

PROPOSED ORGANIC COMPOSTING AND PELLETISING FACILITY ON PORTION 13 OF THE FARM BOSCHKOP 543 JR

FINAL

Ecological Assessment

PREPARED FOR:

Zelda van Wyk
IQS HOLDINGS

COMPILED BY:



Ecological and Environmental Consultants

Eco Assessments cc
(CK 2000/076445/23)

PO Box 441037, LINDEN, 2104

Tel. (011) 782 – 3428, Fax: (086) 649 - 9150
Email: info@ecoassessments.co.za

**Date: November 2020
Amended February 2021
Our Reference: 1587/20**

LIST OF FIGURES

- Figure 1 Locality
- Figure 2 Vegetation and 200m buffer
- Figure 3 Gauteng Information Data Series
- Figure 4 Sensitivity

KEY TERMS & DEFINITIONS

Term / Abbreviation	Description
BGIS	Biodiversity Geographical Information System
CBA	Critical Biodiversity Area
DEFF (DEA)	National Department of Environment, Forestry & Fisheries
ESA	Ecological Support Area
IUCN	International Association for the Conservation of Nature
NEMA	National Environmental Management Act (107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004)
NWA	National Water Act (36 of 1998)
SABAP2	South African Bird Atlas Project 2
SANBI	South African National Biodiversity Institute

Report compiled by:	Aspect Investigated	Dates of field work
Christa Custers MSc (Bot Ecology) <i>Pri.Sci Nat</i> (400003/03)	Ecological Assessment	3 November 2020

I declare that I am a Registered Professional Natural Scientist and acted independently in my assessment of the site.

C H Custers
Ecologist

TABLE OF CONTENTS

LIST OF FIGURES.....II

KEY TERMS & DEFINITIONSII

1. INTRODUCTION - 4 -

2. BIOPHYSICAL ENVIRONMENT - 4 -

3. SCOPE OF WORKS - 4 -

4. METHODOLOGY..... - 4 -

4.1 SITE INVESTIGATION (DURATION, DATE AND SEASON AND RELEVANCE OF SEASON TO OUTCOME) - 4 -

4.2 METHODS - 5 -

4.3 DATA INFORMATION (QUALITY AND AGE) - 6 -

4.4 LIMITATIONS AND ASSUMPTIONS - 6 -

4.5 CONSULTATIONS (WITH COPIES)..... - 6 -

5. FLORAL ASSESSMENT..... - 7 -

5.1 VEGETATION TYPES - 7 -

5.2 ENDANGERED ECOSYSTEMS (AS PER SECTION 52 NEMBA)..... - 7 -

5.3 PROTECTED AREAS - 7 -

5.4 HISTORICAL STATUS..... - 7 -

5.5 ECOLOGICAL UNITS..... - 9 -

5.5.1 *Altered grassland – cattle grazing and agricultural activities* - 9 -

5.5.2 *Natural grassland* - 11 -

5.5.3 *Wet areas and Exotic woodland* - 12 -

5.6 NEMBA: RED DATA FLORA - 13 -

5.7 SURROUNDING LAND USE..... - 13 -

6. FAUNAL ASSESSMENT..... - 13 -

6.1 BIRDS - 13 -

6.2 MAMMALS - 14 -

6.3 REPTILES AND AMPHIBIANS - 15 -

6.4 INVERTEBRATES - 15 -

7. GAUTENG INFORMATION DATA SERIES (GIDS) - 15 -

8. IMPACTS AND MITIGATION MEASURES..... - 16 -

8.1 POTENTIAL IMPACTS AND MITIGATION..... - 16 -

9. SENSITIVITY - 19 -

10. CONCLUSION & RECOMMENDATIONS - 19 -

REFERENCES..... - 20 -

APPENDIX 1 DEFINITION OF TERMS USED TO ASSESS IMPACTS..... - 22 -

APPENDIX 2 IMPACT ASSESSMENT TABLE - 24 -

APPENDIX 3 CURRICULUM VITAE CHRISTA CUSTERS - 25 -

1. INTRODUCTION

ECO ASSESSMENTS CC was appointed by IQS Holdings to assess a proposed organic composting and pelleting/pelletizing facility on Portion 13 on the farm Boschkop 543JR in Gauteng. The property is approximately 9.2 ha in extent. The area around the site within a 200 meter perimeter was also assessed for sensitivities.

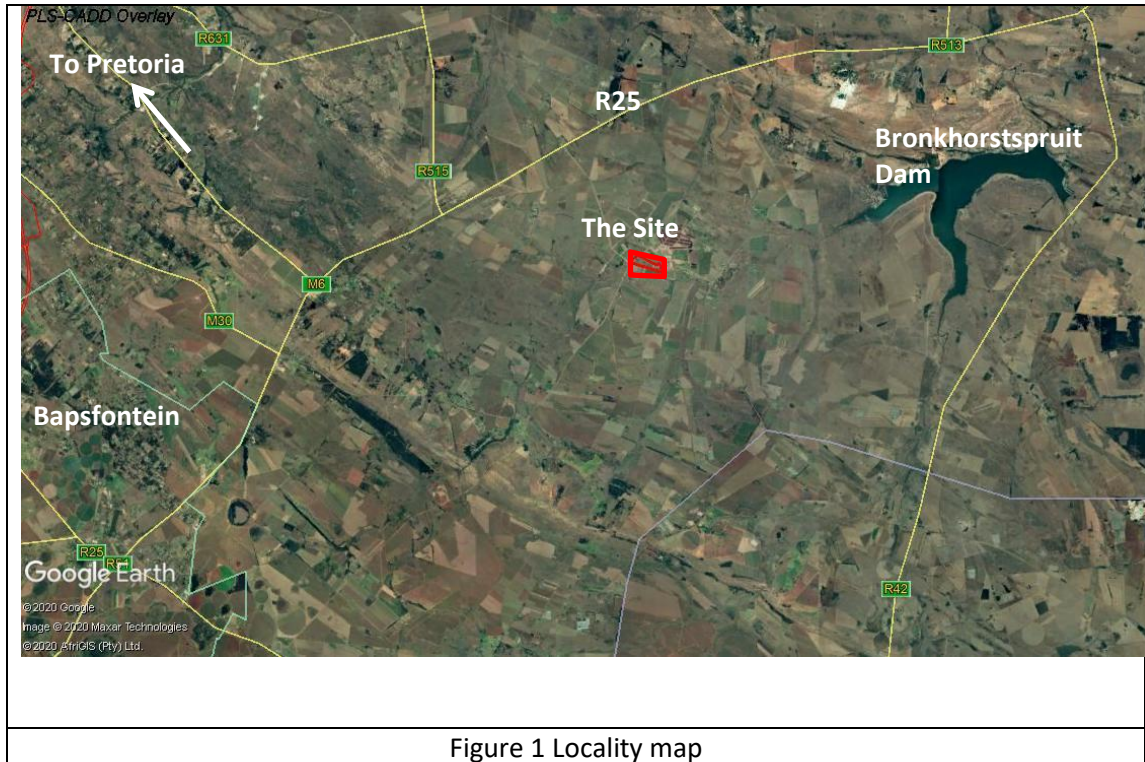


Figure 1 Locality map

2. BIOPHYSICAL ENVIRONMENT

The site is located between the town of Belfast and the Bronkhorstspuit Dam (Figure 1). The site is accessible from the R25 which links the towns of Bapsfontein and Bronkhorstspuit. Tshwane lies approximately 30 kilometres west of the site. A gravel road that lies east of the R25, gives access to the site. A Beefcor plant is located just north of the site. Beefcor procures and farm with cattle, operate an abattoir and sell cattle meat. The Oxbow country estate is located 1.7 km east of the site.

3. SCOPE OF WORKS

The envisaged work is to include an ecological (floral & faunal) assessment of the relevant site to determine the status, sensitivity and potential impact of the proposed future development on the ecological aspects of the particular site and area.

4. METHODOLOGY

4.1 Site investigation (Duration, date and season and relevance of season to outcome)

The site was assessed on 03rd November 2020 for 5 hours. November is considered the start

of the summer season and an optimal time of year to assess vegetation in Gauteng grasslands.

4.2 Methods

- A desktop study was conducted by evaluating the DEA Screening Tool and considering the NEMA Minimum Requirements for the Terrestrial Biodiversity Theme;
- SANBI provided a list of relevant plant and animal species that are likely to occur on the site and in the surrounding areas. This was used to ensure adequate protocols were employed to assess the possible and potential impacts on the site ecology;
- The study site was assessed on foot and all ecological units assessed & described;
- A desktop photographic assessment (dating back 10 years) was undertaken to determine the historical status and sensitivity of the site;
- The present ecological status and sensitivity of each vegetation unit/habitat was described;
- The different faunal habitats were assessed. All signs of faunal activity was noted;
- The IUCN categories referred to are: Critically Endangered (CR), Endangered (EN), Vulnerable (V) and Near Threatened (NT). These species are of conservation concern;
- The vegetation units are categorized into conservation status and Table 1 provides a description of categories used in this report.

Table 1. Conservation Status criteria used to evaluate the vegetation

Category	Description
Very Good	High species richness as compared to other similar vegetation types and units with no exotic vegetation, no human related disturbances or invasive weedy vegetation. A specific Red Data plant occurs here. A plant/eco-system occurs here, which plays an important role in the survival of any Red Data faunal species.
Good	High species richness as compared to other similar vegetation types and units, low exotic vegetation, low human related disturbances, low invasive weedy vegetation.
Moderate	Average species richness as compared to other similar vegetation types and units, exotic vegetation evident, human related disturbances observed, invasive weedy vegetation obvious.
Poor	Poor species richness as compared to other similar vegetation types and units, lots of exotic vegetation evident, substantial human related disturbances observed, substantial invasive weedy vegetation obvious.
Very Poor	Very poor species richness as compared to other similar vegetation types and units, extensive exotic vegetation evident, extensive human related disturbances observed, extensive invasive weedy vegetation obvious.

The definitions used for describing the grassland vegetation units are as follows:

- **Natural grassland** - The vegetation is similar to the vegetation type described in the national vegetation literature. Limited exotic species are present and the soil is largely undisturbed. This vegetation is considered *indigenous vegetation* as per the legislated definition.

- **Disturbed grassland** - The species composition of this vegetation has changed slightly, with exotic species being more prevalent. The soil is largely undisturbed and the area supports grass, forb, tree and shrub species of the original natural vegetation type. This vegetation is considered *indigenous vegetation* as per the legislated definition.
- **Altered grassland** - The species composition has been changed and no longer represents a natural composition of plants of the original vegetation. The soil has been altered by ploughing, regular mowing, dumping of rubble or any other human related disturbance. This vegetation is not categorized as indigenous vegetation.
- **Indigenous Vegetation** - refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation AND (own emphasis added) where the top soil has not been lawfully disturbed (sic. altered) during the preceding ten years.

4.3 Data information (quality and age)

Data was obtained from the SANBI BGIS website, the Department of Environment, Forestry and Fisheries, the Gauteng Provincial Government and the South African Bird Atlas Project 2 (SABAP2).

4.4 Limitations and assumptions

To obtain a real understanding of the dynamics of an ecological system, ecological assessments should be done in different times of the year, including different seasons and even different years. This is however often not feasible and assessments are mostly based on once off sampling efforts.

4.5 Consultations (with copies)

Consultation was had with Ms Lorraine Mills at Gauteng Conservation and Ms Erin Adams from eiadatarequests@sanbi.org.za.

5. FLORAL ASSESSMENT

5.1 Vegetation Types

The site traverses the Rand Highveld Grassland according to Mucina and Rutherford (2006) which stretches from east Tshwane, eastwards past Delmas and Bronkhorstspuit and northwards towards Marble Hall.

The conservation status of this vegetation type is Endangered as it is poorly conserved in small reserves such as Bronkhorstspuit and Boskop Dam nature reserves.

The main land uses that have altered this vegetation type are cultivation, plantations and dam building.

5.2 Endangered Ecosystems (as per Section 52 NEMBA)

In Notice GN 1002 in section 52 of National Environmental Management Biodiversity Act (No 10 of 2004), all the ecosystems are listed that are nationally threatened and in need of protection.

The site is not affected by Endangered Ecosystems.

5.3 Protected Areas

The site does not affect any formally protected areas.

5.4 Historical Status

The Google images indicate that the site and surrounding land might have been ploughed before 2004. Only some portions of the land appear to have been used for cattle grazing activities at that time. Most of the infrastructure such as the chicken coops and the staff housing were already in existence in 2004. From 2008 the site and surrounds were used increasingly for cattle grazing and associated activities such as feeding points.

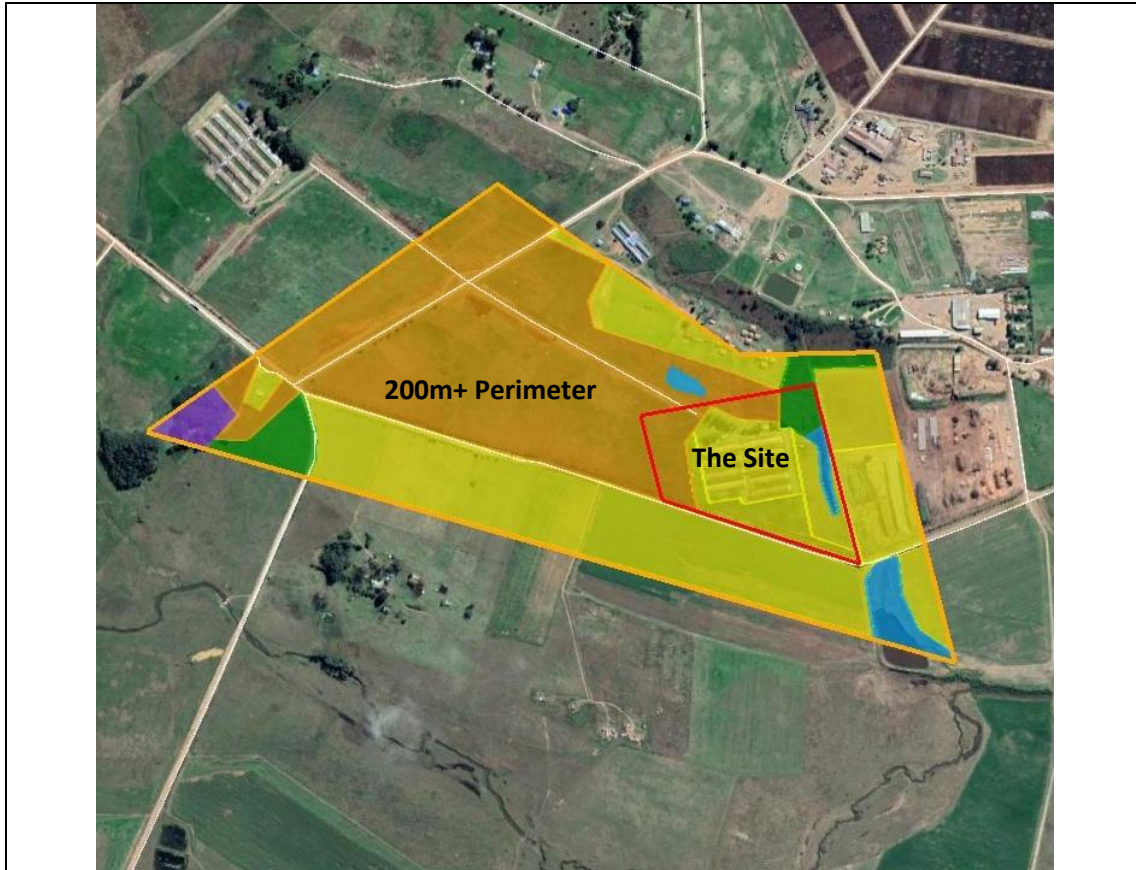


Figure 2 Vegetation units

Red line – The Site

Orange line – 200 + meter buffer assessed

LEGEND

Altered grassland - grazing

Altered grassland - ploughing/infrastructure/crops

Natural grassland





Wet areas/dam





Exotic woodland

5.5 Ecological Units

Three vegetation units were identified within and around the study area (Figure 2):

5.5.1 Altered grassland – cattle grazing and agricultural activities

Environmental factors	
Location: Central and west Soil: Brown Rocks: None Disturbance: Grazing	
	
Cattle feeding areas	<i>Malva parviflora</i> weed
	
Tall grass grazing land	<i>Plantago lanceolata</i> weed

	
Cattle grazing (on adjacent land)	Vacant chicken coops
	
Ploughed land (on adjacent land)	<i>Cirsium vulgare</i> weed

Ecological factors

A large part of the areas around the site and partially on the site, is presently used for feedlots. The area is divided into camps and probably grazed on a rotational basis. The vegetation in all these camps were observed to differ, but had in common that the original combination of species were replaced by a new set of species associated with grazing pressure. Such species included some hardy grass species such as *Avena fatua* (oats grass), *Eragrostis curvula*, *Pennisetum candestinum* (kikuyuy) and *Eragrostis racemose* as well as a range of exotic weedy species such as *Malva parviflora*, *Tagetes minuta* and *Plantago major*.

These grasslands have also been altered by historic and present farming practises, and specifically by ploughing and planting of pastures. Ploughing alters the soil structure that has a lasting effect on the natural vegetation. This effect often persists for years afterwards.

The vacant chicken coops and immediately surrounding land, has been altered and now consists of lawns and compacted soil.

This vegetation is not sensitive and is highly unlikely to support any species of conservation value.


The quality of the grassland is considered to be Poor to Very Poor.

*exotic

Forbs		
<i>Osteospermum sp</i>	<i>Tagetes minuta</i> *	<i>Datura stramonium</i> *
<i>Malva parvulum</i> *	<i>Bidens pilosa</i> *	<i>Plantago major</i> *
<i>Tragopogon dubius</i> *	Asteraceae	<i>Verbena bonariensis</i> *
<i>Cirsium vulgare</i> *	<i>Amaranthus sp.</i> *	<i>Conyza albida</i> *
<i>Achyranthes sp.</i>	<i>Lepidium bonariensis sp.</i> *	<i>Raphanus raphanistrum</i> *
<i>Senecio consanguineus</i>		





Grasses		
<i>Cynodon dactylon</i>	<i>Eragrostis curvula</i>	<i>Pennisetum clandestinum*</i>
<i>Digitaria eriantha</i>	<i>Eragrostis chloromelas</i>	<i>Avena fatua/ sativa</i>
<i>Sporobolus africanus</i>		
Trees		
<i>Acacia karroo</i>	<i>Eucalyptis camaldulensis*</i>	

5.5.2 Natural grassland

Environmental factors	
Location: Two Patches observed Soil: Brown Rocks: Small to medium Disturbance: Weeds	
	
Natural grassland	
Ecological factors	
Two small patches of natural grassland were observed in the area, with approximately 0.6ha of natural grassland occurring on the site. These patches are located within an agricultural surrounding and were found to be slightly disturbed, but natural enough to be classified as “indigenous vegetation” according to legislation. The grassland on site, was found to be relatively small and isolated from other natural grassland patches, which decreases its overall ecological sensitivity in the landscape.	
The quality of this vegetation is considered to be Moderate.	

Forbs		
<i>Conyza podocephala</i>	<i>Felicia muricata</i>	<i>Vernonia oligocephala</i>
<i>Helichrysum rugulosum</i>		
Grasses		
<i>Cynodon dactylon</i>	<i>Hyparrhenia hirta</i>	<i>Eragrostis curvula</i>
<i>Eragrostis chloromelas</i>	<i>Sporobolus africana</i>	

5.5.3 Wet areas and Exotic woodland

Environmental factors	
Location: South eastern and south western corner Soil: Brown Rocks: None Disturbance: Weeds, exotic vegetation	
	
Dam (on neighbouring land)	Crinum Lilies below damwall
	
Wet patch (neighbouring land)	Poplar tree grove
Ecological factors	
<p>Three wet grassland areas were observed on and around the site. All wet areas indicated on the map will need to be confirmed and discussed in the wetland report.</p> <p>The dam and downstream wet areas are features that may support common and sensitive faunal species. While the dam itself is a manmade feature and therefore not sensitive from a vegetation point of view, the area provides habitat for a range of waterbirds. It can also be expected that all kinds of roaming faunal species may utilize the dam as a water source. The dam is <i>outside</i> the site and will only be affected if stormwater from higher lying areas is contaminated and not properly managed.</p> <p>In the south western corner of the site, a Poplar bush was observed around a dwelling. The Poplars are exotic trees and not sensitive from a vegetation point of view.</p> <p>The conservation status is considered to be Poor to Moderate for terrestrial biodiversity.</p>	

Forbs		
<i>Persicaria laphatifolia</i> *	<i>Schoenoplectus corymbosus</i>	<i>Crinum bulbispermum</i>
<i>Achyranthus aspera</i> *	<i>Cyperus spp.</i>	
Grasses		
<i>Typha capensis</i>	<i>Phragmites australis</i>	<i>Agrostis lachnantha</i>
<i>Imperata cylindrica</i>		

5.6 NEMBA: Red Data Flora

According to GDARD records, no Red Data species were recorded on the site or in the vicinity of the site or within 5 kilometres of the site.

Six species were however recorded on the 1 in 50 000 grid of the site. These six species were assessed in terms of the presence of suitable habitat on site. Only two of these species, with Near Threatened status, occurs in grassland which is the predominant veld type on the site. Only one small patches of *natural* grassland occurs within the site where such species may occur. The risk for these species to be impacted upon by development, is however considered to be low.

Two further plants species of conservation concern, were provided by the DEA screen tool. Species 1 habitat is described as “short grasslands, hillsides, on sandy gravel overlying dolomite, and sometimes also on quartzite” while Species 2 is listed for wooded habitat. It is unlikely for both these species to occur mainly due to the lack of natural and suitable habitat on site.

Crinum bulbispermum (Orange River Lily) was observed below the small dam in the south-east. This plant will only be affected if the water quality and quantity running off the development site is not managed properly or storm water or other infrastructure is proposed here.

5.7 Surrounding land use

A 200 meter perimeter area around the site was also assessed for sensitivities (See Figure 2 and 4). The surrounding land is predominantly altered grassland due to farming and grazing activities. One natural grassland patch was observed outside the site as well as a Poplar woodlot in the south western corner.

6. FAUNAL ASSESSMENT

6.1 Birds

The habitats presented on the site for birds included grassland, exotic woodland and open water habitat. Common grassland species were recorded in the grazing areas such as larks and lapwings, and several water birds were recorded on an around the dam such as ducks, weavers and herons (See Table 5). Tall exotic trees that occur on the site are likely to provide habitat to small raptor species and should therefore ideally not be removed.

Table 5 Common bird species recorded on the site

Common name	Scientific name	Common name	Scientific name
Helmeted Guinea Fowl	<i>Numida meleagris</i>	Laughing Dove	<i>Streptopelia senegalensis</i>
Crowned Lapwing	<i>Vanellus coronatus</i>	Black winged kite	
Masked weaver		Cape glossy starling	<i>Lamprotornis nitens</i>
Pied Crow	<i>Corvus albus</i>	Blacksmith Lapwing	<i>Vanellus armatus</i>

Hadedda Ibis	<i>Bostrychia hagedash</i>	Cape wagtail	<i>Motacilla capensis</i>
Common Fiscal	<i>Lanius collaris</i>	Orange throated longclaw	<i>Macronyx capensis</i>
Yellow billed duck	<i>Anas undulata</i>	Southern Red Bishop	<i>Euplectes orix</i>
Grey heron	<i>Ardea cinerea</i>	Cattle egret	<i>Bubulcus ibis</i>
Black headed Heron	<i>Ardea melanocephala</i>	Red-billed Quelea	<i>Quelea quelea</i>
Longtailed widowbird	<i>Euplectes progne</i>	Little Grebe	<i>Tachybaptus ruficollis</i>
Red collared widow	<i>Euplectes ardens</i>	Hottentot teal	<i>Anas hottentota</i>
Reed cormorant	<i>Microcarbo africanus</i>	Pintailed whydah	<i>Vidua macroura</i>
Stonechat	<i>Saxicola torquatus</i>	Greyheaded sparrow	<i>Passer diffusus</i>
Swainson's spurfowl	<i>Pternistis swainsonii</i>		

With regards to more sensitive and scarce species, the following species are considered priority species in Gauteng:

Table 6 Priority Red Listed Species in Gauteng

Cape Vulture	Blue Crane	Lesser Kestrel
African Grass-Owl	African Marsh-Harrier	White-backed Night-Heron
White-bellied Korhaan	Martial Eagle	African Finfoot
Lesser Flamingo	Secretarybird,	Black Stork
Half-collared Kingfisher	Greater Flamingo	

Four “pentad” areas were assessed on the SABAP2 for records of recent sightings in the vicinity of the site. These were 2555_2835, 2550_2835, 2550_2830 and 2555_2830. A pentad area is a 9 X 9 kilometre defined area reference to latitude and longitude lines.

Within these pentads, the most recent sightings include:

One Grass Owl sighting in 2020 occurred in the pentad west of the pentad where the site is located. This sighting was listed under an “Ad hoc” record which means not all the guidelines were strictly followed to list the species for the pentad area. No other Grass Owl sightings have been listed for the actual site pentad, the pentad north or north-west of the site since 2009. The low reporting rate suggests a low risk to this owl species. The altered habitat of the site, and lack of thick grassy areas around wetlands, further supports this risk assessment.

Blue Crane and Secretarybird were recorded in the area in 2019 and 2018 respectively. Secretarybird was also recorded on surrounding pentad areas in 2013 and 2015. While these are also low reporting rates (2.1% and 4.8%), it is likely that they may still occur in the area given the open grassland habitats available between Bapsfontein and Bronkhorstspuit.

The potential occurrence of these bird species is considered to be at low risk from the development, due to the fact that the site is already disturbed regularly by cattle and people movement as well as the existing chicken coop buildings.

6.2 Mammals

Yellow mongoose (*Cynictis penicillata*) was observed running across the road, but otherwise

limited signs of mammal activity were observed on site. Kikuyu and weeds have overgrown much of the original habitat which will have a limiting effect on the occurrence of a variety of smaller mammals.

Common smaller faunal species such as rats, mice, hares and mongoose will however still be present in the area as well as larger nocturnal species.

Chrysothalax villosus is an extremely rare and secretive Roughhaired Golden Mole species and has been highlighted by DEA as a sensitive species for the area. The habitat for this species includes sandy soil in grasslands, meadows and along edges of marshes in Savanna and Grassland biomes.

The closest wet marshy habitat on site occurs below the damwall. This is more than 200 meter from the proposed development site, and will only be impacted upon should the water quality of the stormwater runoff deteriorate. Present impacts below the damwall, includes trampling of the wetland by cattle which negatively affects the marshy area that has formed between the damwall and the stream.

6.3 Reptiles and amphibians

It is likely that common reptile and amphibian species may still be present on the site. One species was highlighted as sensitive in the DEA screening tool. The distribution range of this species is however mostly northern South Africa and Botswana, while other populations have been fragmented to the detriment of the species.

It is not considered at risk from the proposed development.

6.4 Invertebrates

One species is listed as sensitive for the area. Its habitat is listed as tall woodland savanna. This habitat does not occur on the site, and therefore it is not considered at risk from the development.

7. Gauteng Information Data Series (GIDS)

GIDS (version 3.3) is a provincial database that provides information on the biophysical environment in Gauteng (Figure 3). C-Plan is a category of GIDS that provides an overall status for sections of land based on information layers such as the occurrence of wetlands, caves, primary grasslands etc.

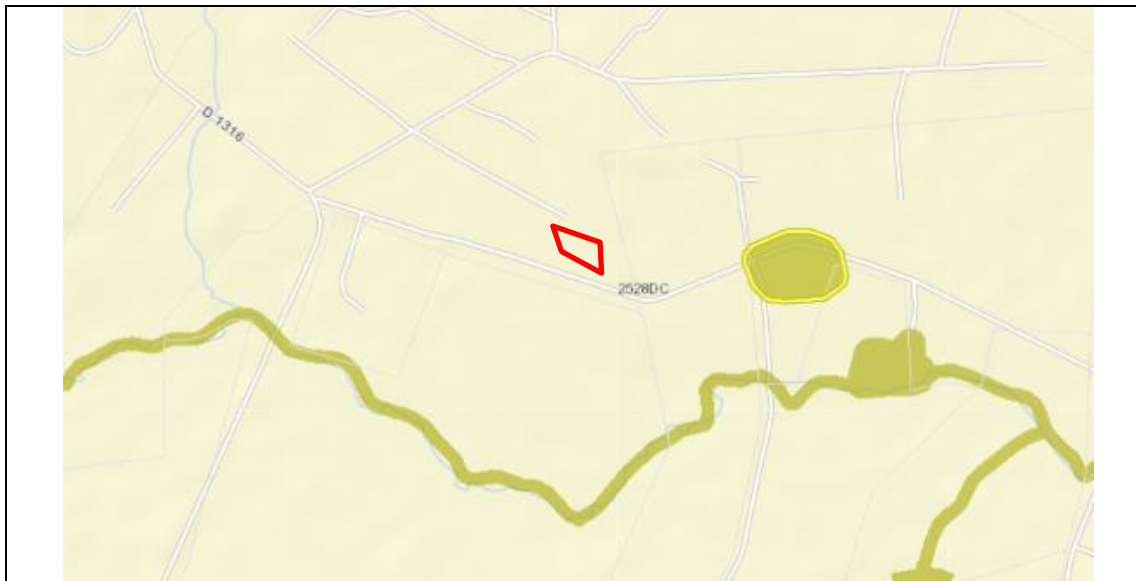


Figure 3 GIDS Conservation Plan (v3.3)
 Green circular – Dam: Ecological Support area
 Green longitudinal – Stream: Ecological Support Area
 Red - Site

The GIDS indicates two features in close proximity to the site i.e. the stream south of, and a dam east, of the site.

These are both features that provide support to the local ecology and should be kept intact during development on the site.

8. IMPACTS AND MITIGATION MEASURES

8.1 Potential Impacts and mitigation

Floral Biodiversity

The proposed development is located on a piece of property which supports limited to no original natural vegetation. The vegetation is therefore described as “altered” implying that the original species were replaced by a new set of hardy species more resilient to grazing and trampling. These species include a low diversity of grass and mostly weedy forb species. A small patch of natural grassland occurs on the site (0.6ha). This patch is small from an ecosystem perspective, and also isolated from other larger patches of natural grassland, and is therefore not considered to be sensitive. The proposed development is therefore unlikely to have an impact on the biodiversity of the site. No sensitive or indigenous trees are threatened by the development.

Mitigation measures:

- Where possible, no trees should be removed from the site. Should trees need to be removed, they should be replaced with indigenous trees species local to the area e.g.

<i>Searsia lancea</i>	<i>Diospyros lycioides</i>	<i>Gymnosporia tenuispina</i>
<i>Searsia pyroides</i>	<i>Celtis africana</i>	<i>Acacia caffra</i>
<i>Leucosidea sericea</i>	<i>Dombeya rotundifolia</i>	<i>Canthium gilfillanii</i>
<i>Searsia viminalis</i>	<i>Ehretia rigida</i>	<i>Gymnosporia buxifolia</i>

- Any rehabilitation effort should include rehabilitation with an indigenous mix of grass species;

Floral species of conservation concern

Altered grassland further has a low probability to support species of conservation value. In addition, a part of the site has already been altered by historically built chicken coops, which has altered the vegetation also in this area.

Common faunal species

Limited faunal species or signs of fauna were observed on site. This may be due to the altered habitat as well as cattle and vehicle movement in the area. Common faunal species will however still roam through the predominantly rural landscape despite the altered habitats. Large exotic trees must be retained where possible as they may provide roosting habitat for small to medium raptor species. Workers on site should not trap or hunt fauna on or around the site.

Mitigation measures:

- Should any fauna be encountered on site during development, they must be appropriately relocated into the neighbouring natural areas. Species that could be encountered include snakes and hedgehogs;
- Tall trees (including exotic trees) must be retained on site.
- Before construction starts, construction workers should be educated with regards to illegal animal trapping.

Fauna of Conservation concern

Threatened faunal species are more habitat sensitive. They are often associated with intact ecosystems. They are unlikely to occur on the site. The closest unique or relatively natural habitat to the site, is the wetland habitats that were observed below the damwall and towards the stream. These areas are however more than 200 meters away from the site, and will only be affected if stormwater runoff quality deteriorates or if storm water infrastructure is proposed to be developed.

Mitigation measures:

- Both the construction and the operational phases must include a storm water management strategies that address potential impacts on the downhill ecology.

Connectivity of habitats

The proposed development is unlikely to affect the connectivity habitats, due to the presence of rural land around the proposed development area. This implies that faunal species that are displaced by development activities can disperse into surrounding natural land if threatened.

Ecological Support Areas(ESA)

No ESA's identified in the Gauteng spatial database, will be directly affected by the development.

Construction activities and operational phase

Construction activities will have a variety of impacts on the fauna and flora of the site as well as on the surrounding area. Construction or operational large vehicles are likely to impact on the neighboring land if not controlled. Soil disturbance or vegetation disturbance that is not rehabilitated, will give rise to the establishment of exotic plants. During the operational phase of the facility, impacts could include the generation of waste, exotic vegetation, noise,

polluted and increased stormwater runoff. Mitigation measures must be put in place for such impacts in accordance with present law. Vehicles may leak oil and fuels on the soil.

Mitigation measures:

- In the construction and the operational phases, the construction camp and work areas need to be clearly demarcated to prevent activities spilling over onto other pieces of land;
- Waste and litter management strategies must be in place to contain waste and litter to the development site;
- Topsoil must be conserved if it needs to be removed for the development;
- Drip trays must be available on site to prevent soil pollution from leaking trucks.

A summary of impacts are provided in Table 3 below.

Table 3. Impact Significance per development phase (refer to Appendix 1 for criteria used to determine significance) – (High - H, Medium – M, Low – L)

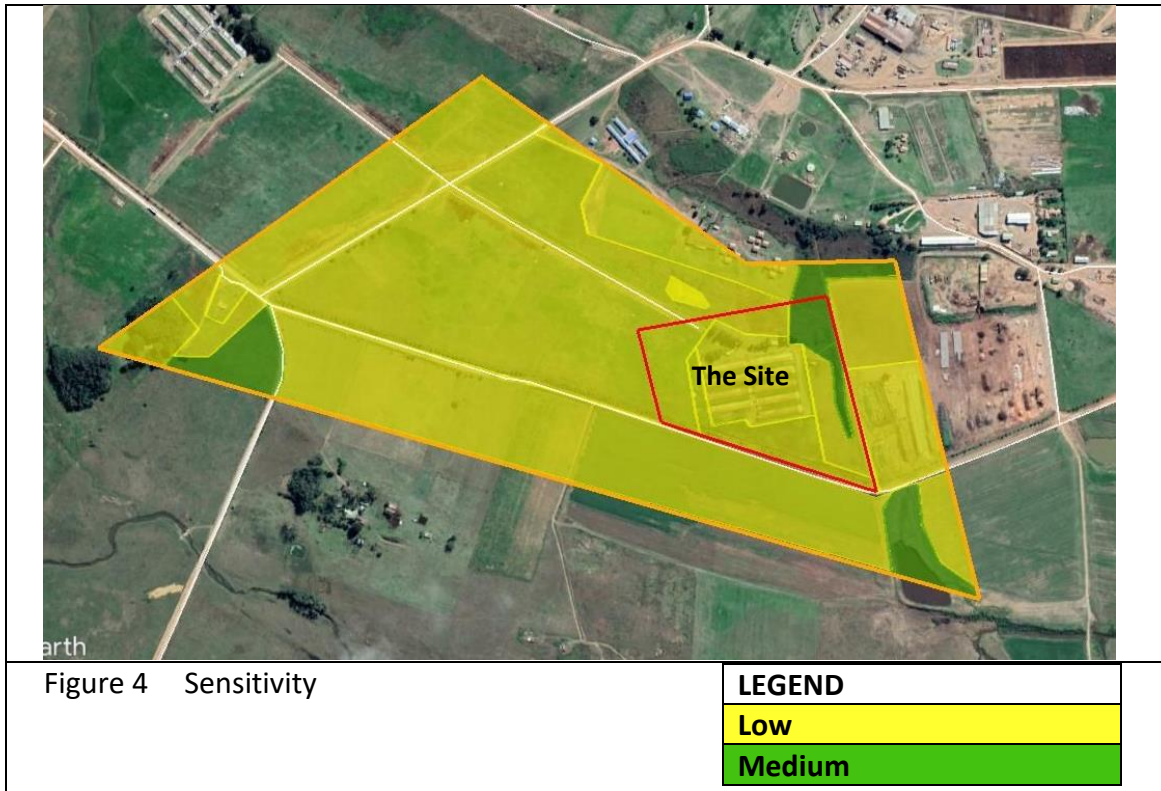
Activity	Impact	Impact significance			
		Construction Phase		Operational Phase	
		Without mitigation	With mitigation	Without mitigation	With mitigation
Clearing of vegetation on site	Loss of floral species diversity.	M	L		
	Loss of faunal species diversity.	M	L		
	Loss of sensitive flora and faunal species	M	L		
	Loss of large trees (Exotic and indigenous)	L	None		
Habitat connectivity	Loss of habitat connectivity.	M	L		
Surrounding vegetation destruction	Ad hoc movement of vehicles on surrounding land	L	None		
Litter and waste	Litter and waste on surrounding land	L	None		
Oils and Fuels	Contamination of soil by fuels and oils	L	None		
Exotic plant infestation	Creation of disturbed areas that will increase exotic plant infestation.	M	L		
Operational activities	Movement of vehicles, noise, exotic vegetation, increased and			M	L

	polluted stormwater runoff.				
--	-----------------------------	--	--	--	--

General mitigation for construction activities is included in the next section of this report.

9. SENSITIVITY

Considering all aspects assessed, most areas within the site are classified as Low ecological sensitivity while the Natural grassland patches and dam is of a Medium sensitivity. (Figure 4).



10. CONCLUSION & RECOMMENDATIONS

The proposed development site is located on level farmland just north-east of Bapsfontein in north-eastern Gauteng. The original vegetation was found to be largely altered by cattle grazing and historical and existing agricultural activities, with only a small natural grassland patch occurring in the study site. This has largely reduced the plant species richness, the faunal species richness as well as the possibility of sensitive species occurring on the site.

On surrounding land, some natural grassland and a small dam was observed that could support a more natural component of fauna and flora. These features should not be disturbed during the development activities on site.

Mitigation measures should consider the natural environment and where possible apply ecological sustainable land use practises such as protecting wetlands, soil and water quality.

REFERENCES

Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland. 2014. Edited by Michael F. Bates, William R. Branch, Aaron M. Bauer, Marius Burder, Johan Marais, Graham J. Alexander & Marianne S. de Villiers. SANBI, Pretoria.

Barnes, K.N. (ed.) 2000. The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.

Branch, W.R. 1998. Field Guide to Snakes and other reptiles of Southern Africa. Struik Publishers, Cape Town.

Branch, W.R. 1988 (ed.) South African Red Data Book - Reptiles and Amphibians. S.A. National Scientific Programmes Report No 151.

Bromilow, C. 1995. Problem Plants of South Africa. Briza Publications, Pretoria.

Friedmann Y. and Daly B. (editors). 2004. Red Data Book of the Mammals of South Africa: A conservation Assessment: CBSG Southern Africa, Conservation Breeding Specialist Group (SSC/IUCN), Endangered Wildlife Trust. South Africa.

Gibbon, G. and Maclean, G. 1998. Roberts' Multimedia Birds of Southern Africa version 2.1. John Voelcker Bird Book Fund, Cape Town.

Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V. & Brown, C.J. (eds.). 1997. The Atlas of Southern African Birds. Vol. 1 & 2. BirdLife South Africa, Johannesburg.

Maclean, G.L. 1993. Roberts' Birds of Southern Africa. John Voelcker Bird Book Fund, Cape Town.

Mills, G. & Hes, L. 1997. The complete book of Southern African Mammals. Struik Winchester, Cape Town, RSA.

Mucina L. & Rutherford M.C. (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

Passmore, N.I. & Carruthers, V.C. 1995. South African Frogs a Complete Guide. Southern Book Publishers, Witwatersrand University Press, Johannesburg.

Rutherford, M.C and Westfall, R.H.1994. Biomes of southern Africa: an objective categorization. National Botanical Institute, Pretoria.

South African Bird atlas Programme 2 – www.sabap2.co.za

Taylor, P.J. 2000. Bats of Southern Africa. Guide to Biology, Identification and Conservation. University of Natal Press. Pietermaritzburg.

Virtual Museum University of Cape Town – vmus.adu.org.za

Skinner, J.D. & Smithers, R.H.N. 1990. The Mammals of the Southern African Subregion. University of Pretoria, Pretoria, RSA.

Smithers R.H.N. 1986. *South African Red Data Book – Terrestrial Mammals*. S.A. National Scientific Programmes Report no.125. Pretoria.

Van Oudtshoorn, F. 1999. *Guide to Grasses of southern Africa*. Briza Publications, Pretoria.

Van Wyk, B., Van Oudtshoorn, B. & Gericke, N. 1997. *Medicinal Plants of South Africa*. Briza. Pretoria.

Van Wyk, B and Malan, S. 1988. *Field Guide to the Wild Flowers of the Witwatersrand and Pretoria Region*. Struik Publishers, Cape Town.

Appendix 1 Definition of terms used to assess impacts

The Department of Environmental Affairs (DEA) guidelines are as follows:

Extent:

This indicates the special area that may be affected by the impact and further describes the possibility that adjoining areas may be impacted upon. This includes four classes that are listed as follows:

- Local – Extending only as far as the site
- Limited – Limited to the site and it's immediate surrounds
- Regional – Extending beyond the immediate surrounds to affect a larger area
- National or International

Duration:

This refers to the period of the time that the impact may be operative for (i.e. the lifetime of the impact). This includes the following four classes that are listed as follows:

- Short – 0 - 5 years
- Medium – 5 -15 years
- Long – > 15 years and/or where natural processes will return following the cessation of the activity or following human intervention
- Permanent – Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient

Intensity:

This indicates whether the impact is likely to be destructive or have a lesser effect. Three such classes of intensity are defined and these are listed as:

- Low – Where natural, cultural and social functions and processes are not affected by the development
- Medium – Where natural, cultural and/or social functions and processes are affected by the development but can continue in a modified way
- High – Where natural, cultural and /or social functions and processes are altered to the extent that it will temporarily or permanently cease

Probability:

This refers to the likelihood of the impact actually occurring. The following four classes are used to describe the probability of the impact:

- None – The impact will not have an influence on the decision and requires no mitigation
- Medium –The impact is likely to have an influence on the decision and requires mitigation
- High- Mitigation is required and this may not be sufficient to ensure that the environment is not detrimentally affected by the proposed development

Significance:

The significance of the impact (i.e. whether it will lead to a marked change in the environment or not) is determined through a synthesis of the aspects produced in terms of their nature, intensity, extent and probability. Four classes of significance exist:

- None – The impact will not have an influence on the decision and requires no mitigation
- Low – Where it is likely to have an influence on the decision and requires mitigation
- Medium – Where it should have an influence on the decision unless it is mitigated
- High – Where it would influence the decision regardless of any possible mitigation

Appendix 2 Impact Assessment Table

Phase	Activity	Nature of Impact	Impact Assessment (without mitigation)			
			Extent	Duration	Intensity	Probability
Construction	Clearing of vegetation on site	Loss of floral species diversity.	Local	Long	Low	Low
		Loss of faunal species diversity.	Local	Long	Low	Low
		Loss of sensitive flora and faunal species	Local	Long	Low	Low
		Loss of large trees (Exotic and indigenous)	Local	Medium	Low	Low
	Habitat connectivity	Loss of habitat connectivity.	Local	Long	Low	Low
	Surrounding vegetation destruction	Ad hoc movement of vehicles on surrounding land	Local	Short	Low	Medium
	Litter and waste	Litter and waste on surrounding land	Local	Short	Low	Medium
	Oils and Fuels	Contamination of soil by fuels and oils	Local	Short	Low	Medium
	Exotic plant infestation	Creation of disturbed areas that will increase exotic plant infestation.	Local	Medium	Low	Medium
Operational	Movement of vehicles, people across and within the site	Movement of vehicles, noise, exotic vegetation, increased and polluted stormwater runoff.	Local	Long	Low	Medium

(High - H, Medium - M, Low - L)

Appendix 3 Curriculum vitae Christa Custers

I am a trained ecologist and have been working in the field of ecology and development for most of my career, finding win-win solutions between conserving natural elements and habitats and allowing development within these limitations. I have further been involved in several larger projects where ecologists need to be coordinated, or where I was part of a team of ecologists.

Dept of Education | 1990-1992 | Teacher

My work as teacher at the Department of National Education involved teaching Natural Science to Standard 6 and 7 classes and Biology to Standard 6-10 classes. It further involved ecological excursions and recreational activities management.

Transvaal Provincial Govt | 1992-1998 | Principle Nature Conservation Scientist

During my employment at the provincial Conservation department, my main task was to evaluate development applications from an environmental and ecological point of view and provide comments to the Local authorities in the absence of environmental legislation. The work further entailed presenting the provincial conservation and environmental point of view on all projects and planning forums in the Western Transvaal (North West) and Gauteng region.

Gauteng Province | 1998-2000 | Assistant Director Environment

My work here entailed evaluation of EIA 's which included the administrative processing of all reports submitted in terms of sections of the Environmental Conservation Act 1989. The work further entailed management of staff members, drawing up agreements between the province and industry, building capacity in the Directorate Environment, compilation of departmental policies to streamline administrative processes and managing projects geared to improve the sustainable use of natural resources in the Gauteng province.

Eco Assessments Consultants | 2000 - present | Member/Ecologist

As ecologist at Eco Assessments, I am responsible for all Ecological Assessments, Red Data Species assessments, Biodiversity studies and Rehabilitation plans. A summarized project list is attached of projects completed since 2000.

EDUCATION

University of Pretoria | Tshwane, South Africa

- BSc Botany Zoology 1987
- HED (Education Dip) 1988
- BSc Hons Ecology 1989
- MSc Ecology 2000
- Pri Sci Nat

SKILLS

- Ecological Assessments
- Red Data Flora Assessments
- Habitat Risk for development
- Strategic Ecological Assessments
- Biodiversity Assessments

Ecological Assessments

- Roosboom Residential Project. Ladysmith. 2019
- Themba, Garst Kloof, Kwaggasrant and Onderstepoort Landfill site closures. 2018
- Bridge crossings, Jukskei river. Nietgedacht. 2018
- Roodekop Junction Hill Wadeville. 2017
- West Park Cemetary, Red Data plant scans. 2017
- Protearif, Krugersdorp. 2017
- Oakfield Wedding venue. 2017
- Lords View Business park. Midrand. Open Space Management. 2017
- Eskom Powerlines. Pelly Fairfield Route Alternatives. Cullinan Hammanskraal project. 2015
- Eskom powerlines. Donkerhoek, Tshwane Route Alternatives. 2015-2017
- Eskom powerlines: Dinokeng Route Alternatives. 2015
- Rant and Dal township. Krugersdorp. 2016
- Wildtuinpark township. Krugersdorp. 2016
- Vleiloerie Proposed Township. Ecological Risk Assessment. Krugersdorp. 2016
- Lords View Industrial Park. Rehabilitation Plan. Midrand. 2016
- Riverside Cradle. Stately Home. Cradle of Humankind. 2016
- MSD industries. Midrand. Township establishment. 2016
- Fourways Mall. Demolishing of an existing retention pond. 2015
- Sedibeng Sewer upgrade. 2016
- Alliance township. Daveyton. 2016
- West Park Cemetary. Melville Koppies. 2017
- Lindley mixed development site. Strategic ecological assessments and Red Data plants scans. Lanseria. 2014-2015.
- Rustenburg Rapid Bus System. An ecological assessment of routes and bus depots. 2014.
- Blue Hills residential development. Midrand. 2014
- Chloorkop / Lords view Industrial Park Midrand. Ecological assessment. 2014.
- Finaalspan Ecological assessment. Boksburg. 2014
- Invubu – Theta 400KV powerline – (2009-2010)
- Kookfontein, Meyersdal. Township. 2009
- Coordinator ecological assessments: Highlands gate. Dullstroom.
- R41 delineation – Wetland assessment – Gautrans.
- Elandshoek Trust – Dullstroom. Site sensitivity scan.
- Proposed K97, Midrand to Irene, Gauteng. (Gautrans)
- Proposed K109, Midrand, Gauteng. Ecology. (Gautrans)
- Proposed K90 intersection with the R21, Kempton Park.
- Proposed K111, Midrand.
- Proposed office park Doornpoort, Irene.
- Floral Assessment - Residential Development. Driefontein - Muldersdrift, Krugersdorp.
- Faunal and Floral Assessment of a proposed Theme Park, Tembisa, Gauteng.
- Faunal and Floral Assessment of a proposed low cost housing initiative, Cosmo City, Gauteng.
- Vegetation assessment and carrying capacity for the Klipriviersberg Masterplan (proposed Meyersdal Nature Area), Alberton, Gauteng. (1200 ha)
- Ecological Assessment of a proposed mast development in the Vredefort Dome area, Parys, Free State Province.
- Medical Waste Incinerator on the natural environment: Wadeville, Germiston, Gauteng.
- 60 meter TELKOM Microwave facility on the CSIR campus, Pretoria, Gauteng.

- Acted as a member of the Alberton project committee responsible for the compilation of a land use and zoning map for the Klipriviersberg Nature Area (Alberton);
- Vegetation survey and open space proposals for a proposed residential development (Pretorius Park X9, 11 and 12) east of Pretoria (131ha), Gauteng.
- Proposed residential development (Renamile X1) at Mooinooi (40ha), North-West Province.
- Residential development on Karee, Rooikoppies and Marikana X2 sites (190 ha in total), North-West Province.
- Low cost housing development at Olievenhoutbosch (95ha), Gauteng.
- Vegetation assessment for a low cost housing township: Golden Triangle Sub-region south of Johannesburg (100ha), Gauteng.
- Vegetation assessment and land-use assessment for the Klipriviersberg Masterplan in Alberton (600ha), Gauteng.
- Environmental Implementation Plan for rehabilitation purposes in the Magaliesberg Protected Natural Environment, Commissiedrift, North West Province.
- Vegetation assessment for a housing development in Siyabuswa (60ha), Northern Province.
- Eskom Central Master Plan study area, Ekurhuleni.
- Sedibeng EMF Study Area, Ekurhuleni.
- Environmental Management Plan implementation for Highland Gate Golf Estate (Ecology). 2006
- Environmental Management Plan implementation for Southdowns Development (Ecology). 2005
- Environmental Management Plan Implementation for Midrand Estates (Ecology).
- Ingula hydro scheme IFC ecological audit. 2013.
- Ecological assessments of a masterplan for eThekweni Electricity to assess ecological impact of 20 year forward planning of electrical infrastructure. 2010
- Initial sensitivity assessment, Mountain view Estate, Broederstroom. 2009
- Invubu powerline upgrading, Melmoth. 2009
- Team member with Environomics for the accumulation of information pertaining to the National Forest Inventory in the East Griqualand (Transkei) area. 2002.
- Responsible for all ecological work associated with the Alexandra Environmental Management Framework. 2001-2002.
- Compile a development management policy for the Bronberg Nature Area relating to minimum size of sub-divisions and limited development areas;