study, a note was made of fauna that were sighted opportunistically, or recorded as a result of scat, tracks and signs. Such faunal species included some bird species, vervet monkeys and lizards. Figure 3.17 shows a nest, most likely Hadedea or Woolly Necked Stork found on site. In order to determine the full suite of fauna using the site as habitat, it is recommended that a full faunal survey be undertaken. This would include night surveys for herpetofauna as well as dawn and dusk bird surveys and trapping for small mammals. Indigenous forest such as this also often harbours specific millipede and butterfly species along with other invertebrate species. However, having not been flagged by the online sensitivity tool for fauna species, this is up to the discretion of the municipality, who will have to be consulted with regards to any potential relaxation of D'MOSS boundaries and associated loss of faunal habitat in addition to loss of forest.



Figure 3.17: A nest found in the study area belonging most likely to a Hadedea or Woolly Necked Stork.

4 Sensitivity

Characteristics of the site contributing to sensitivity and biodiversity value were assessed and ranked, and the resulting matrix used to calculate a sensitivity score, which could be applied to each of the vegetation communities and habitats. Forests and rocky outcrops, as these are essential for the function of ecosystems and form niche habitats, are assigned a high sensitivity automatically. Characteristics included the following:

- Species of Conservation Concern (Any red listed or protected species);
- Presence of sensitive habitats (such as wetlands, rocky outcrops);
- Presence of Critical Biodiversity Areas;
- Level of degradation of the site (erosion, grazing);
- Presence of indigenous vegetation;
- Proximity to watercourses;
- Proximity to wetlands;
- Proximity to National Parks;
- Proximity to other protected areas;
- Proximity to National Protected Areas Expansion Strategy (NPAES) Focus Areas;
- Proximity to Important Bird Areas (IBAs);
- Proximity to Ramsar sites;
- Proximity to World Heritage Sites; and
- Proximity to Threatened Ecosystems as gazetted.

Sensitivity ratings for the site can be seen in Figure 4.1. The site is assessed as high sensitivity as it is comprised of indigenous forest that is critically endangered. The site is also somewhat contiguous with other remaining forest along the beach at this site (separated by a railway line).

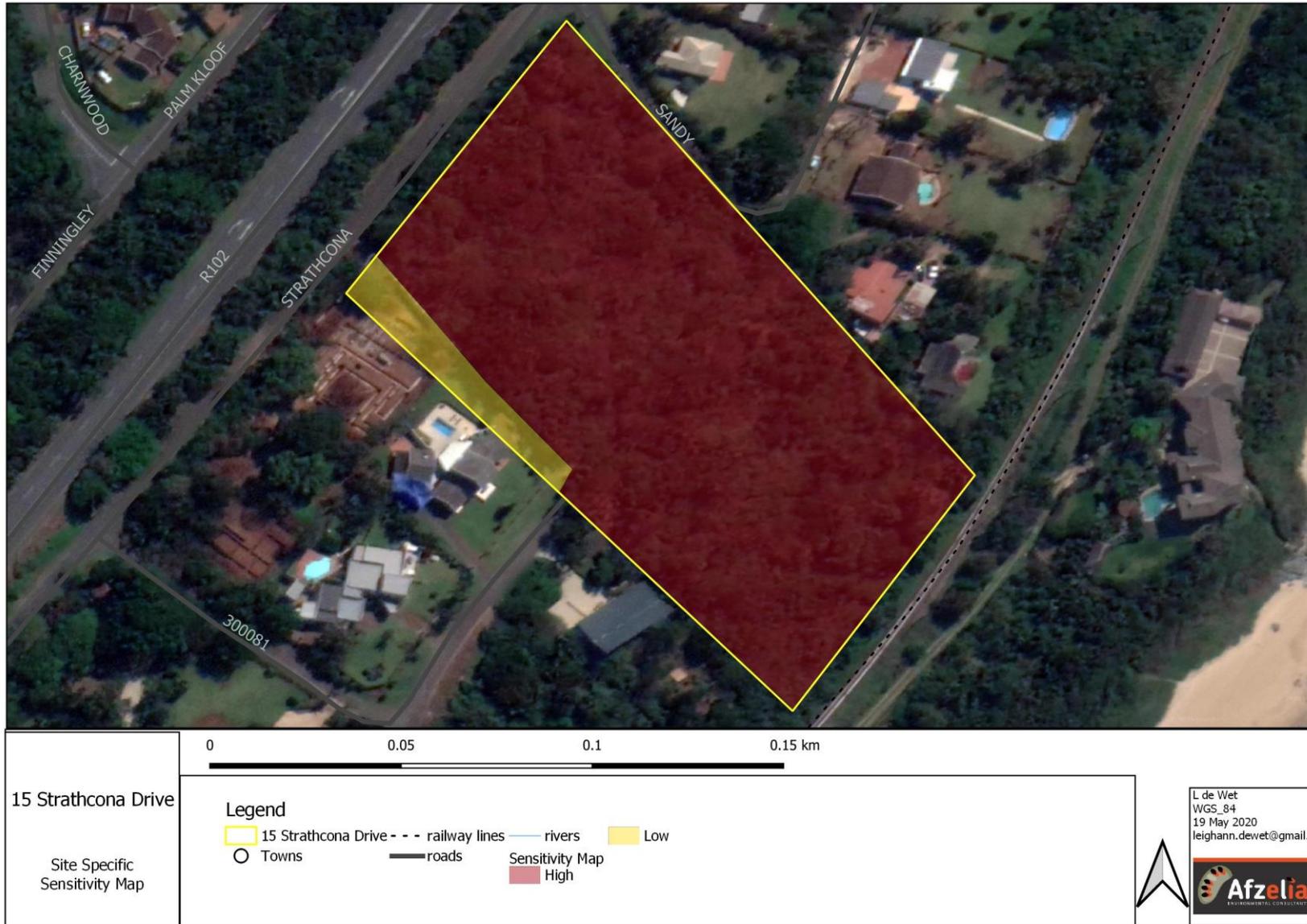


Figure 4.1: Sensitivity map of the Project Site.

5 Impact assessment

The impacts on the terrestrial biodiversity have been rated according to the methodology in Section 2.3. They span three issues and five impacts, which are outlined in sections 5.1 through 5.3. Mitigation measures are also provided for each of the expected impacts. Impacts associated with the planned development are based on the picture/artistic representation of a plan provided and indicate that approximately half of the site will be developed (the side adjacent to Strathcona Drive) and the remainder left as is.

Important to note are the current anthropogenic pressures on the site including continued use as a dumping ground and toilet, influx of people and influx of alien invasive plants. These pressures, coupled with the edge effects associated with a patch of isolated forest (a railway line separates it from contiguous forest), results in a relatively high negative long-term impact associated with leaving the site as is. Ultimately, this site will become heavily invaded as well as forming a dumping area which will result in the loss of ecosystem function, species richness and diversity, as well as habitat and continuity with similar vegetation communities.

Impacts are assessed for the following possibilities (which will have to be reassessed based on any plans produced):

- Without mitigation: Impacts associated with 60% loss of all forest¹;
- With mitigation: Impacts associated with stringent mitigation measures (such as building on stilts in the manor of forest lodges at game reserves);
- No-Go: Impacts associated with leaving the site as is.

5.1 Issue 1: Loss of Vegetation Communities

Vegetation will be lost permanently as a direct result of the construction phase of the project. The areas that will be lost are located within a Critically Endangered Ecosystem and approximately 60% area of forest will be lost as a result of the development, and the remaining forest subject to increased edge effects as a result of the construction. To reduce impacts, recommendations for potential lower-impact building are given here. For comparison, the impacts associated with not developing are also given here.

Possible mitigation measures include:

- The construction and operational footprint of the development must not extend past the site footprint (maximum 50% of the overall site), and laydown areas should be placed outside of the forest in disturbed areas or pavements of the road;
- Forest should be kept intact as far as possible, with construction activities restricted to lower impact building such as building in the forest on stilts, creating raised walkways and decking for the third row of units (closest to the sea, bordering the forest);
- Felling of large trees should be avoided as much as possible;
- No gardens should be planted, the “garden” should comprise uninvaded indigenous forest;
- No trees should be felled to allow for a sea view;
- Fencing the site and controlling access for people but allowing full access for fauna for the remaining forest area;
- Management and control of alien invasive species within and surrounding the proposed development including the remaining forest area.

¹ At this stage, only an artist's rendition of the plan has been provided to the specialist, and the 60% loss of the forest on site is an estimate. As such, detailed area calculations have not been done for the site. These can be calculated when a detailed plan is provided.

5.1.1 Impact 1: Loss of Forest

Impact statement

Impact on this community type without mitigation is expected to be national in extent and very high in magnitude permanently and is highly probable, with an overall significance of very high negative. Application of the mitigation measures will ensure the impact is a medium negative. Keeping the site as is would result in a very high negative impact. This impact is assessed with a high level of confidence.

Impact table

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	National	4	Permanent	5	Very High	10	Highly Probable	4	76	Very high
With mitigation	National	4	Permanent	5	Moderate	6	Probable	3	45	Medium
No-Go	National	4	Permanent	5	High	8	Definite	5	85	Very high

Impact interpretation

This impact rating means that the impact of leaving the site as is, is a higher negative than developing the site. However, development must be done through strict guidelines including building to retain as much natural forest as possible and then managing this forest for alien invasive plants and similar pressures. Alternatively, the site must become part of a reserve, or the site must be offset by conserving a site of equal or greater biodiversity value elsewhere according to offset metrics. This MUST be discussed with the Ethekewini Municipality.

5.2 Issue 2: Loss of Species of Conservation Concern and Biodiversity

Loss of SCC and biodiversity is species specific and measures the impact of the proposed development on SCC and biodiversity. As the site is forest, and is part of a Critically Endangered Ecosystem, the sensitivity is high.

Mitigation measures include:

- Avoidance of any and all SCC possible;
- Application for permits for the removal of listed plant SCC;
- Removal and replanting/ relocation to a nursery of existing SCC;
- Maintenance of the remaining forest areas to ensure SCC are not damaged or destroyed going forward;
- Planting of additional individuals of specific SCC within the “gardens” associated with the proposed development.

5.2.1 Impact 2: Loss of flora SCC

Impact statement

Loss of the SCC without mitigation will be national in extent, and moderate permanently as well as definite. Overall significance is very high negative but with application of the mitigation measures, the impact can be reduced to medium negative. Keeping the site as is would result in a very high negative impact. This impact is assessed with a high level of confidence.

Impact table

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	National	4	Permanent	5	Moderate	6	Definite	5	75	Very high
With mitigation	Regional	3	Short term	2	Low	4	Probable	3	27	Medium
No-Go	National	4	Permanent	5	Moderate	6	Definite	5	75	Very high

Impact interpretation

This impact rating means that the impact of leaving the site as is, is equal to the impact of developing the site. However, development must be done through strict guidelines including building to retain as much natural forest as possible and then managing this forest for alien invasive plants and similar pressures. Alternatively, the site must become part of a reserve, or the site must be offset by conserving a site of equal or greater biodiversity value elsewhere according to offset metrics. This MUST be discussed with the Ethekwini Municipality.

5.2.2 Impact 3: Loss of fauna SCC

Impact statement

Loss of the fauna SCC without mitigation will be regional in extent, and moderate permanently as well as probable. Overall significance is medium negative but with application of the mitigation measures, the impact can be reduced to low negative. The significance of leaving the site as is, is a medium negative. This impact is assessed with a low level of confidence.

Impact table

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Regional	3	Permanent	5	Moderate	6	Probable	3	42	Medium
With mitigation	Regional	3	Medium-term	3	Low	4	Improbable	2	20	Low
No-Go	Regional	3	Permanent	5	Low	4	Probable	3	36	Medium

Impact interpretation

This impact rating means that the impact of leaving the site as is, is equal to the impact of developing the site. However, development must be done through strict guidelines including building to retain as much natural forest as possible and then managing this forest for alien invasive plants and similar pressures. Alternatively, the site must become part of a reserve, or the site must be offset by conserving a site of equal or greater biodiversity value elsewhere according to offset metrics. This MUST be discussed with the Ethekwini Municipality.

5.3 Issue 3: Loss of Ecosystem Function and Process

Ecosystem function and process are important for terrestrial biodiversity. Invasion by alien flora species can result in the change of vegetation and the loss of function, especially when a forest is impacted, resulting in the reduction of ecosystem services such as flood attenuation, erosion control as well as provision of food and habitat for fauna and flora. The edge effects associated with developing half of the site will result in decreased biodiversity in the remainder of the site. The proposed development will further fragment an already fragmented ecosystem.

Recommended mitigation measures include:

- Development and application of an alien invasive management plan to prevent spread and new invasions by alien invasive plant species over the full site for both the construction and operational phases of the proposed development;
- Forest should be kept intact as far as possible, with construction activities restricted to lower impact building such as building in the forest on stilts, creating raised walkways and decking for the third row of units (closest to the sea, bordering the forest);
- Felling of large trees should be avoided as much as possible;
- No gardens should be planted, the “garden” should comprise uninvaded indigenous forest;
- No trees should be felled to allow for a sea view;
- Fencing the site and controlling access for people but allowing full access for fauna for the remaining forest area;
- Keeping the disturbance footprint as small as possible; and
- Rehabilitation should take place as soon as possible after construction is completed.

5.3.1 Impact 4: Fragmentation and edge effects

Overall, fragmentation of the ecosystem is high, with, the presence of high numbers of alien species adding to the fragmentation in terms of barriers to pollination, seed dispersal and animal movement. The site should be managed to reduce fragmentation where possible and corridors for ecological processes should be maintained.

Impact statement

Fragmentation and edge effects without mitigation will be regional in extent, and high in magnitude permanently as well as definite. Overall significance is very high negative but with application of the mitigation measures, the impact can be reduced to medium negative. Keeping the site as is would result in a very high negative impact. This impact is assessed with a moderate level of confidence.

Impact table

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Regional	3	Permanent	5	High	8	Definite	5	80	Very high
With mitigation	Regional	3	Medium-term	3	Low	4	Probable	3	30	Medium
No-Go	Regional	5	Permanent	5	High	8	Definite	5	80	Very high

Impact interpretation

This impact rating means that the impact of leaving the site as is, is equal to the impact of developing the site. However, development must be done through strict guidelines including building to retain as much natural forest as possible and then managing this forest for alien invasive plants and similar pressures. Alternatively, the site must become part of a reserve, or the site must be offset by conserving a site of equal or greater biodiversity value elsewhere according to offset metrics. This MUST be discussed with the Ethekwini Municipality.

5.3.2 Impact 5: Invasion of alien species

There are already alien invasive species on site. There is a high risk of these invasive species spreading as the proposed development is constructed, in addition to new species being introduced through seed dispersal, and on vehicles and personnel.

Impact statement

Impact of alien invasive species without mitigation will be local in extent, and high in magnitude and permanent as well as definite. Overall significance is very high negative but with application of the mitigation measures, the impact can be reduced to low negative. Keeping the site as is would result in a very high negative impact. This impact is assessed with a high level of confidence.

Impact table

Impact	Effect						Probability		Total Score	Significance
	Extent		Duration		Magnitude					
Without mitigation	Local	2	Permanent	5	High	8	Definite	5	75	Very high
With mitigation	Local	2	Short-term	2	Minor	2	Probable	3	18	Low
No-Go	Local	2	Permanent	5	High	8	Definite	5	75	Very high

Impact interpretation

This impact rating means that the impact of leaving the site as is, is equal to the impact of developing the site. However, development must be done through strict guidelines including building to retain as much natural forest as possible and then managing this forest for alien invasive plants and similar pressures. Alternatively, the site must become part of a reserve, or the site must be offset by conserving a site of equal or greater biodiversity value elsewhere according to offset metrics. This MUST be discussed with the Ethekwini Municipality.

6 Conclusions and recommendations

The vegetation of the study site is comprised of indigenous forest. It is located in a Critically Endangered Ecosystem (KZN) but does not contain any Critical Biodiversity areas. Overall impacts are very high to medium, with mitigation measures resulting in the reduction to medium or low in most cases. Leaving the site as is, with no management interventions will result in impacts equal to or higher than those associated with developing the site, even if the full site is lost (Table 6.1).

Table 6.1: Summary of impacts associated with the proposed 15 Strathcona Drive development.

Impact	Without Mitigation	With mitigation	No-Go
Issue 1: Loss of vegetation communities			
1: Loss of Forest	Very high	Medium	Very high
Issue 2: Loss of Species of Conservation Concern and biodiversity			
2: Loss of flora SCC	Very high	Medium	Very high
3: Loss of fauna SCC	Medium	Low	Medium
Issue 3: Loss of ecosystem function and process			
4: Fragmentation and edge effects	Very high	Medium	Very high
5: Invasion of alien species	Very high	Low -	Very high

Recommended mitigation measures include the following:

- The construction and operational footprint of the development must not extend past the site footprint, and laydown areas should be placed outside of the forest in disturbed areas or pavements of the road;
- Forest should be kept intact as far as possible, with construction activities restricted to lower impact building such as building in the forest on stilts, creating raised walkways and decking for the third row of units (closest to the sea, bordering the forest);
- Felling of large trees should be avoided as much as possible;
- No gardens should be planted, the “garden” should comprise uninvaded indigenous forest;
- No trees should be felled to allow for a sea view;
- Fencing the site and controlling access for people but allowing full access for fauna for the remaining forest area;
- Avoidance of any and all SCC possible;
- Application for permits for the removal of listed plant SCC;
- Removal and replanting/ relocation to a nursery of existing SCC;
- Maintenance of the forest areas to ensure SCC are not damaged or destroyed going forward;
- Planting of additional individuals of specific flora SCC within the “gardens” associated with the proposed development.
- Development and application of an alien invasive management plan to prevent spread and new invasions by alien invasive plant species over the full site for both the construction and operational phases of the proposed development;
- Keeping the disturbance footprint as small as possible; and
- Rehabilitation should take place as soon as possible after construction is completed.

Impacts associated with the planned development are based on the picture/ artistic representation of a plan provided and indicate that approximately half of the site will be developed (the side adjacent to Strathcona Drive) and the remainder left as is.

Important to note are the current anthropogenic pressures on the site including continued use as a dumping ground and toilet, influx of people and influx of alien invasive plants. These pressures, coupled with the edge effects associated with a patch of isolated forest (a railway line separates it from contiguous forest), results in a relatively high negative long-term impact associated with leaving the site as is. Ultimately, this site will become heavily invaded as well as

forming a dumping area which will result in the loss of ecosystem function, species richness and diversity, as well as habitat and continuity with similar vegetation communities. Thus No-Go impacts are as high or higher than developing the site.

This site is unique in that the impacts of developing it (without extremely stringent mitigation measures) are as high or lower than leaving the site as is. This would seem to indicate that construction should go ahead as impacts will be high later. However, the location of the site in a Critically Endangered Ecosystem and the fact that it forms part of an indigenous functional ecosystem are important to take into consideration as these functions should not be lost. It is recommended that the several options be considered by the developer in conjunction with the Ethekewini Municipality department responsible for D'MOSS (Table 6.2). Here, two options are viable for both development and conservation of habitat, Options 5 and 6.

Table 6.2: Options for the site with associated impacts and repercussions

#	Option	Impact on terrestrial biodiversity	Impact on construction*
1	Develop 60% of the site as a residential site, relaxing the D'MOSS and losing the biodiversity of the site	Very high negative – 60% of area and associated biodiversity is lost	Very high Positive - Any construction can proceed
2	Leaving the site as is, with no management interventions	Very high negative – all biodiversity is lost in time	Very high negative – No construction can go ahead
3	Putting aside the site as a conservation area and managed as such as part of a linked reserve	Very high positive – conservation of biodiversity	Very high negative – No construction can go ahead
4	Develop the site with stringent mitigation measures such as building on stilts with wooden walkways and decking	Medium positive – low impacts and site is managed for indigenous forest	Medium negative – very restricted
5	Develop the site with some mitigation measures in place such as reducing the D'MOSS boundaries and conserving the remainder as part of a stewardship arrangement	Medium positive – some of the site is conserved	Medium Positive – some of the site can be developed in any way
6	Develop the site and offset the loss as per offset requirements for the municipality and province, provided an area in the same area (Clansthal) can be set aside and managed for conservation in perpetuity.	High positive – areas facing the same pressures will be managed for conservation.	Very high positive – Any construction can take place.

*where low is (can do anything) and high is (can do nothing)

The specialist recommends that the development go ahead provided the following conditions are met:

- A meeting must be held with Ethekewini Municipality and a way forward agreed upon based on the recommended options above;
- Development and application of an alien invasive management plan;
- A walk through of the full site prior to construction to determine the presence and identity of any protected plants and the relevant permits applied for;
- The allowance for natural corridors within the site plan wherever practicable;
- A management plan must be drawn up for remaining natural areas; and
- The development and application of a rehabilitation plan.

7 References

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Government of South Africa (2008). National Protected Area Expansion Strategy for South Africa 2008: Priorities for expanding the protected area network for ecological sustainability and climate change adaptation. Government of South Africa, Pretoria. 2010. ISBN 978-1-919976-55-6.

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8 Appendix A: Species of Conservation Concern, list and category details

8.1 IUCN

These categories are the same for both global and national IUCN red data lists, the same criteria are used to determine the IUCN rating for these species.

Table 1: IUCN Categories

Category	Abbreviation	Explanation
Extinct	EX	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild	EW	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered	CR	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered	EN	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable	VU	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened	NT	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern	LC	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
Data Deficient	DD	taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.
Not Evaluated	NE	A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

8.2 TOPS

The TOPS list used in this report is from: National Environmental Management; Biodiversity Act, 2004 (Act 10 of 2004): Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species (GN 30568, 14 Dec 2007).

Table 1: TOPS list summary of Schedules and Categories

Category	Abbreviation	Explanation
Critically Endangered Species	CR	Indigenous species facing an extremely high risk of extinction in the wild in the immediate future
Endangered Species	EN	Indigenous species facing a high risk of extinction on the wild in the near future, although they are not a critically endangered species
Vulnerable Species	VU	Indigenous species facing a high risk of extinction in the wild in the medium-term future, although they are not a critically endangered species or an endangered species
Protected Species	P	Indigenous species of high conservation value or national importance that require national protection

8.3 KZN Conservation Ordinance

The provincial list is obtained from the Nature Conservation Ordinance (No. 15 of 1974) for the province, and the associated species listed in the Schedules, which need permits to remove or kill according to the associated legislation. This list is shortened to “KZN” for reporting. Pertinent lists are as follows:

- Schedule 2: Protected game;
- Schedule 3: Specially Protected Game;
- Schedule 6: Endangered Mammals;
- Schedule 7: Protected Amphibians, Invertebrates and Reptiles;
- Schedule 9: Specially Protected Birds;
- Schedule 11: Protected Indigenous Plants; and
- Schedule 12: Specially Protected Indigenous Plants.

9 Appendix B: List of Expected Plant Species

Family	Species	POSA	M&R	Endemic	IUCN	KZN	TOPS	Trees	Invasive	CARA	NEMA
Acanthaceae	<i>Asystasia gangetica</i>		x		LC						
	<i>Dicliptera cernua</i>	x			LC						
	<i>Dyschoriste depressa</i>	x									
	<i>Dyschoriste setigera</i>	x			LC						
	<i>Isoglossa woodii</i>		x		LC						
	<i>Justicia betonica</i>	x			LC						
	<i>Justicia petiolaris</i>	x			LC						
	<i>Phaulopsis imbricata</i>	x			LC						
Achariaceae	<i>Xylothea kraussiana</i>		x								
Adoxaceae	<i>Sambucus canadensis</i>	x						x			
Agavaceae	<i>Chlorophytum saundersiae</i>	x		x	LC						
Aizoaceae	<i>Carpobrotus dimidiatus</i>	x			LC						
	<i>Mesembryanthemum cordifolium</i>	x		x							
Amaranthaceae	<i>Achyranthes aspera</i>		x								
	<i>Alternanthera pungens</i>	x							x		
	<i>Alternanthera sessilis</i>	x							x		
	<i>Dysphania carinata</i>	x							x		
Amaryllidaceae	<i>Haemanthus deformis</i>	x		x	VU	Sch.12					
Anacardiaceae	<i>Schinus terebinthifolius</i>	x			NE				x	1	1b
	<i>Searsia chirindensis</i>	x			LC						
	<i>Searsia dentata</i>	x			LC						
	<i>Searsia nebulosa</i>		x		LC						
Anemiaceae	<i>Anemia dregeana</i>	x			LC						
Annonaceae	<i>Artabotrys monteiroae</i>		x		LC						
	<i>Monanthes affra</i>		x		LC						
	<i>Uvaria affra</i>	x	x		LC						
Apiaceae	<i>Centella asiatica</i>	x			LC						
	<i>Cyclosporum leptophyllum</i>	x							x		
Apocynaceae	<i>Acokanthera oblongifolia</i>		x		LC						
	<i>Brachystelma sandersonii</i>	x		x	VU	Sch.12					

Family	Species	POSA	M&R	Endemic	IUCN	KZN	TOPS	Trees	Invasive	CARA	NEMA
	<i>Callichilia orientalis</i>		x		LC						
	<i>Carissa bispinosa</i>		x		LC						
	<i>Gomphocarpus physocarpus</i>	x			LC						
	<i>Landolphia kirkii</i>		x		LC						
Aspleniaceae	<i>Asplenium rutifolium</i>	x			LC						
	<i>Acanthospermum australe</i>	x							x		
	<i>Acanthospermum glabratum</i>	x							x		
	<i>Acmella caulirhiza</i>	x			LC				x		
	<i>Ageratum houstonianum</i>	x							x	1	1b
	<i>Ambrosia artemisiifolia</i>	x							x		
	<i>Ambrosia psilostachya</i>	x							x		
	<i>Brachylaena discolor subsp. discolor</i>		x		LC						
	<i>Doellia cafra</i>	x			LC						
	<i>Gamochaeta antillana</i>	x							x		
Asteraceae	<i>Gazania rigens</i>	x			LC						
	<i>Helichrysum pallidum</i>	x			LC						
	<i>Mikania natalensis</i>	x			LC						
	<i>Osteospermum monilifera subsp. rotundata</i>		x		LC						
	<i>Pulicaria scabra</i>	x			LC						
	<i>Senecio albanensis</i>	x			LC						
	<i>Senecio deltoideus</i>	x			LC						
	<i>Senecio madagascariensis</i>	x			LC						
	<i>Senecio oxyriifolius</i>	x			LC						
	<i>Tridax procumbens</i>	x							x		
Boraginaceae	<i>Ehretia rigida</i>	x			LC						
	<i>Trichodesma zeylanicum</i>	x			LC						
Brassicaceae	<i>Nasturtium officinale</i>	x							x		
Burseraceae	<i>Commiphora harveyi</i>	x			LC						
Buxaceae	<i>Buxus natalensis</i>		x		LC						
Cannaceae	<i>Canna indica</i>	x			NE				x	1	1b
Capparaceae	<i>Cadaba natalensis</i>	x			LC						
	<i>Maerua cafra</i>	x			LC						
Celastraceae	<i>Celtis gomphophylla</i>		x		LC						

Family	Species	POSA	M&R	Endemic	IUCN	KZN	TOPS	Trees	Invasive	CARA	NEMA
	<i>Gymnosporia buxifolia</i>	x			LC						
	<i>Gymnosporia nemorosa</i>		x		LC						
	<i>Mystroxydon aethiopicum</i>	x		x	LC						
	<i>Pleurostyliia capensis</i>	x			LC						
	<i>Pristimera peglerae</i>	x		x							
	<i>Putterlickia verrucosa</i>		x		LC						
Colchicaceae	<i>Gloriosa superba</i>		x		LC						
Combretaceae	<i>Combretum erythrophyllum</i>	x			LC						
Commelinaceae	<i>Aneilema aequinoctiale</i>	x			LC						
	<i>Hewittia malabarica</i>	x			LC						
	<i>Ipomoea cairica</i>	x									
Convolvulaceae	<i>Ipomoea indica</i>	x							x	1	1b
	<i>Ipomoea obscura</i>	x			LC						
	<i>Ipomoea wightii</i>	x			LC						
Cucurbitaceae	<i>Coccinia mackenii</i>	x			LC						
	<i>Cucumis zeyheri</i>	x			LC						
	<i>Bulbostylis boeckeleriana</i>	x			LC						
	<i>Cyperus albostriatus</i>		x		LC						
	<i>Cyperus cyperoides</i>	x			LC						
	<i>Cyperus turbatus</i>	x		x							
	<i>Fimbristylis variegata</i>	x		x	LC						
	<i>Isolepis prolifera</i>	x			LC						
	<i>Isolepis sepulcralis</i>	x			LC						
	<i>Kyllinga nemoralis</i>	x			LC						
	<i>Pycneus flavescens</i>	x			LC						
	<i>Pycneus mundii</i>	x			LC						
	<i>Pycneus permutatus</i>	x									
	<i>Pycneus rehmannianus</i>	x			LC						
Dichapetalaceae	<i>Tapura fischeri</i>		x								
Dracaenaceae	<i>Dracaena aletriformis</i>		x		LC						
Droseraceae	<i>Drosera natalensis</i>	x			LC						
	<i>Diospyros inhacaensis</i>		x		LC						
Ebenaceae	<i>Euclea natalensis</i>	x	x		LC						

Family	Species	POSA	M&R	Endemic	IUCN	KZN	TOPS	Trees	Invasive	CARA	NEMA
	<i>Euclea racemosa</i>		x		LC						
Erythroxylaceae	<i>Erythroxylum emarginatum</i>		x		LC						
Euphorbiaceae	<i>Cavacoa aurea</i>		x		LC						
	<i>Erythrococca berberidea</i>		x		LC						
	<i>Euphorbia flanaganii</i>	x		x	VU						
	<i>Euphorbia indica</i>	x			NE				x		
	<i>Ricinus communis</i>	x			NE				x	2	2
	<i>Suregada africana</i>	x			LC						
	Fabaceae	<i>Adenopodia spicata</i>	x			LC					
<i>Albizia adianthifolia</i>			x		LC						
<i>Argyrolobium harveyanum</i>		x			LC						
<i>Argyrolobium rotundifolium</i>		x			LC						
<i>Dalbergia armata</i>			x		LC						
<i>Desmodium incanum</i>		x			NE				x		
<i>Dichilus reflexus</i>		x			LC						
<i>Eriosema cordatum</i>		x			LC						
<i>Medicago polymorpha</i>		x			NE				x		
<i>Senegalia kraussiana</i>			x		LC						
<i>Senegalia kraussiana</i>		x			LC						
<i>Senna bicapsularis</i>		x			NE				x	3	1b
<i>Senna septemtrionalis</i>		x			NE				x		
<i>Trifolium africanum</i>		x			NE						
<i>Trifolium burchellianum</i>		x			LC						
<i>Vachellia karroo</i>		x			LC						
<i>Vachellia kosiensis</i>			x		LC						
<i>Vachellia nilotica</i>	x			LC							
Gesneriaceae	<i>Streptocarpus haygarthii</i>	x		x	LC						
Hyacinthaceae	<i>Drimia calcarata</i>	x			LC	Sch.12					
	<i>Ledebouria cooperi</i>	x			LC	Sch.12					
	<i>Ledebouria petiolata</i>	x			LC	Sch.12					
Hydrocharitaceae	<i>Najas marina</i>	x			LC						
Hypoxidaceae	<i>Hypoxis acuminata</i>	x			LC						
	<i>Hypoxis angustifolia</i>	x			LC						

Family	Species	POSA	M&R	Endemic	IUCN	KZN	TOPS	Trees	Invasive	CARA	NEMA
Iridaceae	<i>Aristea abyssinica</i>	x			LC	Sch.12					
	<i>Gladiolus dalenii</i>	x			LC	Sch.12					
	<i>Gladiolus longicollis</i>	x			LC	Sch.12					
Juncaceae	<i>Juncus effusus</i>	x			LC						
Juncaginaceae	<i>Triglochin striata</i>	x			LC						
Lamiaceae	<i>Ocimum americanum</i>	x			LC						
	<i>Ocimum gratissimum</i>	x			NE						
	<i>Vitex trifolia</i>	x							x		
Liliaceae	<i>Lilium formosanum</i>	x							x	3	1b
Loganiaceae	<i>Strychnos usambarensis</i>	x			LC						
Loranthaceae	<i>Agelanthus gracilis</i>	x			LC						
	<i>Erianthemum dregei</i>	x			LC						
Lythraceae	<i>Heimia myrtifolia</i>	x							x		
Malvaceae	<i>Corchorus trilocularis</i>	x			NE				x		
	<i>Hibiscus altissimus</i>	x			LC						
	<i>Pavonia burchellii</i>	x			LC						
	<i>Sida cordifolia</i>	x			LC						
Mavaceae	<i>Cola natalensis</i>		x		LC						
Meliaceae	<i>Ekebergia capensis</i>	x			LC						
	<i>Trichilia emetica</i>		x		LC						
	<i>Turraea floribunda</i>		x								
Moraceae	<i>Ficus polita</i>	x			LC						
Myrtaceae	<i>Eugenia capensis</i>		x		LC						
	<i>Syzygium cumini</i>	x							x	3	1b
Ochnaceae	<i>Ochna arborea</i>	x			NE						
Olacaceae	<i>Ximenia caffra</i>	x			LC						
Oleaceae	<i>Olea woodiana</i>	x									
Orchidaceae	<i>Eulophia speciosa</i>	x			LC	Sch.12					
	<i>Mystacidium venosum</i>	x			LC	Sch.12					
Oxalidaceae	<i>Oxalis corniculata</i>	x							x		
Papaveraceae	<i>Argemone mexicana</i>	x							x	1	1b
Peraceae	<i>Clusia pulchella</i>	x		x	LC						
Plantaginaceae	<i>Veronica anagallis-aquatica</i>	x			LC						

Family	Species	POSA	M&R	Endemic	IUCN	KZN	TOPS	Trees	Invasive	CARA	NEMA
Poaceae	<i>Arundo donax</i>	x			NE				x	1	1b
	<i>Bothriochloa inculpta</i>	x			LC						
	<i>Digitaria ciliaris</i>	x			NE				x		
	<i>Digitaria debilis</i>	x			LC						
	<i>Eragrostis pilosa</i>	x			LC						
	<i>Eragrostis tenuifolia</i>	x			LC						
	<i>Hyparrhenia tamba</i>	x			LC						
	<i>Oplismenus hirtellus</i>	x	x		LC						
	<i>Panicum maximum</i>	x			LC						
	<i>Paspalum distichum</i>	x			LC				x		
	<i>Pennisetum purpureum</i>	x			NE				x		
	<i>Polypogon monspeliensis</i>	x			NE				x		
	<i>Sorghum bicolor</i>	x			LC						
	Polygalaceae	<i>Polygala serpentaria</i>	x			LC					
<i>Polygala transvaalensis</i>		x			LC						
Polypodiaceae	<i>Microsorium scolopendria</i>		x		LC						
Potamogetonaceae	<i>Potamogeton pectinatus</i>	x			LC						
Pteridaceae	<i>Cheilanthes hirta</i>	x			LC						
	<i>Cheilanthes involuta</i>	x			LC						
	<i>Cheilanthes viridis</i>	x			LC						
	<i>Doryopteris concolor</i>	x			LC						
	<i>Pityrogramma calomelanos</i>	x							x		
	<i>Pteris vittata</i>	x			LC						
Putranjivaceae	<i>Drypetes natalensis</i>		x		LC						
	<i>Drypetes reticulata</i>		x		LC						
Rhamnaceae	<i>Scutia myrtina</i>		x		LC						
Rubiaceae	<i>Coffea racemosa</i>		x		LC						
	<i>Cordylostigma virgata</i>	x									
	<i>Hyperacanthus amoenus</i>		x		LC						
	<i>Kraussia floribunda</i>		x								
	<i>Pavetta bowkeri</i>	x		x	LC						
	<i>Psydrax obovata</i>	x	x		LC						
Ruscaceae	<i>Eriospermum mackenii</i>	x			NE						

Family	Species	POSA	M&R	Endemic	IUCN	KZN	TOPS	Trees	Invasive	CARA	NEMA
Rutaceae	<i>Teclea gerrardii</i>		x		LC						
	<i>Vepris bachmannii</i>	x									
	<i>Vepris lanceolata</i>		x								
	<i>Vepris trichocarpa</i>	x									
Salicaceae	<i>Dovyalis longispina</i>		x		LC						
	<i>Dovyalis rhamnoides</i>	x	x		LC						
	<i>Homalium rufescens</i>	x		x	LC						
	<i>Salix mucronata</i>	x			LC						
	<i>Scolopia zeyheri</i>	x			LC						
Salviniaceae	<i>Azolla filiculoides</i>	x			NE				x	1	1b
Sapindaceae	<i>Deinbollia oblongifolia</i>		x		LC						
	<i>Haplocoelum foliolosum subsp. mombasense</i>		x		LC						
	<i>Hippobromus pauciflorus</i>	x			LC						
	<i>Pancovia golungensis</i>		x		LC						
Sapotaceae	<i>Chrysophyllum viridifolium</i>		x		LC						
	<i>Englerophytum natalense</i>		x		LC						
	<i>Inhambanella henriquesii</i>		x		LC						
	<i>Manilkara concolor</i>		x		LC						
	<i>Mimusops caffra</i>		x		LC			x			
	<i>Sideroxylon inerme</i>	x	x		LC			x			
Solanaceae	<i>Lycium acutifolium</i>	x		x	LC						
	<i>Solanum mauritianum</i>	x							x	1	1b
Strelitziaceae	<i>Strelitzia nicolai</i>		x		LC						
Strychnaceae	<i>Strychnos decussata</i>		x		LC						
	<i>Strychnos henningsii</i>		x		LC						
Thelypteridaceae	<i>Ampelopteris prolifera</i>	x			LC						
Thymeliaceae	<i>Peddiea africana</i>		x		LC						
Urticaceae	<i>Laportea peduncularis</i>		x		LC						
Vitaceae	<i>Cissus fragilis</i>	x		x	LC						
	<i>Rhoicissus tomentosa</i>		x		LC						
Zamiaceae	<i>Encephalartos ferox</i>		x		NT	Sch. 12	Protected				
Zosteraceae	<i>Zostera capensis</i>	x			LC						

10 Appendix C: Expected mammal species for the 15 Strathcona Drive Development

Family	Scientific Name	Comon name	Red List	KZN	TOPs
Bovidae	<i>Philantomba monticola</i>	Blue Duiker	VU		VU
	<i>Tragelaphus scriptus</i>	Bushbuck	LC	Sch.1, Sch.2	
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet Monkey	LC		
	<i>Chlorocebus pygerythrus pygerythrus</i>	Vervet Monkey (subspecies pygerythrus)	LC		
Hystricidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC		
Muridae	<i>Grammomys dolichurus</i>	Common Grammomys	LC		
	<i>Lemniscomys rosalia</i>	Single-Striped Lemniscomys	LC		
	<i>Mastomys natalensis</i>	Natal Mastomys	LC		
	<i>Mus (Nannomys) minutoides</i>	Southern African Pygmy Mouse	LC		
	<i>Rattus norvegicus</i>	Brown Rat	LC		
	<i>Rattus rattus</i>	Roof Rat	LC		
Pteropodidae	<i>Rattus tanezumi</i>	Oriental House Rat			
	<i>Epomophorus sp.</i>	Epauletted Fruit Bats			
Vespertilionidae	<i>Hypsugo anchietae</i>	Anchieta's Pipistrelle	NT		
	<i>Scotophilus dinganii</i>	Yellow-bellied House Bat	LC		

11 Appendix D: Expected bird species for the 15 Strathcona Drive Development

Scientific name	Common name	Red List	KZN	TOPs
<i>Accipiter melanoleucus</i>	Sparrowhawk, Black			
<i>Accipiter minullus</i>	Sparrowhawk, Little			
<i>Accipiter tachiro</i>	Goshawk, African			
<i>Acridotheres tristis</i>	Myna, Common		Sch.8	
<i>Acrocephalus baeticatus</i>	Reed-warbler, African			
<i>Acrocephalus gracilirostris</i>	Swamp-warbler, Lesser			
<i>Actitis hypoleucos</i>	Sandpiper, Common			
<i>Actophilornis africanus</i>	Jacana, African			
<i>Alcedo cristata</i>	Kingfisher, Malachite			
<i>Alcedo semitorquata</i>	Kingfisher, Half-collared	NT, LC		
<i>Alopochen aegyptiacus</i>	Goose, Egyptian		Sch.1	
<i>Amandava subflava</i>	Waxbill, Orange-breasted			
<i>Amaurornis flavirostris</i>	Crake, Black			
<i>Amblyospiza albifrons</i>	Weaver, Thick-billed			
<i>Anas hottentota</i>	Teal, Hottentot		Sch.2	
<i>Anas sparsa</i>	Duck, African Black		Sch.2	
<i>Anas undulata</i>	Duck, Yellow-billed		Sch.1	
<i>Anastomus lamelligerus</i>	Openbill, African			
<i>Andropadus importunus</i>	Greenbul, Sombre			
<i>Anhinga rufa</i>	Darter, African			
<i>Anthus cinnamomeus</i>	Pipit, African			
<i>Anthus leucophrys</i>	Pipit, Plain-backed			
<i>Apalis thoracica</i>	Apalis, Bar-throated			
<i>Apaloderma narina</i>	Trogon, Narina			
<i>Aplopelia larvata</i>	Dove, Lemon			
<i>Apus affinis</i>	Swift, Little			
<i>Apus caffer</i>	Swift, White-rumped			
<i>Apus horus</i>	Swift, Horus			
<i>Ardea cinerea</i>	Heron, Grey			
<i>Ardea goliath</i>	Heron, Goliath			
<i>Ardea melanocephala</i>	Heron, Black-headed			
<i>Ardea purpurea</i>	Heron, Purple			
<i>Aviceda cuculoides</i>	Hawk, African Cuckoo			
<i>Batis capensis</i>	Batis, Cape			
<i>Batis molitor</i>	Batis, Chinspot			
<i>Bostrychia hagedash</i>	Ibis, Hadedash			
<i>Bradypterus baboecala</i>	Rush-warbler, Little			
<i>Bradypterus barratti</i>	Warbler, Barratt's			
<i>Bubo africanus</i>	Eagle-owl, Spotted			
<i>Bubulcus ibis</i>	Egret, Cattle			
<i>Burhinus vermiculatus</i>	Thick-knee, Water			
<i>Buteo rufofuscus</i>	Buzzard, Jackal			
<i>Buteo vulpinus</i>	Buzzard, Steppe			
<i>Butorides striata</i>	Heron, Green-backed			
<i>Bycanistes bucinator</i>	Hornbill, Trumpeter			
<i>Calidris alba</i>	Sanderling, Sanderling			
<i>Calidris minuta</i>	Stint, Little			
<i>Camaroptera brachyura</i>	Camaroptera, Green-backed			

Scientific name	Common name	Red List	KZN	TOPs
<i>Campephaga flava</i>	Cuckoo-shrike, Black			
<i>Campethera abingoni</i>	Woodpecker, Golden-tailed			
<i>Caprimulgus pectoralis</i>	Nightjar, Fiery-necked			
<i>Centropus burchellii</i>	Coucal, Burchell's			
<i>Cercomela familiaris</i>	Chat, Familiar			
<i>Cercotrichas leucophrys</i>	Scrub-robin, White-browed			
<i>Cercotrichas signata</i>	Scrub-robin, Brown			
<i>Ceryle rudis</i>	Kingfisher, Pied			
<i>Ceuthmochares australis</i>	Malkoha, Green			
<i>Chalcomitra amethystina</i>	Sunbird, Amethyst			
<i>Chalcomitra senegalensis</i>	Sunbird, Scarlet-chested			
<i>Charadrius hiaticula</i>	Plover, Common Ringed			
<i>Charadrius marginatus</i>	Plover, White-fronted			
<i>Charadrius tricollaris</i>	Plover, Three-banded			
<i>Chlorocichla flaviventris</i>	Greenbul, Yellow-bellied			
<i>Chloropeta natalensis</i>	Warbler, Dark-capped Yellow			
<i>Chrysococcyx caprius</i>	Cuckoo, Diderick			
<i>Chrysococcyx klaas</i>	Cuckoo, Klaas's			
<i>Ciconia episcopus</i>	Stork, Woolly-necked			
<i>Ciconia nigra</i>	Stork, Black	VU, LC		VU
<i>Cinnyricinclus leucogaster</i>	Starling, Violet-backed			
<i>Cinnyris afer</i>	Sunbird, Greater Double-collared			
<i>Cinnyris bifasciatus</i>	Sunbird, Purple-banded			
<i>Cinnyris talatala</i>	Sunbird, White-bellied			
<i>Circaetus pectoralis</i>	Snake-eagle, Black-chested			
<i>Cisticola aberrans</i>	Cisticola, Lazy			
<i>Cisticola ayresii</i>	Cisticola, Wing-snapping			
<i>Cisticola chiniana</i>	Cisticola, Rattling			
<i>Cisticola erythrops</i>	Cisticola, Red-faced			
<i>Cisticola fulvicapilla</i>	Neddicky, Neddicky			
<i>Cisticola galactotes</i>	Cisticola, Rufous-winged			
<i>Cisticola juncidis</i>	Cisticola, Zitting			
<i>Cisticola natalensis</i>	Cisticola, Croaking			
<i>Cisticola tinniens</i>	Cisticola, Levaillant's			
<i>Coccyzygia melanotis</i>	Waxbill, Sweet			
<i>Colius striatus</i>	Mousebird, Speckled		Sch.8	
<i>Columba guinea</i>	Pigeon, Speckled		Sch.8	
<i>Columba livia</i>	Dove, Rock			
<i>Coracina caesia</i>	Cuckoo-shrike, Grey			
<i>Corvus albicollis</i>	Raven, White-necked			
<i>Corvus albus</i>	Crow, Pied		Sch.8	
<i>Cossypha caffra</i>	Robin-chat, Cape			
<i>Cossypha dichroa</i>	Robin-chat, Chorister			
<i>Cossypha natalensis</i>	Robin-chat, Red-capped			
<i>Crithagra gularis</i>	Seedeater, Streaky-headed			
<i>Crithagra mozambicus</i>	Canary, Yellow-fronted			
<i>Crithagra scotops</i>	Canary, Forest			
<i>Crithagra sulphuratus</i>	Canary, Brimstone			
<i>Cuculus solitarius</i>	Cuckoo, Red-chested			
<i>Cyanomitra olivacea</i>	Sunbird, Olive			
<i>Cyanomitra veroxii</i>	Sunbird, Grey			

Scientific name	Common name	Red List	KZN	TOPs
<i>Cypsiurus parvus</i>	Palm-swift, African			
<i>Dendrocygna viduata</i>	Duck, White-faced		Sch.1	
<i>Dendropicos fuscescens</i>	Woodpecker, Cardinal			
<i>Dendropicos griseocephalus</i>	Woodpecker, Olive			
<i>Dicrurus adsimilis</i>	Drongo, Fork-tailed			
<i>Dicrurus ludwigii</i>	Drongo, Square-tailed			
<i>Dryoscopus cubla</i>	Puffback, Black-backed			
<i>Egretta garzetta</i>	Egret, Little			
<i>Elanus caeruleus</i>	Kite, Black-shouldered			
<i>Estrilda astrild</i>	Waxbill, Common			
<i>Estrilda perreini</i>	Waxbill, Grey			
<i>Euplectes ardens</i>	Widowbird, Red-collared			
<i>Euplectes axillaris</i>	Widowbird, Fan-tailed			
<i>Euplectes capensis</i>	Bishop, Yellow			
<i>Euplectes orix</i>	Bishop, Southern Red			
<i>Euplectes progne</i>	Widowbird, Long-tailed			
<i>Falco biarmicus</i>	Falcon, Lanner	VU, LC		
<i>Falco peregrinus</i>	Falcon, Peregrine		Sch.9	VU
<i>Gallinula chloropus</i>	Moorhen, Common			
<i>Gallirex porphyreolophus</i>	Turaco, Purple-crested			
<i>Gypohierax angolensis</i>	Vulture, Palm-nut		Sch.9	
<i>Haematopus moquini</i>	Oystercatcher, African Black			
<i>Halcyon albiventris</i>	Kingfisher, Brown-hooded			
<i>Haliaeetus vocifer</i>	Fish-eagle, African			
<i>Hedypipna collaris</i>	Sunbird, Collared			
<i>Himantopus himantopus</i>	Stilt, Black-winged			
<i>Hirundo abyssinica</i>	Swallow, Lesser Striped			
<i>Hirundo albigularis</i>	Swallow, White-throated			
<i>Hirundo cucullata</i>	Swallow, Greater Striped			
<i>Hirundo fuligula</i>	Martin, Rock			
<i>Hirundo rustica</i>	Swallow, Barn			
<i>Hirundo smithii</i>	Swallow, Wire-tailed			
<i>Indicator indicator</i>	Honeyguide, Greater			
<i>Indicator minor</i>	Honeyguide, Lesser			
<i>Indicator variegatus</i>	Honeyguide, Scaly-throated			
<i>Ispidina picta</i>	Pygmy-Kingfisher, African			
<i>Jynx ruficollis</i>	Wryneck, Red-throated			
<i>Lagonosticta rubricata</i>	Firefinch, African			
<i>Lagonosticta senegala</i>	Firefinch, Red-billed			
<i>Lamprotornis corruscus</i>	Starling, Black-bellied			
<i>Lamprotornis nitens</i>	Starling, Cape Glossy			
<i>Laniarius ferrugineus</i>	Boubou, Southern			
<i>Lanius collaris</i>	Fiscal, Common (Southern)			
<i>Larus cirrocephalus</i>	Gull, Grey-headed			
<i>Larus dominicanus</i>	Gull, Kelp			
<i>Limosa lapponica</i>	Godwit, Bar-tailed			
<i>Lophaetus occipitalis</i>	Eagle, Long-crested			
<i>Lybius torquatus</i>	Barbet, Black-collared			
<i>Macronyx croceus</i>	Longclaw, Yellow-throated			
<i>Malaconotus blanchoti</i>	Bush-shrike, Grey-headed			
<i>Mandingoa nitidula</i>	Twinspot, Green		Sch.9	

Scientific name	Common name	Red List	KZN	TOPs
<i>Megaceryle maximus</i>	Kingfisher, Giant			
<i>Melaenornis pammelaina</i>	Flycatcher, Southern Black			
<i>Melierax gabar</i>	Goshawk, Gabar			
<i>Merops pusillus</i>	Bee-eater, Little			
<i>Milvus aegyptius</i>	Kite, Yellow-billed			
<i>Mirafra africana</i>	Lark, Rufous-naped			
<i>Monticola explorator</i>	Rock-thrush, Sentinel			
<i>Monticola rupestris</i>	Rock-thrush, Cape			
<i>Morus capensis</i>	Gannet, Cape	VU, VU		
<i>Motacilla aguimp</i>	Wagtail, African Pied			
<i>Motacilla capensis</i>	Wagtail, Cape			
<i>Motacilla clara</i>	Wagtail, Mountain			
<i>Muscicapa adusta</i>	Flycatcher, African Dusky			
<i>Muscicapa caerulescens</i>	Flycatcher, Ashy			
<i>Muscicapa striata</i>	Flycatcher, Spotted			
<i>Mycteria ibis</i>	Stork, Yellow-billed	EN, LC	Sch.9	
<i>Numenius phaeopus</i>	Whimbrel, Common			
<i>Numida meleagris</i>	Guineafowl, Helmeted		Sch.1	
<i>Onychognathus morio</i>	Starling, Red-winged			
<i>Oriolus larvatus</i>	Oriole, Black-headed			
<i>Pandion haliaetus</i>	Osprey, Osprey		Sch.9	
<i>Parus niger</i>	Tit, Southern Black			
<i>Passer diffusus</i>	Sparrow, Southern Grey-headed			
<i>Passer domesticus</i>	Sparrow, House		Sch.8	
<i>Passer melanurus</i>	Sparrow, Cape			
<i>Pelecanus rufescens</i>	Pelican, Pink-backed	VU, LC	Sch.9	EN
<i>Phalacrocorax africanus</i>	Cormorant, Reed			
<i>Phalacrocorax capensis</i>	Cormorant, Cape	EN, EN		
<i>Phalacrocorax carbo</i>	Cormorant, White-breasted			
<i>Phoeniculus purpureus</i>	Wood-hoopoe, Green			
<i>Phyllastrephus terrestris</i>	Brownbul, Terrestrial			
<i>Phylloscopus ruficapilla</i>	Woodland-warbler, Yellow-throated			
<i>Phylloscopus trochilus</i>	Warbler, Willow			
<i>Platalea alba</i>	Spoonbill, African			
<i>Platysteira peltata</i>	Wattle-eye, Black-throated			
<i>Plectropterus gambensis</i>	Goose, Spur-winged		Sch.1	
<i>Ploceus bicolor</i>	Weaver, Dark-backed			
<i>Ploceus capensis</i>	Weaver, Cape			
<i>Ploceus cucullatus</i>	Weaver, Village			
<i>Ploceus ocularis</i>	Weaver, Spectacled			
<i>Ploceus subaureus</i>	Weaver, Yellow			
<i>Ploceus velatus</i>	Masked-weaver, Southern			
<i>Ploceus xanthops</i>	Weaver, Golden			
<i>Pogoniulus bilineatus</i>	Tinkerbird, Yellow-rumped			
<i>Pogoniulus pusillus</i>	Tinkerbird, Red-fronted			
<i>Pogonocichla stellata</i>	Robin, White-starred			
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN, VU		VU
<i>Polyboroides typus</i>	Harrier-Hawk, African			
<i>Porphyrio madagascariensis</i>	Swamphen, African Purple			
<i>Prinia subflava</i>	Prinia, Tawny-flanked			
<i>Prodotiscus regulus</i>	Honeybird, Brown-backed			

Scientific name	Common name	Red List	KZN	TOPs
<i>Psalidoprocne holomelaena</i>	Saw-wing, Black (Southern race)			
<i>Pternistis natalensis</i>	Spurfowl, Natal			
<i>Pycnonotus tricolor</i>	Bulbul, Dark-capped			
<i>Quelea erythroptera</i>	Quelea, Red-headed			
<i>Quelea quelea</i>	Quelea, Red-billed		Sch.8	
<i>Riparia paludicola</i>	Martin, Brown-throated			
<i>Sarothrura elegans</i>	Flufftail, Buff-spotted			
<i>Saxicola torquatus</i>	Stonechat, African			
<i>Scopus umbretta</i>	Hamerkop, Hamerkop			
<i>Sigelus silens</i>	Flycatcher, Fiscal			
<i>Spermestes cucullatus</i>	Mannikin, Bronze			
<i>Spermestes nigriceps</i>	Mannikin, Red-backed			
<i>Stactolaema leucotis</i>	Barbet, White-eared			
<i>Stephanoaetus coronatus</i>	Eagle, African Crowned	VU, NT		
<i>Sterna albifrons</i>	Tern, Little			
<i>Sterna bengalensis</i>	Tern, Lesser Crested			
<i>Sterna bergii</i>	Tern, Swift			
<i>Sterna caspia</i>	Tern, Caspian	VU, LC		
<i>Sterna hirundo</i>	Tern, Common			
<i>Streptopelia capicola</i>	Turtle-dove, Cape		Sch.8	
<i>Streptopelia semitorquata</i>	Dove, Red-eyed		Sch.8	
<i>Streptopelia senegalensis</i>	Dove, Laughing			
<i>Strix woodfordii</i>	Wood-owl, African			
<i>Sturnus vulgaris</i>	Starling, Common		Sch.8	
<i>Tachybaptus ruficollis</i>	Grebe, Little			
<i>Tauraco corythaix</i>	Turaco, Knysna			
<i>Tchagra senegalus</i>	Tchagra, Black-crowned			
<i>Tchagra tchagra</i>	Tchagra, Southern			
<i>Telophorus olivaceus</i>	Bush-shrike, Olive			
<i>Telophorus quadricolor</i>	Bush-shrike, Gorgeous			
<i>Telophorus sulfureopectus</i>	Bush-shrike, Orange-breasted			
<i>Terpsiphone viridis</i>	Paradise-flycatcher, African			
<i>Thamnolaea cinnamomeiventris</i>	Cliff-chat, Mocking			
<i>Threskiornis aethiopicus</i>	Ibis, African Sacred			
<i>Tockus alboterminatus</i>	Hornbill, Crowned			
<i>Trachyphonus vaillantii</i>	Barbet, Crested			
<i>Treron calvus</i>	Green-pigeon, African			
<i>Tricholaema leucomelas</i>	Barbet, Acacia Pied			
<i>Tringa glareola</i>	Sandpiper, Wood			
<i>Trochocercus cyanomelas</i>	Crested-flycatcher, Blue-mantled			
<i>Turdus libonyanus</i>	Thrush, Kurrichane			
<i>Turdus olivaceus</i>	Thrush, Olive			
<i>Turtur chalcospilos</i>	Wood-dove, Emerald-spotted			
<i>Turtur tympanistria</i>	Dove, Tambourine			
<i>Upupa africana</i>	Hoopoe, African			
<i>Urocolius indicus</i>	Mousebird, Red-faced			
<i>Vanellus armatus</i>	Lapwing, Blacksmith			
<i>Vidua chalybeata</i>	Indigobird, Village			
<i>Vidua funerea</i>	Indigobird, Dusky			
<i>Vidua macroura</i>	Whydah, Pin-tailed			
<i>Zoothera guttata</i>	Ground-thrush, Spotted	EN, EN		

Scientific name	Common name	Red List	KZN	TOPs
<i>Zosterops virens</i>	White-eye, Cape			

12 Appendix E: Expected reptile species for the 15 Strathcona Drive Development

Family	Scientific name	Common name	Red List	KZN	TOPs
Agamidae	<i>Acanthocercus atricollis</i>	Southern Tree Agama	LC		
Chamaeleonidae	<i>Bradypodion melanocephalum</i>	KwaZulu Dwarf Chameleon	VU		
	<i>Chamaeleo dilepis</i>	Common Flap-neck Chameleon	LC		
Colubridae	<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	LC		
	<i>Philothamnus hoplogaster</i>	South Eastern Green Snake	LC		
	<i>Philothamnus natalensis</i>	Eastern Natal Green Snake	LC		
	<i>Philothamnus occidentalis</i>	Western Natal Green Snake	LC		
	<i>Philothamnus semivariatus</i>	Spotted Bush Snake	LC		
Emydidae	<i>Trachemys scripta</i>	Red-eared Slider			
Gekkonidae	<i>Afroedura pondolia</i>	Pondo Flat Gecko	LC		
	<i>Hemidactylus mabouia</i>	Common Tropical House Gecko	LC		
	<i>Lygodactylus capensis</i>	Common Dwarf Gecko	LC		
Lamprophiidae	<i>Amblyodipsas concolor</i>	Natal Purple-glossed Snake	LC		
	<i>Aparallactus capensis</i>	Black-headed Centipede-eater	LC		
	<i>Boaedon capensis</i>	Brown House Snake	LC		
	<i>Lycodonomorphus laevisissimus</i>	Dusky-bellied Water Snake	LC		
	<i>Lycodonomorphus rufulus</i>	Brown Water Snake	LC		
	<i>Lycophidion capense capense</i>	Cape Wolf Snake	LC		
	<i>Psammophis brevirostris</i>	Short-snouted Grass Snake	LC		
Leptotyphlopidae	<i>Leptotyphlops scutifrons scutifrons</i>	Peters' Thread Snake			
Scincidae	<i>Panaspis wahlbergi</i>	Wahlberg's Snake-eyed Skink	LC		
	<i>Scelotes inornatus</i>	Durban Dwarf Burrowing Skink	CR		
	<i>Trachylepis striata</i>	Striped Skink	LC		
Viperidae	<i>Causus rhombeatus</i>	Rhombic Night Adder	LC		

13 Appendix F: Expected amphibian species for the 15 Strathcona Drive Development

Family	Scientific name	Common Name	Red List	KZN	TOPs
Arthroleptidae	<i>Arthroleptis wahlbergi</i>	Bush Squeaker	LC		
	<i>Leptopelis natalensis</i>	Forest Tree Frog	LC		
Brevicipitidae	<i>Breviceps mossambicus</i>	Mozambique Rain Frog	LC		
Bufonidae	<i>Sclerophrys capensis</i>	Raucous Toad	LC		
	<i>Sclerophrys gutturalis</i>	Guttural Toad	LC		
Hyperoliidae	<i>Afrixalus fornasinii</i>	Greater Leaf-folding Frog	LC		
	<i>Afrixalus spinifrons</i>	Natal Leaf-folding Frog	LC		
	<i>Hyperolius marmoratus</i>	Painted Reed Frog	LC		
	<i>Hyperolius pickersgilli</i>	Pickersgill's Reed Frog	EN		
	<i>Hyperolius pusillus</i>	Water Lily Frog	LC		
	<i>Hyperolius tuberilinguis</i>	Tinker Reed Frog	LC		
	<i>Kassina senegalensis</i>	Bubbling Kassina	LC		
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i>	Dwarf Puddle Frog	LC		
Ptychadenidae	<i>Ptychadena oxyrhynchus</i>	Sharpnosed Grass Frog	LC		
Pyxicephalidae	<i>Amietia delalandii</i>	Delalande's River Frog	LC		
	<i>Cacosternum nanum</i>	Bronze Caco	LC		
	<i>Natalobatrachus bonebergi</i>	Kloof Frog	EN		

14 Appendix G: Plant species recorded from the 15 Strathcona Drive site

Family	Species	POSA	M&R	Endemic	IUCN	KZN	TOPS	Trees	Invasive	CARA	NEMA
Acanthaceae	<i>Asystasia gangetica</i>		x		LC						
	<i>Barleria sp.</i>										
	<i>Dicliptera cernua</i>	x			LC						
	<i>Isoglossa woodii</i>		x		LC						
Amaranthaceae	<i>Achyranthes aspera</i>		x								
Amaryllidaceae	<i>Scadoxus puniceus</i>				LC	Sch.12					
Anacardiaceae	<i>Protorhus longifolia</i>				LC						
	<i>Searsia chirindensis</i>	x			LC						
Annonaceae	<i>Monanthes affra</i>		x		LC						
Apiaceae	<i>Centella asiatica</i>	x			LC						
Apocynaceae	<i>Acokanthera oblongifolia</i>		x		LC						
	<i>Carissa bispinosa</i>		x		LC						
	<i>Carissa macrocarpa</i>				LC						
	<i>Rauvolfia caffra</i>				LC						
	<i>Secamone alpini</i>				LC						
	<i>Tabernaemontana elegans</i>				LC						
Araceae	<i>Syngonium podophyllum</i>								x		1b
Arecaceae	<i>Hyphaene coriacea</i>				LC						
	<i>Phoenix reclinata</i>				LC						
Asparagaceae	<i>Asparagus falcatus</i>				LC						
Asteraceae	<i>Acmella caulirhiza</i>	x			LC				x		
	<i>Berkheya rigida</i>				LC						
	<i>Bidens pilosa</i>										
	<i>Brachylaena discolor subsp. discolor</i>		x		LC						
	<i>Chromolaena odorata</i>								x	1	1b
	<i>Osteospermum monilifera subsp. rotundata</i>		x		LC						
	<i>Senecio deltoideus</i>	x			LC						
Basellaceae	<i>Anredera cordifolia</i>								x	1	1b
Cannabaceae	<i>Trema orientalis</i>				LC						
Cannaceae	<i>Canna indica</i>	x			NE				x	1	1b

Colchicaceae	<i>Gloriosa superba</i>		x		LC	Sch.12				
Commelinaceae	<i>Aneilema aequinoctiale</i>	x			LC					
	<i>Commelina erecta</i>				LC					
Convolvulaceae	<i>Hewittia malabarica</i>	x			LC					
	<i>Ipomoea wightii</i>	x			LC					
Cucurbitaceae	<i>Momordica balsamina</i>				LC					
Cyperaceae	<i>Cyperus cyperoides</i>	x			LC					
Diascoreaceae	<i>Dioscorea sp.</i>					Sch.12				
Dracaenaceae	<i>Dracaena alectrifomis</i>		x		LC					
Ebenaceae	<i>Euclea natalensis</i>	x	x		LC					
Euphorbiaceae	<i>Euphorbia heterophylla</i>									
	<i>Ricinus communis</i>	x			NE			x	2	2
	<i>Tragia glabrata</i>		x		LC					
Fabaceae	<i>Albizia adianthifolia</i>		x		LC					
	<i>Dalbergia armata</i>		x		LC					
	<i>Dalbergia obovata</i>				LC					
	<i>Desmodium incanum</i>	x						x		
	<i>Erythrina lysistemon</i>				LC					
	<i>Senna pendula</i>							x	3	1b
Iridaceae	<i>Crocasmia aurea</i>				LC	Sch.12				
Lamiaceae	<i>Volkameria glabra</i>				LC					
Lauraceae	<i>Litsea glutinosa</i>							x	1	1b
Loganiaceae	<i>Strychnos spinosa</i>				LC					
Meliaceae	<i>Melia azedarach</i>							x	3	1b
	<i>Trichilia dregeana</i>				LC					
Moraceae	<i>Ficus burkei</i>				LC					
	<i>Ficus lutea</i>				LC					
Myrtaceae	<i>Eugenia capensis</i>		x		LC					
Phyllanthaceae	<i>Bridelia micrantha</i>				LC					
Poaceae	<i>Arundo donax</i>	x			NE			x	1	1b
	<i>Digitaria ciliaris</i>	x						x		
	<i>Oplismenus hirtellus</i>	x	x		LC					
	<i>Panicum maximum</i>	x			LC					
	<i>Paspalum distichum</i>	x			LC					

	<i>Setaria megaphylla</i>				LC					
Polypodiaceae	<i>Microsorium scolopendria</i>		x		LC					
Rubiaceae	<i>Catunaregam obovata</i>				LC					
	<i>Kraussia floribunda</i>		x		LC					
	<i>Psychotria capensis</i>				NE					
	<i>Psydrax obovata</i>	x	x		LC					
Rutaceae	<i>Vepris lanceolata</i>		x		LC					
Sapindaceae	<i>Deinbollia oblongifolia</i>		x		LC					
Sapotaceae	<i>Mimusops caffra</i>		x		LC			x		
	<i>Sideroxylon inerme</i>	x	x		LC			x		
Smilacaceae	<i>Smilax anceps</i>				LC					
Solanaceae	<i>Cestrum laevigatum</i>							x	1	1b
	<i>Solanum mauritianum</i>	x						x	1	1b
Strelitziaceae	<i>Strelitzia nicolai</i>		x		LC					
Verbenaceae	<i>Lantana camara</i>							x	1	1b
Vitaceae	<i>Cissus fragilis</i>	x		x	LC					
	<i>Cyphostemma hypoleucum</i>				LC					
	<i>Rhoicissus rhomboidea</i>				LC					

15 Appendix H: CV of the specialist

1. Personal Particulars

Name: **Leigh-Ann de Wet**
 Date of birth: **1 September 1982**
 Place of Birth: **Durban**
 Place of Tertiary education: **Rhodes University**
 Dates of tertiary education: **2001 - 2003 (BSc)**
 2004 (BSc Hons)
 2005 - 2007 (MSc)

2. Qualifications

2005 - 2007 **MSc** in Botany – Rhodes University
 2005 **BSc Honours** in Botany (with Distinction) – Rhodes University
 2001 - 2004 **BSc** (Botany and Entomology) – Rhodes University

Courses

2013 Wetland Management: Introduction to Law – University of the Free State
 2013 Wetland Management: Introduction and Delineation Short Course – University of the Free State
 2011 Land Degradation Short Course – Rhodes University
 2009 EIA Short Course – Rhodes University and Coastal and Environmental Services

Professional Membership

2012 – Present Professional Natural Scientist with SACNASP: Ecological Science (No. 400233/12)
 2004 – Present South African Association of Botanists

3. Name of current employer and position in company

Afzelia Environmental Consulting
 Ecological specialist

4. Overview of last 10 years experience

Year	Organisation	Position	Selected Projects
2017 - Current	Afzelia Environmental Consultants	Ecological Specialist	Elysium Desalination Plant Desktop Ecological Assessment, KZN - Review Hawaii Road Upgrade Desktop Ecological Assessment, KZN - Review Ecological Assessment for the proposed bulk eater infrastructure at Nomandlovo, KZN
2014 - 2017	LD Biodiversity Consulting	Biodiversity Specialist	Protected Species permitting for the Skuitdrift Solar Energy Facility, Northern Cape Ecological Assessment Rehabilitation Plan Plant Rescue and Protection Plan Open Space Management Plan Alien Vegetation Management Plan for the Rooideplaas Inyanda Wind Energy Facility, Eastern Cape Ecological Impact Assessment, Saldanha Bay Network Strengthening Project, Western Cape Conservation Value Assessment, Little Falls Nature Reserve, City of Johannesburg, Gauteng

				Conservation Value Assessment, Melville Koppies Nature Reserve, City of Johannesburg, Gauteng
				Conservation Value Assessment, Ruimsig Butterfly Reserve, City of Johannesburg, Gauteng
				Conservation Value Assessment, Rietfontein Nature Reserve, City of Johannesburg, Gauteng
				High Conservation Value Assessment Botanical Assessment Boteka Oil Palm Plantation, Feronia, DRC
				High Conservation Value Assessment Botanical Assessment Lokutu Oil Palm Plantation, Feronia, DRC
				High Conservation Value Assessment Botanical Assessment Yaligimba Oil Palm Plantation, Feronia, DRC
2012 - 2014	Digby Wells Environmental	Biophysical Unit Manager		Ecological Assessment Dalyshope Coal Mine, Limpopo
				Ecological Assessment Putu Iron Ore Mine, rail and port, Liberia
				Ecological Assessment New Liberty Gold Mine, Liberia
				Critical Habitat Assessment New Liberty Gold Mine, Liberia
				Ecological Assessment Rhodium Reefs, Limpopo
				Biodiversity Action Plans (various) Anglo Coal
2009 - 2012	Coastal and Environmental Services	Ecological Specialist		Ecological Assessment, Toliara sands, Madagascar
				Ecological Assessment. Richards Bay Wind Energy Facility, KZN
				Ecological Assessment, various Wind Energy Facilities, Eastern, Western and Northern Cape
				Ecological Assessment, Laguna Bay Development
				Ecological Assessment, Linas Monazite mine, Malawi
				High Conservation Value Assessment, various, Equatorial Palm Oil, Liberia
2007 - 2009	Rhodes University	Research Assistant - Botany		Effects of global climate change on grassland composition.

5. Outline of selected recent assignments/ experience that have a bearing on the scope of work

No	NAME OF PROJECT	CLIENT DETAILS	PROJECT TYPE	PROJECT VALUE	DURATION
1	Feronia High Conservation Value Assessment	Feronia Oil Palm	High Conservation Value Assessment and Botanical Assessment in three Oil Palm Plantations (6 projects) in the DRC	500 000	1 year (2015 - 2016)
2	Simandau Bankable Feasibility Study	Rio Tinto	Critical Habitat Assessment, Inselberg Ecological Assessment, Offset Design for a mine, rail and port facility in Guinea	200 000	6 months (2016)
3	Putu Iron Ore Ecological Assessment	Putu Iron Ore	Terrestrial Ecology Assessment of a mine, rail and port in Liberia.	500 000	1 year (2014)

4	Roodeplaat Inyanda Wind Energy Facility Terrestrial Ecology	Newcombe Wind	Terrestrial Ecology Assessment and associated management plans for a Wind Energy Facility in an environmentally sensitive area, Eastern Cape.	100 000	ongoing (since 2016)
5	Richards Bay Wind Energy facility Terrestrial Ecology		Wind Energy Facility planned for Richards Bay, Terrestrial Ecology Assessment	50 000	2011