



(EIA) TERRESTRIAL BIODIVERSITY STUDY REPORT

**Proposed Grimbeek park township establishment-JB Marks local Municipality-in
Potchefstroom.**



Report number	AfrgriembeekbiodTBR2025
Project Title	Grimbeek park township establishment
Client	Vhuluvhi group

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Declaration by specialist

I Mugwabana Fhatuwani Hendrick declare that: this report is certified correct and represents the findings on the proposed site capability and suitability to support intended development. I declare that this report reflects a true reflection of what exists on site, and we have no conflict of interest in the project proposed. I act as an independent specialist in this application.

I will perform the work relating to the application objectively, even if this results in views and findings that are not favorable to the applicant.

I declare that there are no circumstances that may compromise my objectivity in performing such work.

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations, and any guidelines that have relevance to the proposed activity. I will comply with the Act, Regulations, and all other applicable legislation. I have no, and will not engage in, conflicting interests in the undertaking of the activity.

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken to the application by the competent authority; and

- the objective of any report, plan or document to be prepared by myself for submission to the competent authority; all the particulars furnished by me in this form are true and correct; and

I realize that a false declaration is an offense in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signed: 

Date: 30/04/2025

Executive Summary

Africa Ecological and Development Services was appointed by the Vhuluvhi group to conduct a terrestrial biodiversity study for a site where a proposed GRIMBEEK PARK TOWNSHIP will be established in Potchefstroom.

As required by the National Forest Act any disturbance; destruction or removal of vegetation; Indigenous trees; trees or groups of trees must be done with an approved license granted by the Department of Forestry; fisheries and the Environment.

The effect of the declaration of protected trees is that, in terms of section 15(1) of the National Forests Act, 1998 (Act No. 84 of 1998), no person may cut, disturb, damage destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister; on in terms of the exemption from the provisions of this subsection published by the Minister in the Gazette on the advice of Council.

An extensive field survey was undertaken on the 15th of April 2025, to confirm the conditions of the biophysical environment where the proposed project will be located. The site's vegetation type is a Rand Highveld Grassland that falls within a Mesic Highveld Grassland Bioregion.

Before the site visit, desktop studies were undertaken to review details of existing literature about the historical nature of the area concerning the environmental screening tool. Relevant existing literature was also reviewed to establish background data on the proposed site and to understand the site's biophysical environment.

The pre-ecological desktop-based bio-diversity information will be used in combination with that which was collected on site during field surveys, as part of our investigations and will be used to inform the Government's review for the application process of the proposed development.

Township development can have significant impacts on the natural environment in various ways. These include direct vegetation clearance, introduction of alien plants, alteration of microhabitats, soil erosion and compaction. Although township Development is necessary for the development that entails homes and work opportunities, it requires careful consideration of the potential environmental impacts on the various natural resources.

The sensitivity study revealed that the site is covered by a floodplain which will require a 50m buffer. The main river associated with the floodplain is the Mooi Rivier.

The aquatic sensitivity of the site is very high as per the screening tool results and this was confirmed correct as there is a mooiriver that flows through the site to the north eastern side. Hydropedology assessment was done and confirmed the site water flow to be subsurface water flow mostly influenced by rainfall recharge and the surrounding catchments characterized by hills and sills.

During the site survey, no faunal species of conservation concern were encountered on site. Their absence could be explained by the habitat fragmentation and daily presence of humans in the area and grazing. A vegetation survey revealed that the site has been exposed to continuous disturbance from uncontrolled veld fires, grazing, ploughing and alien invasion.

It is the opinion of the specialist that this application should be considered, provided that all recommendations and mitigations are strictly adhered to and any further additional measures that might arise also get the involvement or seek continuous advice from the specialist.

Floristic land cover is limited due to the site being cultivated land where maize crops are the only crops found to have been planted on all the three farm portions. The open spaces in between the farm portions are covered with grass; exotic weeds and invasive trees and reeds.

Agricultural suitability and capability are high as this was confirmed by the cultivated maize which was found to have yielded good production.

INDEMNITY STATEMENT

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1 Introduction

Background

The proposed township development falls within JB Marks Local Municipality, North west Province. This appointment includes providing terrestrial biodiversity study undertaken by Africa Ecological services to compile a supporting the proposed township development. This terrestrial biodiversity report has evaluated the extent at which natural environment is likely to be impacted; and analyzed the current existing environmental impacts and recommend the preventative and control measures.

As stipulated in the master National Environmental Management Act; National Environmental Management Biodiversity Act and other environmental legislations; the South African government is committed to sustainable development without compromising on both human needs and the protection of natural resources. Sustainable development principles are well observed and followed when considering authorizations for all development projects.

This report gives all the details on current biological diversity with much focus on floristic species compositions, the state of the environment, and current environmental problems. In the constitution of the Republic of South Africa which is the supreme law of the land section 24 states that: everyone has the right:

to an environment that is not harmful to their health and well-being.

Have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that:

Prevent pollution and ecological degradation.

Promote conservation.

Secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and balanced sustainable development.

Every government authority, national, provincial, and local must take reasonable steps. In its current functions as well as future, to prevent pollution, promote conservation, and ensure sustainable development.

Section 8 of the constitution says the Bill of Rights applies to non-state bodies and individuals whereas section 8 offers us protection against individuals and companies who cause pollution and other damage to the environment. Private companies and individuals must respect each other's environmental rights.

It protects our health and well-being.

It places a duty on the state, on business, and on all South Africans, to prevent pollution and other damage to the environment, and promote conservation and sustainable development.

This specialist report provides a baseline and impact assessment of the ecosystems that might be affected by the proposed activity which might lead to the removal of vegetation and pollution. This report gives details of the vegetation survey and habitat survey which were done to determine the current ecological state of the area for both fauna and flora and the predicted post-environmental impacts that are likely to occur.

An assessment of the affected site was done to determine the magnitude of the impacts likely to occur and to determine whether the site is suitable or not for the development proposed.

The only threat that was found is the one that is caused by invasive alien plants that are high in causing ground water reduction.

The proposed development must take into consideration the legislative requirements, policies, guidelines, and principles of the relevant regulatory documents such as the National Spatial Development Framework, the Local Municipality Integrated Development Plan (IDP), and National Biodiversity Plan; the provincial biodiversity sector plan and the National Environmental Management Act (NEMA).

The National Environmental Management Act (NEMA) outlines several principles that give guidance to developers, private landowners, members of the public, and authorities, of which principle number three of the act stipulates that development must be socially, environmentally, and economically sustainable. Section number 4(a) of the Act states that consideration should be given to all relevant factors which include ecosystem disturbance and loss of biological diversity must be avoided and prevented, and or where they cannot be completely avoided must be minimized, and mitigation measures applied; and that pollution and environmental degradation be avoided, and or where such cannot be completely avoided remedial action to the environment be instituted.

African Union climate change and resilient development strategy and action plan (2022-2032).

This strategy states the following

Principle 2: Conserving and restoring natural capital.

On 15 July 2021 the African Union launched our continental Green Recovery Action Plan, which focuses in five priority areas of which the following two are relevant to sustaining the natural resources through sustainable development:

Nature-based solutions and focus on biodiversity through work on sustainable land management, forestry, oceans, and ecotourism. Resilient agriculture, by focusing on inclusive economic development and green jobs. Green and resilient cities, including a focus on water (flooding and water resources) and enhancing information, communication and technology.

If natural ecosystems continue to degrade and habitat loss is left unchecked, human-wildlife conflict is inevitable and the experiences so far suggest that the odds are stacked against wildlife and ecosystems.

Land-based ecosystems and the carbon sinks they comprise are concomitantly Africa's biggest risk

and opportunity in the face of projected impacts of climate change. Terrestrial biodiversity conservation is dependent on the protection and restoration of key ecosystems such as forests, wetlands, grasslands, highlands and coastal systems, which all serve as carbon sinks. Human-induced modification of the structure and function of many ecosystems through land use change and degradation (e.g., agricultural conversion, forest/grassland clearing and burning, urban expansion, mine and road expansion etc.). Africa's extensive tropical forests, mangroves and rangelands are critical land-based ecosystems in combating global climate change and provide valuable

ecosystem services to its people.

1.1 Aim, scope, limitations, and objectives of the study.

The government seeks to shift the national economy into an inclusive, value-adding, and export-driven industrialization pathway. The National Development Plan 2030 (NDP), the New Growth Path (NGP) and the Industrial Policy Action Plan (IPAP) encapsulate the key policy thrusts for the reorientation of the economy to create jobs, and rollback poverty and under-development.

This study aimed to undertake a detailed inclusive terrestrial biodiversity assessment in the study area's biophysical environment. Surveys were conducted on all ecological components and ecosystems.

- Provide baseline data on habitat and species on and adjacent to the site where the proposed listed activity will take place.
- Provide advice on a legislative framework relating to habitats and species on site.
- Suggest mitigation measures to be employed for the impacts that might occur due to the development activities.
- Check and assess the possibility of the existence of threatened ecosystems and species of both fauna and flora and recommend measures to protect them.
- Identification of both fauna and flora on-site and within the study site 200m radius buffer.
- Identify and list trees that might be affected by the development including protected trees.
- Identify and map breeding sites that might be occurring in the study site to avoid their destruction.
- Identify and validate species that might be listed in a red data list and map them.
- Identify and map ecological corridors that might require buffers.
- Identify all sensitive sites and species that are to be kept safe and or avoided.
- To evaluate the present state of the vegetation and ecological functioning of the area.
- To identify possible negative impacts that might exist already on site and propose mitigation measures.

2 Study Area

2.1 Geographic Area

The site is situated within the area of jurisdiction of JB MARKS Local

Municipality, north west province. It is located within the following coordinates: Latitude: 26°44'5.8S 27°9'57.22E E. The site located in an area characterized by and surrounded by existing residential areas. Is located along the mooirivier river catchment.

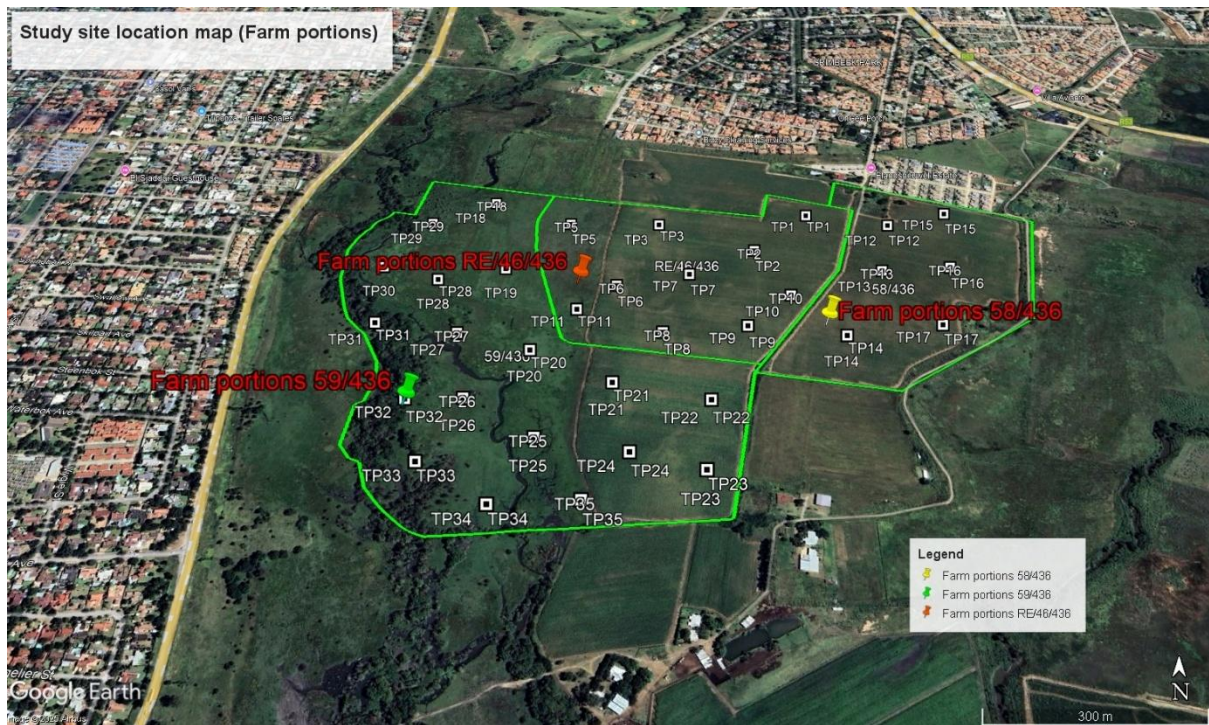


Figure 1: Locality orientation map. The site of study is demarcated by the red line on the map.

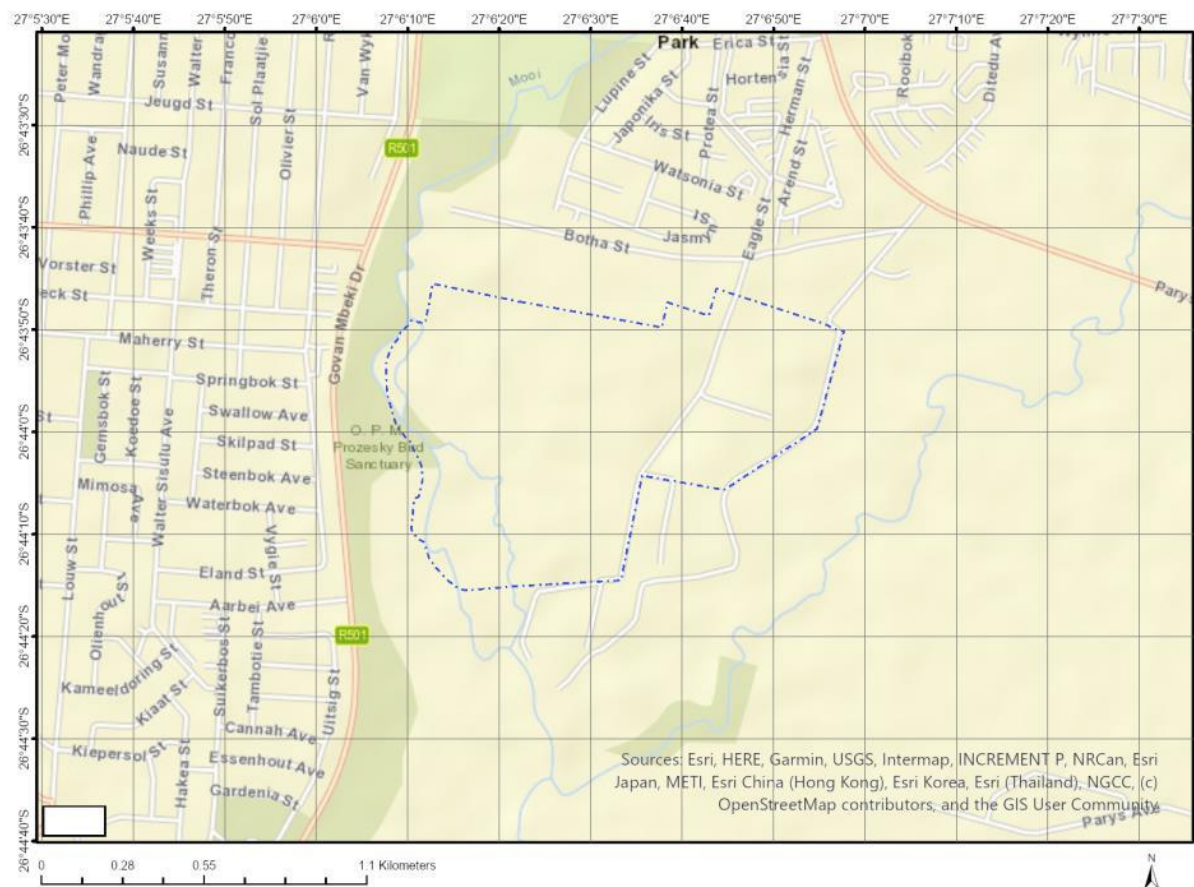


Figure 2: Orientation to the location of the study site (Sourced from screening report).

3 Assessment

3.1 Drainage areas and surface hydrology.

Surface hydrology is characterized by land which lacks streams and rivers with mooirivier river being the only river that characterize aquatic ecology of the area. The site itself does not have a wetland. Drainage of the area is also highly influenced by rainfall. Grassland being the main vegetation cover does influence the infiltration of water to the ground.

3.2 Climate; relief; Geology and Topography (Physiography) of the affected area

In Potchefstroom, the summers are long, warm, and mostly clear and the winters are short, cold, dry, and clear. Over the course of the year, the temperature typically varies from 36°C.

During the months of April, May, June, July and August you are most likely to experience good weather with pleasant average temperatures that fall between 20°C and 26°C. The area's topography is characterized by flat gentle land. The main geology of the area is characterized by Diabase rock group. Diabase is an intrusive igneous rock with the same mineral composition as basalt. It cools under basaltic volcanoes, like those at mid-ocean ridges. Diabase cools moderately quickly when magma moves up into fractures and weak zones below a volcano. The main soil group falls within the Rhodic Lixisols. Lixisols (notably in argic horizons) are the result of 'rubefaction' by dehydration of ferrihydrite to hematite in long dry seasons. These soils cover a total area of about 435 million hectares, of which more than half in Sub-Saharan and East Africa.

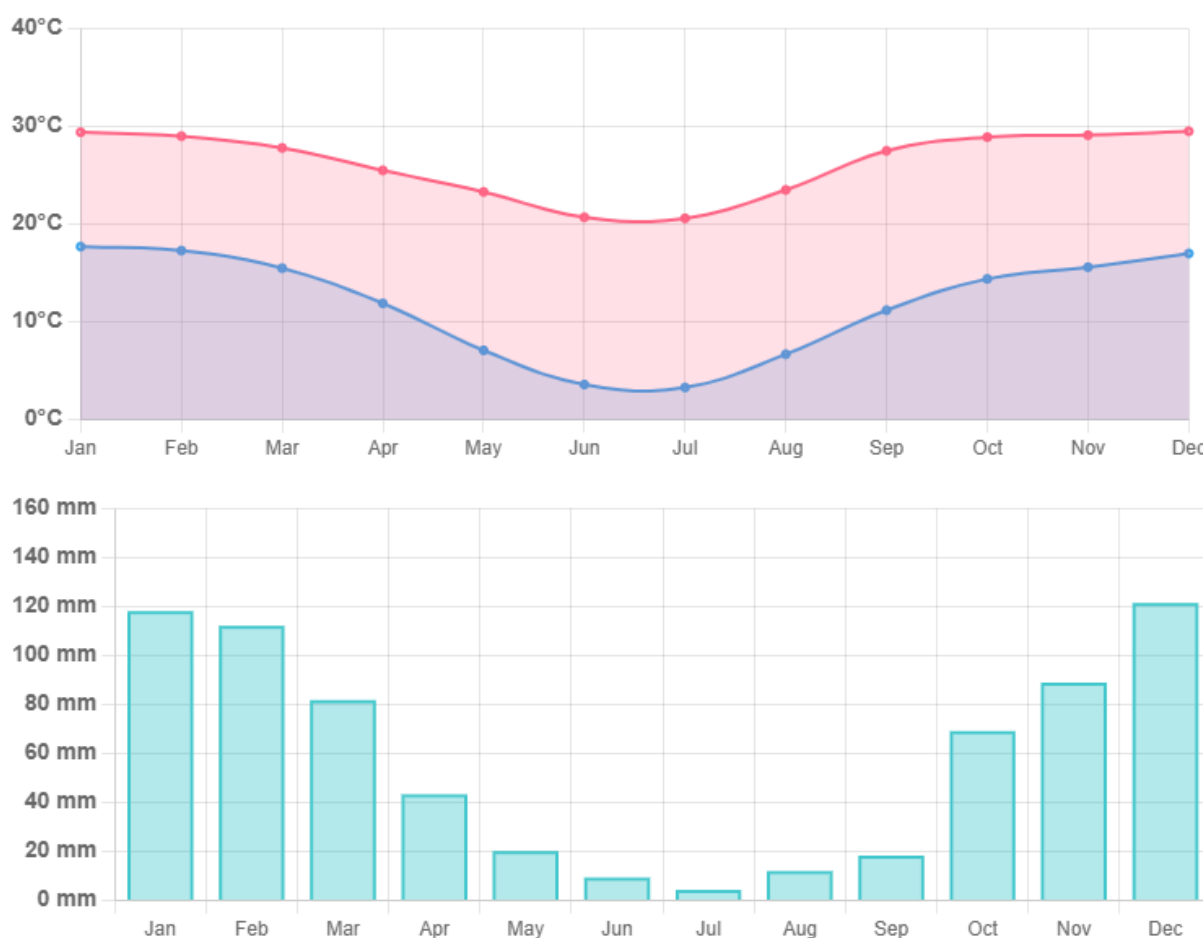


Figure 3: Climatic data of the study area (Climate data.org).

4 Methodologies that were used to conduct field surveys, impact assessments, and impact ratings.

The scope of the fieldwork was informed by research informed by desktop data analysis, knowledge of the study area, discussions with Darlington Borough Council, E3 Partnership Report 2005, and the timing and timescale of the study. A detailed field survey was undertaken with a focus on all biological diversity aspects. A variety of surveys that were undertaken are indicated with their findings in this report.

The field survey was done on the site where the proposed development will be established and on the surrounding 200m radius.

The site was assessed using transects and sample plots. During the survey, all noted fauna and flora species were ranked into rare and dominant species. The broad vegetation types present on the site were determined. The state of the environment was assessed in terms of condition, grazing impacts, disturbance by humans, erosion, and the presence of invaders and exotic species.

This study considered the collection of data considering all existing previous records to have informative data for decision-making. Data was collected for both fauna and flora using field surveys.

Data collection was based on the protocols listed to be used by appointed specialists when assessing environmental sensitivity considering the outcome of the screening tool report.

Pre-site evaluation was done using environmental sensitivity screening report results. Its analysis was done using number rating assumptions. This was then concluded with findings conducted during field surveys.

Photos with coordinates were taken using a GPS camera to indicate the protected trees and hot spot zones that exist within and around the proposed site.

Flora

- A visual inspection of the study area was done before surveys were conducted.
- During the process different homogenous vegetation units were identified and subsequently surveyed on foot and by vehicle to determine the floristic composition of each unit.
- A plotless sampling method was used to record data.
- Species identification was done following reputable checklists and field guides.
- Where necessary, plant material was collected and/or photographs taken of specimens for identification purposes.

Fauna

Before the initial visit, satellite images (Google Earth) of the site were studied and the different habitat types were identified (uniform features from an aerial perspective).

The sites were then ground-truthed upon arrival.

- Non-invasive walk transects were performed during the site assessment, documenting all animal sightings.
- Avifaunal surveys were conducted using walk transects and point count methods. A 12-minute point count method on a 20 m radius was used (Macchi & Grau 2012).

Animal species were also noted as well as the probability of other species occurring on or near the site according to their distribution areas and habitat requirements.

Data presentation and analysis

Detailed data was collected using evidence referrals such as photos. Analysis was presented using graphs and tables. Coordinates for identified sensitive sites were taken to emphasize their protection.

Specific unknown and unclear unidentifiable biophysical elements

Various photos were taken across the site and are presented to reflect the condition and biophysical view of the sites including vegetation communities and species identified. All that required post-field identification had samples taken.

4.1 Criteria used to assess the site.

Several criteria were used to assess the site and determine the overall status of the environment. Each assessment undertaken had its unique results that were analyzed and presented and gave guidance on the recommendations that will assist in final decision making.

Vegetation characteristics.: Characteristics of the vegetation in its current state. The diversity of species, sensitivity of habitats, and their ecological importance.

Scoring:

Wide variety of species occupying a variety of niches =1, Variety of species occupying a single nich =2, Single species dominance over a large area containing a low diversity of species =3.

Habitat Diversity and species richness: normally a function of locality, habitat diversity, and climatic conditions.

Scoring:

Wide variety of species occupying a variety of niches =1, Variety of species occupying a single nich =2, Single species dominance over a large area containing a low diversity of species =3.

Presence of rare and endangered species: The actual occurrence or potential occurrence of rare or endangered species on a proposed site plays a large role in the feasibility of a development. Depending on the status and provincial conservation policy, the presence of a Red Data species.

Scoring:

Occurrence actual or highly likely =1, Occurrence possible =2, Occurrence highly unlikely =3.

Ecological function: All plant communities play a role in the ecosystem. The ecological importance of all areas though, can vary significantly e.g. wetlands, drainage lines, ecotone.

Scoring:

Ecological function critical for greater system =1, Ecological function of medium importance =2, No special ecological function (the system will not fail if absent) =3.

Degree of rarity/conservation value:

Scoring:

Scoring: Very rare and/or in pristine condition =1, Fair to good condition and/or relatively rare =2, Not rare, degraded and/or poorly conserved =3.

Vegetation condition.: The sites are compared to benchmark sites in good to excellent condition. Vegetation management practices (e.g. grazing regime, fire, management, etc.) can have a marked impact on the condition of the vegetation.

Percentage ground cover: Ground cover is under normal and natural conditions as a function of climate and biophysical characteristics. Under poor grazing management, ground cover is one of the first signs of vegetation degradation.

Scoring:

Scoring: Good to excellent =1, Fair =2, Poor =3.

Vegetation structure: This is the ratio between tree, shrub, sub-shrubs, and grass layers. The ratio could be affected by grazing and browsing by animals.

Scoring:

All layers still intact and showing specimens of all age classes =1, Sub-shrubs and/or grass layers highly grazed while tree layer still fairly intact (bush partly opened up) =2, Mono-layered structure often dominated by a few unpalatable species (presence of barren patches notable) =3.

Infestation with exotic weeds and invader plants or encroachers:

Scoring:

No or very slight infestation levels by weeds and invaders =1, Medium infestation by one or more species =2, Several weed and invader species present and high occurrence of one or more species =3.

Degree of grazing/browsing impact:

Scoring:

No or very slight notable signs of browsing and/or grazing =1, Some browse lines evident, shrubs show signs of browsing, grass layer grazed though still intact = 2, Clear browse line on trees, shrubs heavily pruned and grass layer almost absent =3.

Signs of erosion: The formation of erosion scars can often indicate the severity and/or duration of vegetation degradation.

Scoring:

No or very little signs of soil erosion =1, Small erosion gullies present and/or evidence of slight sheet erosion =2, Gully erosion well developed (medium to large dongas) and/or sheet erosion removed the topsoil over large areas =3.

Faunal characteristics:

Presence of rare and endangered species: The actual occurrence or potential occurrence of rare or endangered species on a proposed site plays a large role in the feasibility of a development. Depending on the status and provincial conservation policy, the presence of a Red Data species or unique and sensitive habitats can potentially be destroyed.

Scoring:

Occurrence actual or highly likely =1, Occurrence possible =2, Occurrence highly unlikely =3.

4.2 Biodiversity sensitivity rating (BSR).

Descriptive detailed criteria		
BSR	BSR general floral description.	Floral score equating to BSR class.
Ideal (5)	Vegetation is totally transformed or in a highly degraded state, generally has a low level of species diversity, no species of concern, and/or has a high level of invasive plants. The area has lost its inherent ecological function. The area has no conservation value and the potential for successful rehabilitation is very low. The site is ideal for the proposed development.	29 – 30
Preferred (4)	Vegetation is in an advanced state of degradation, has a low level of species diversity, no species of concern, and/or has a high level of invasive plants. The area's ecological function is seriously hampered, has a very low conservation value.	26 – 28
Acceptable (3)	Vegetation is notably degraded, has a medium level of species diversity although no species of concern are present. Invasive plants are present but are still controllable. The area's ecological function is still intact but may be hampered by the current levels of degradation. Successful rehabilitation of the area is possible. The conservation value is regarded as low. The area is acceptable for the proposed development.	21 – 25

Not preferred (2)	The area is in good condition although signs of disturbance are present. Species diversity is high and species of concern may be present. The ecological function is intact and very little rehabilitation is needed. The area is of medium conservation importance. The area is not preferred for the proposed development.	11 – 20
Sensitive (1)	The vegetation is in a pristine or near pristine condition. Very little signs of disturbance other than those needed for successful management are present. The species diversity is very high with several species of concern known to be present. Ecological functioning is intact and the conservation importance is high. The area is regarded as sensitive and not suitable for the proposed development.	0 - 10

4.3 Results for vegetation assessment and evaluation.

Criteria description	Score
Vegetation characteristics	3
Habitat diversity and species richness	3
Presence of rare and endangered species	3
Ecological function	3
Degree of rarity/conservation value	3
Percentage ground cover	3
Vegetation structure	3
Infestation with exotic weeds and invader plants	3
Degree of grazing/browsing impact	3
Signs of erosion	1
Faunal characteristics	3
Total score	31

The results of the assessment confirmed that the area is on a score of 31. Vegetation is totally transformed and in a highly degraded state, there is no species diversity, no species of concern, has a high level of invasive plants. The area has lost its inherent ecological function.

The area has no conservation value and the potential for successful rehabilitation is very low. The site is ideal for the proposed development.

There are no sensitive or protected areas and species within and around the study area. The area is fully transformed into agricultural land.



TERRESTRIAL VEGETATION COMPOSITION AND STRUCTURE					
Date of field investigations done			15 April 2025		
Duration of field investigations done			One day.		
Season of assessment and indication of growing or not growing season					
It was just after a growing season and early beginning of winter.					
Biome	Grassland	Name	Rand highveld	CBA class	ESA 1-2,CBA1-
Plant types of classes		Percentage cover on the overall study area occurrence			
(Vegetation conundrum)		Percentage(100%)		Ecosystem value	
Trees		5		Low	
Shrubs		10		Low	
Grass		40		High	
Herbaceous		15		Low	
Climbers		0		Degraded	
Runners		0		Degraded	
Aloes		0		Degraded	
Lichens and Bryophytes		0		Degraded	
Parasites		0		Degraded	
Indigenous plant species composition and invasive alien plant species composition in percentage in the proposed site (%)					
Indigenous plant species				1%	
Invasive alien plant species				99%	
Indication of identified protected plant species listed on the National Forest Act 84 of 1998					
No protected plant species were identified or either listed on the IUC red data list.					

As represented by the analysis above the site plant species diversity has been lost due transformation of the land into fully fledged agricultural land.

4.4 Terrestrial biodiversity assessment results discussion.

Vegetation is falling on the Rand Highveld grassland. The site has the dominance of invasive species such as grey poplar, gum trees; seringa; weeping willow and wild asparagus. Indigenous few trees that exist are sweet thorn trees and sericea lancea occurring in very small, scattered numbers along the riparian zones. Plant species composition is very low because the land is transformed.

Trees species and shrub species that were identified on the study site include some of the listed in the table below.

Scientific name	Common names	Occurrence level	National Forest Act Protection	IUCN Red list Conservation status
<i>Celtis africana</i>	White stink wood	††††		Least concern
<i>Vachelia karoo</i>	Sweet thorn	†††††		Least concern
<i>Searsia lancea</i>	karee	††††		Least concern

Table 1: List of indigenous plants identified in the study site.

Terrestrial tree indigenous tree species composition is very low and restricted on areas that are on the south-western and northern side where there is a perennial river whose riparian vegetation is dominated by invasive alien plants.

There are no threatened plant species or protected plants that exist in the study area. During the field surveys it was found that the plant species diversity is mostly dominated by invasive alien plants and reeds on open spaces that divide the farm portions.

Scientific name	Common name	Dominancy score
<i>Cenchrus ciliaris</i>	foxtail buffalo grass	
<i>Eragrostisrigidior</i>	Curly leaf grass	
<i>Setaria incrassate</i>	Vlei bristle grass	
<i>Themeda triandra</i>	red grass	
<i>Panicum deustum</i>	Broad-leaved panicum	
<i>Tragus berteronianus</i>	Carrot seed grass	

Table 2: List of grass species identified in the study site.

4.4.1 Problem plants and invasive alien plants identified.

Scientific name	Common name	Category(NEMBA)
<i>Lantana camara</i>	common lantana	1b
<i>Solanum mauritianum</i>	Bugweed	1b
<i>Populus canescens</i>	Grey Poplar	1b
<i>Melia azedarach</i>	Seringa	2
<i>Eupatorium macrocephalum</i>	Pompom weed	1b
<i>Morus alba</i>	Common mulberry	3
<i>Arundo donax</i>	Giant reed	1a
<i>Melia azedarach</i>	Syringa	1b

Table 3: List of invasive species identified in the study site.



4.4.2 Reptile and amphibian survey.

The area is a highly transformed habitat and cannot fully support the habitat requirements for both reptiles and amphibians. None of these were identified or sighted during the field survey. Hence this does not mean that they do not exist as they tend to be located at very scarce sites and in limited populations.

4.4.3 Bird survey (Avifauna)

Birds are known to move from one area to another across the habitat foraging on various plants and grass. Those which were sighted are listed on the table below.

Scientific name	Common name	Favorable habitat
<i>Bostrychia hagedash</i>	hadada ibis	Wooded, riparian, habitats. Residential areas in fruit trees and parks.
<i>Pycnonotus tricolor</i>	Dark capped bulbul, black eyed.	Wooded, riparian, habitats. Residential areas in fruit trees and parks.
<i>Halcyon albiventris</i>	Brown hooded king fisher	Woodland and riparian margins
<i>Corvus albus</i>	Pied crow	Settlements
<i>Corvus albicollis</i>	White necked raven	Along roads
<i>Ploceus velatus</i>	Southern masked weaver	Wooded, riparian, habitats. Residential areas in fruit trees
<i>Streptopelia semitorquata</i>	Red-eyed Dove	Woodland and riparian margins

Table 4: List of bird species identified in the study site.

An assessment was also undertaken using the biodiversity sector plan to verify the possibility of breeding and nesting sites that might be existing within the study area and none was found to be in existence except that they are existing within the high lying areas that are far from the study area.

4.4.4 Invertebrate (Butterfly; Beetles; Locusts, Ants, and dragonfly) survey.

Scientific name	Common name	Habitat
<i>Acrida acuminata</i>	Common stick grasshopper	Long grass and sandy habitats.
<i>Truxaloides braziliensis</i>	Common stick grasshopper	Long grass and sandy habitats.
<i>Locustaniapardalina</i>	Brown locust	Semi-arid regions. woodland.
<i>Acanthacris ruficornis</i>	Garden locust	Bushes; trees; open ground.

Table 5: List of grass hoppers identified in the study site.

Butterflies and dragon flies are species that like to be found in wet areas during flowering season. Although this is the case none of these species were identified in the area and are also likely to be found during wet seasons when temporary ponds get established when it gets to rain. None of the protected species or rare have been identified. Dragon flies do have potential to exist in this area. Ants were seen although not identified as rare species; locusts were sighted also but no key threatened species were identified. A lot of millipedes were sighted.



Truxalis nasuta(short-horned grasshopper)

HABITAT.— Frequently found in old farms, this species occupies grassland, tufty gramineous areas, and cultivated



Shows Grasses and reeds on unplanted open spaces and where there are flood control channels

Grassland is known to be a common good habitat for locusts throughout the country. Variety of locust species are dependent more on their breeding in a well-established grass cover.

4.5 Critical biodiversity and sensitivity areas assessment of the affected environment (area of study).

ENVIRONMENTAL AND PROTOCOLS SCREENING REPORT ASSESSMENT RESULTS FIELD VERIFICATION RESULTS					
PROJECT TITLE		PROPOSED uTHUKELA SPECIAL ECONOMIC ZONE DEVELOPMENT IN ALFRED DUMA LOCAL MUNICIPALITY, KWAZULU-NATAL			
COORDINATES	26°44'5.8S		COORDINATES	27°9'57.22E	
STUDY AREA ENVIRONMENTAL SENSITIVITY					
SENSITIVITY	VERY HIGH	HIGH	MEDIUM	LOW	RESULTCONFIRMATION
AGRICULTURE		x			Confirmed correct
ANIMAL		x			No habitat left
AQUATIC	x				Floodplain
PLANT			x		Transformed land
TERRESTRIAL	x				Transformed land
AGRICULTURE THEME SENSITIVITY FEATURES SCREENING RESULTS					
SENSITIVITY(+)		FEATURES			SITE
High		Rainfed Annual Crop Cultivation / Planted Pastures			Currently active
ANIMAL THEME SENSITIVITY FEATURES SCREENING RESULTS					
SENSITIVITY(+)		FEATURES			SITE RESULTS
High		Aves-Tyto capensis; Aves-Circus ranivorus			No habitat left
Medium		Mammalia-Hydrictis maculicollis			No habitat left
Medium		Mammalia-Ourebia ourebi ourebi			No habitat left
Medium		Invertebrate-Clonia uvarovi			No habitat left
AQUATIC BIODIVERSITY THEME SENSITIVITY FEATURES SCREENING RESULTS					
SENSITIVITY(+)		FEATURES			SITE RESULTS
Very High sensitivity		Wetlands_MesicHighveldGrasslandBioregion(Floodplain).			Buffered
RELATIVE PLANT SPECIES THEME SENSITIVITY FEATURES SCREENING RESULTS					
SENSITIVITY (+)		FEATURES			SITE RESULTS
Medium		Sensitive species 1252, Sensitive species 691			Outside focus site
RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY FEATURES SCREENING RESULTS					
SENSITIVITY(+)		FEATURES			SITE RESULTS
Very high		VU_Rand Highveld Grassland			Transformed

ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY FOR VERY HIGH SENSITIVITY-RATED SITE	
SENSITIVITY RATING FOR TERRESTRIAL BIODIVERSITY FEATURES	A description of the ecological drivers or processes of the system and how the proposed development will impact these.
BIODIVERSITY FEATURES LISTED VU_Rand Highveld Grassland	Study area have been fully transformed to agriculture
	Ecological functioning and ecological processes (e.g. fire, migration, pollination, etc.) that operate within the preferred site.
	Study area have been fully transformed to agriculture
	The ecological corridors that the proposed development would impede include migration and movement of flora and fauna.
	Study area have been fully transformed to agriculture
The description of any significant terrestrial landscape features (including rare or important flora-faunal associations, presence of strategic water source areas (SWSAs), or freshwater ecosystem priority area (FEPA) sub-catchments.	
Study area have been fully transformed to agriculture	
Main vegetation types.	
VU_Rand Highveld Grassland	
Threatened ecosystems, including listed ecosystems as well as locally important habitat types identified.	
VU_Rand Highveld Grassland with study site being fully transformed into agricultural land.	
Ecological connectivity, habitat fragmentation, ecological processes, and fine-scale habitats.	
Study site is fully transformed into agricultural land. Floodplain will not be affected.	
Species, distribution, important habitats (e.g. feeding grounds, nesting sites,etc.), and movement patterns identified.	
This have been highly impacted due to land being fully transformed on the study area	
Identification of an alternative development footprint.	
Limited due to the existing land uses. No need as the site is suitable.	
Terrestrial critical biodiversity areas (CBAs).	
Low sensitivity.	
The reasons why an area has been identified as a CBA.	
Not applicable.	
An indication of whether the proposed development will be consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation.	
The affected environment is already transformed to agriculture. Flood plain must be maintained.	
The impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to the remaining extent of the ecosystem type(s).	

There will be minimal impact as the area is already transformed.
The impact on ecosystem threat status.
There will be limited impact, and the indicated buffer must be maintained with restrictions enforcement.
The impact on explicit subtypes in the vegetation.
This will not occur because the site is a transformed land currently ploughed.
The impact on any changes to the threat status of populations of species of conservation concern in the CBA.
There will be no impact due to the current status of the environment which is degraded.
The extent the proposed development will impact on the functionality of the ESA.
Impact will be minimal and low.
Loss of ecological connectivity (on-site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna.
Predicted to be medium.
An opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area management plan.
It does align because the land is a transformed land. There is no protected area nearby.
The way in which in which the proposed development will compromise or contribute to the expansion of the protected area network.
There is no expansion plan for protected area on the affected environment.
The impact(s) on the terrestrial habitat of a SWSA.
None
The impacts of the proposed development on the SWSA water quality and quantity (e.g. describing potential increased runoff

Buffer zone protection will reduce the risk of impact on the river and its riparian and floodplain.

leading to increased sediment load in water courses: Buffer must be maintained and managed to prevent sediment
The impacts of the proposed development on habitat condition and species in the FEPA sub catchment.
Impact might occur if no buffer enforcement on the floodplain
Impact on the ecological integrity of the forest: No forest
Percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.
The area is a grassland that have been fully transformed.

5 Impact assessment rating and mitigation support action

5.1 Restrictions based on findings minimize ecological impacts.

The proposed development must take into consideration all the areas that are covered by a floodplain and the associated riparian and riverine areas. Designs and drawings must take into consideration the indicated buffer line so that footprint do not affect flood line.

Biodiversity plays a pivotal role in South Africa's development, encompassing economic, socio-economic, and sustainable livelihood dimensions. The preservation of species, ecosystems, and ecological processes is imperative for the long-term sustainable utilization of the country's ecological resources. Effective governance in the biodiversity sector is essential to ensure these resources remain available for future generations.

5.2 Evaluation of Ecological Impacts.

Nature of Impact	Development stage associated with	IMPACT RANKING, WEGHING AND SCALING							
		extent	Duration	Intensity	Probability	Weighting factor	Significance rating	Mitigation efficiency	Significance following
Removal of vegetation	A	1	1	1	1	1	10-1	2.0	0-1
Destabilization of soil	A	3	5	5	5	5	20-39	1.0	20-39
	B								
Compaction of soil	A	3	3	3	3	3	20-39	1.0	20-39
	B								
Spread of invasive alien plant seeds	A	4	4	2	3	3	20-39	0.6	20-39
Habitat fragmentation	A	2	2	2	2	1	0-19	2.0	2-1

Land capability and suitability to support the proposed activity	
Is the site proposed capable of being used for the listed activity?	Yes (Excluding flood line)
Is the site suitable to be used for the listed activity with measures?	Geologist recommendations
Can the listed proposed activity be considered for authorization with consideration of the above?	Yes caution of flood line and water logging.
Suitability for agriculture and associated practices	Highly suitable for crops and citrus. Maize and sorghum. Pasture production and fish farming. Hydroponic and drip irrigation is recommended.

5.3 Red data Species Checklist Verification.

Verification and assessment were done to determine if there are any listed red data species both fauna and flora in the study area. There was none that was found to exist hence main factor would be that the area have been fully transformed into agricultural land.

6 Environmental Sensitivity overview.

6.1 Development footprint determination about the produced screening report results.

The footprint will be localized but with minimum potential to expand the impacts outside.

6.2 Project Alternatives.

There is no need to consider any alternative site within the catchment area because the land suitable for the proposed development is big enough with the inclusion of the no go areas.

6.3 The No-Go Alternative

There are limited sites that can be considered for expansion.

6.3.1 Ecosystem drivers

The main drivers include birds, animals, and reptiles with the inclusion of livestock.

6.3.2 Habitat fragmentation

The site which is targeted for development is a fully transformed land which is now being used for maize ploughing.

6.3.3 Ecological connectivity

Connectivity is not balanced with the poorly sustained ecosystem services that got diminished by extensive agricultural practices and urbanization. It is limited within the localized eco-zones. This must be maintained by protecting the floodplain.

6.3.4 Biodiversity sensitivity rating results for the proposed site.

The total score came at 31 which confirmed that the site has lost its ecological value and is suitable to develop.

6.4 Ecological niche assessment of the study area.

An assessment that was done during field surveys revealed that the ecological niche of the area is medium to low. Few species still occupy their space and perform their key roles with much of the disturbances. Birds; ants; rodents; reptiles; rabbits; squirrels; and rock lizards have been confirmed to be the main species whose habitat is still partially available.

6.5 Prediction of the impact on ecosystem regulation and supporting services

Ecosystem regulation and support services	The impact prediction on services
Flood attenuation	No risk
Streamflow regulation	Low risk
Sediment trapping	Low risk
Phosphate assimilation	No risk
Nitrate assimilation	No risk
Toxicant assimilation	No risk
Erosion control	Medium risk
Carbon storage	Low risk

6.6 Nitrogen assimilation

All processes are still functional. The decomposer catalysts are in place to enhance the process. It is an important process for the synthesis of organic matter in the ecosystem. This can be highly affected by introducing fertilizers.

6.7 Agricultural potential assessment.

- Conducting a soil survey and mapping exercise of the viable crop land and citrus land.
- Describe the physical properties of the soils sampled.
- Describe the vegetation communities associated with the site.
- Describe the agricultural potential of the soils identified within the site.
- Describe the land use and capability of the site based on the soil forms identified, slope of the site, climatic data, rockiness, surface crusting and wetness; and
- Provide recommendations for the proposed project.

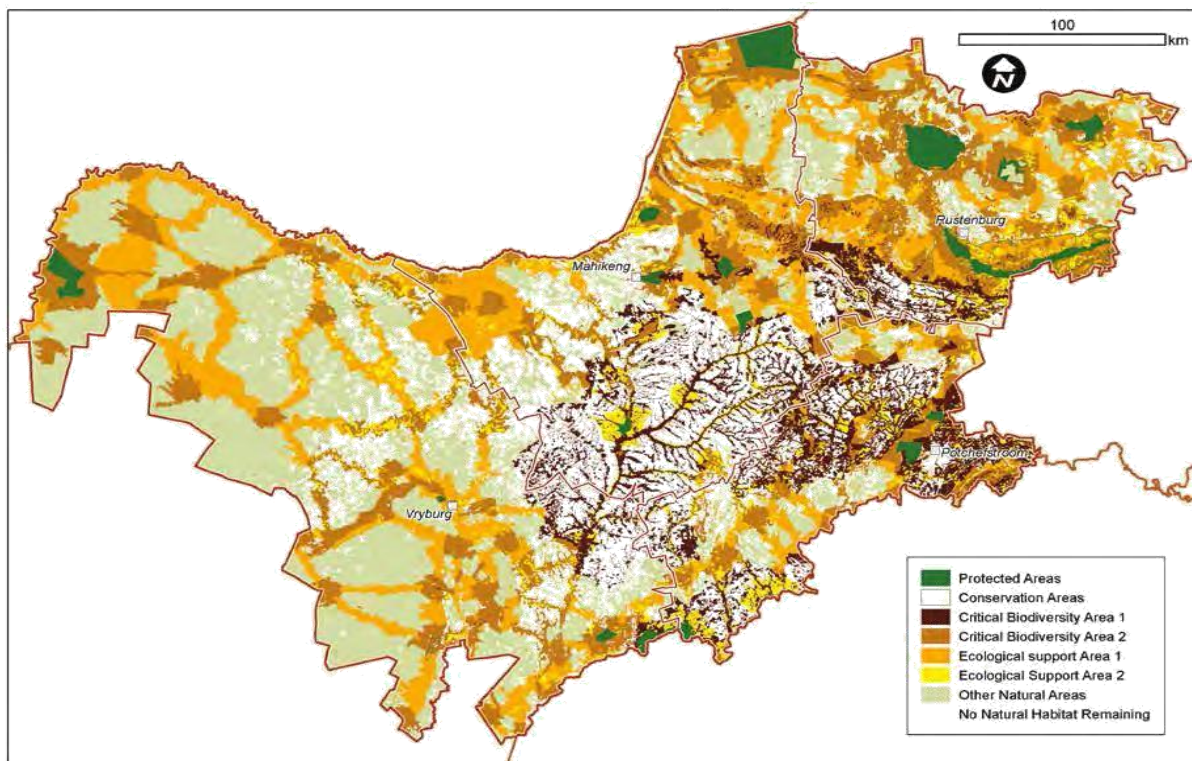
7 Conclusion.

In consideration of the field surveys and investigations undertaken, all the results obtained confirmed the decision to recommend certain zones within the study site that must not be developed and those that can be developed. It is recommended that the area where there is a floodplain must not be developed. It must remain a no-go area that will continue to support ecosystem services (Farm portion 59/436). The catchment along the river must be protected from any development or human activity that will hamper natural resources functionality. Therefore, farm portion 46/436 and 58/436 can be developed on with caution of possible water logging when the ground gets fully recharged.

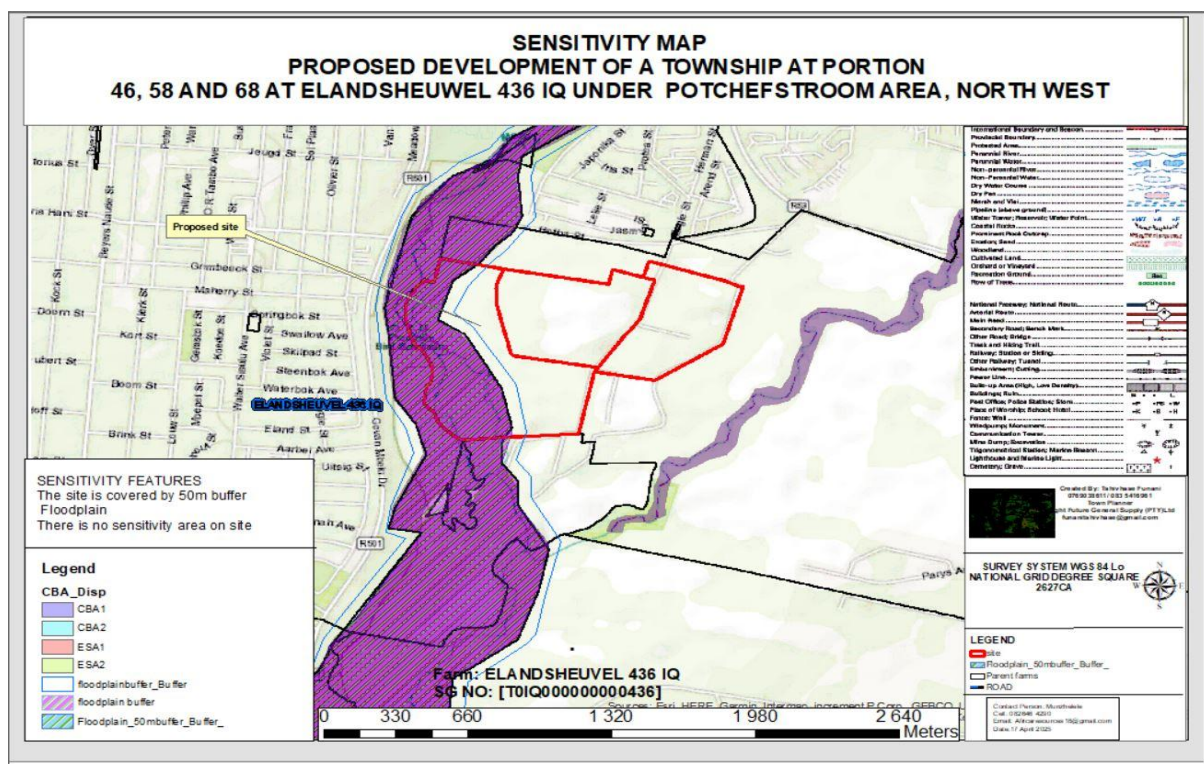
7.1 Recommendations

RECOMMENDATIONS
Recommendation 1
A detailed environmental management plan must be developed by an ecologist for the Municipality and must specify that all no-go areas that are not-go areas must be demarcated on the Municipality Habitat Management Plans.
Recommendation 2
An invasive alien plants management plan must be developed with the assistance of an ecologist. Its implementation must be guided by a qualified ecologist and an authorized pest control person where the herbicide will be used. Implementation of biological control methods can be used as a long-term mechanism to control populations of the species that currently have biological control agents. The bio diversity officers responsible can be contacted from the department of Forestry Fisheries and environment for assistance in the biological control implementation.
Recommendation 3
Environmental education to raise awareness on the value and protection of rivers must be done for local communities and schools for them to understand the importance of floodplains and protecting them.
Recommendation 4
As stated in chapter 3 part four of the National Water Act 36 of 1998, invasive alien plants must be controlled using chemical and mechanical methods. Near permanent wetlands or rivers only manual removal must be used.
Recommendation 5
Surface water hydrological designs must be developed to assist in stormwater management and must be developed by hydrological engineers in consideration of avoiding pollution of flood line areas.
Recommendation 6
Integrated stakeholder engagement must urgently take place as it will assist in coming up with joint measures that will assist in the sustainable use and protection of the catchment and empower local people on the need to protect catchment.

8 Annexure A: Maps and Photos.



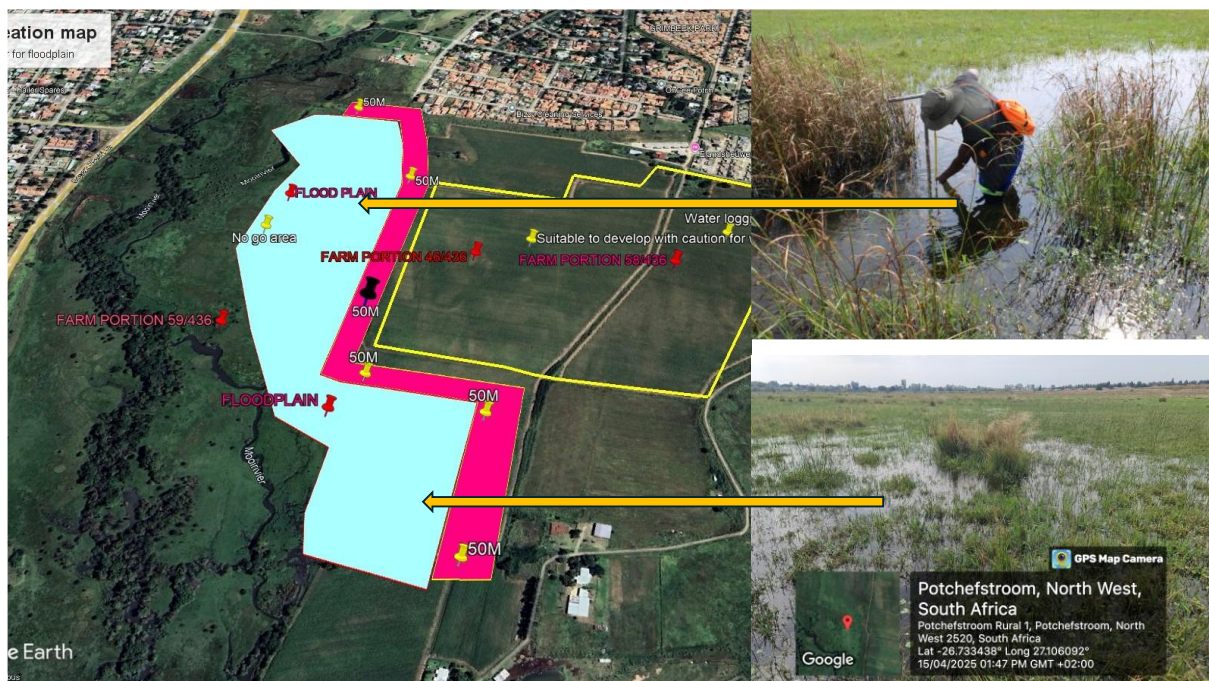
Map 1: Critical biodiversity areas (Northwest biodiversity sector plan).



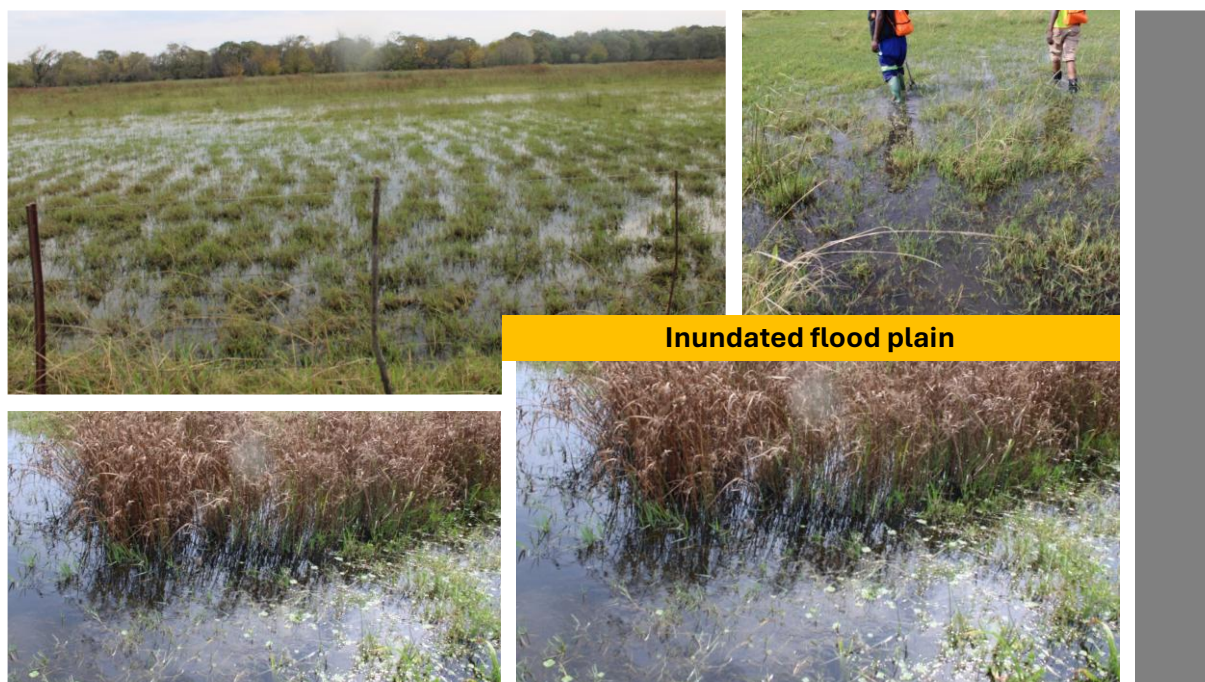
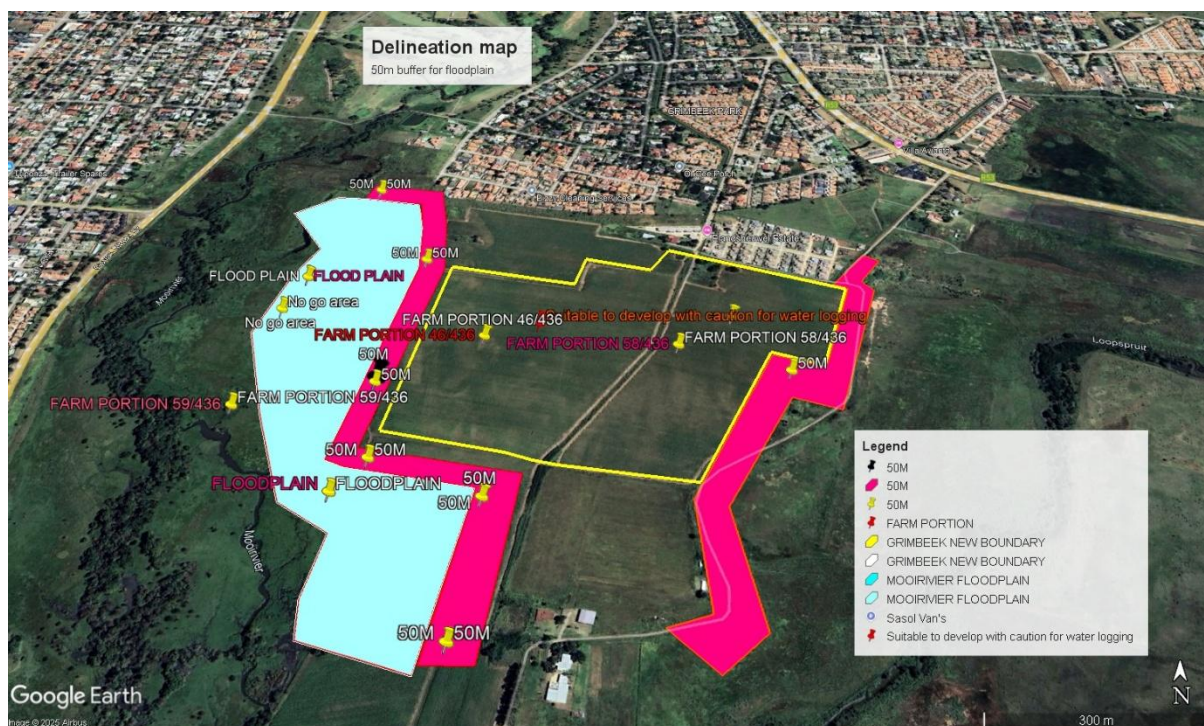
Map 2: Sensitivity map.



Map 3: showing mapped and delineated flood line and buffer.



Map 4: Delineated flood line with referral photos of the actual look.







Grey poplar on western boundary of farm portion 58/436



Soil sampling on flooded zone with non -wetland grasses(*Cynodon dactylon*/Bermuda grass)

Soil type is a rich agricultural dark loamy clay soil



Vegetation view of mixed invasive shrubs and trees on north-eastern corner of farm portion 58/43

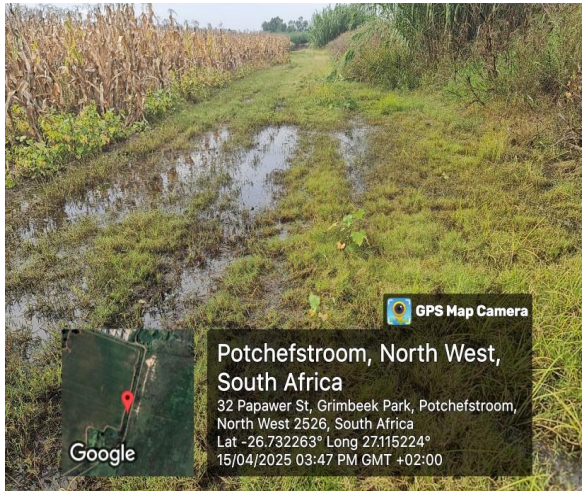


Patches of giant reed on farm portion 58/436



Growing on ridges and channels that separates the farm portions most of which are men made

Water logged farm road on farm portion 58/436 north eastern corner boundary



Flooded area on farm portion 59/436



View of grazed grass
cover on open spaces



Vegetation cover view
south -western corner of
farm portion 59/436

9 References

- Alan S. (2003), *Introducing physical geography*, John Willey and Sons, USA.
- Bromilow C (2010), *Problem plants and alien weeds of South Africa*, Briza, Pretoria South Africa
- Camp K.G. (1999), *the Bio resource Groups of KwaZulu Natal*, Department of Agriculture, Pietermaritzburg.
- Chris and Stuart T (1995) *Mammals of Southern Africa*, Struik, Cape Town South Africa.
- Farina M.P.W. (1981), the hunter system of soil analysis, *Fertilizer Society of South Africa Journal*, 1, 39-41.
- Henderson L. (2001), *Alien weeds and invasive plants*, Paarl Printers, Cape Town.
- Hilton-Taylor, C. (1996) *Red data list of Southern African plants*. National Botanical Institute, Pretoria.
- IUCN (1993), *Draft IUCN Red List Categories*, IUCN Gland, Switzerland.
- Smit N (2008), *Field guide to Acacias of South Africa*, Briza, Pretoria South Africa.
- Van wyk B and Van wyk P (2007), *Field guide to trees of Southern Africa*, Struik, Cape Town South Africa.
- Van wyk E (2002), *a guide to grasses of Southern Africa*, Briza, Pretoria South Africa.
- Fanie and Julye Ann Venter (2002), *making the most of indigenous trees*, Briza, Pretoria South Africa.
- Piet Van Wyk (2008), *field guide to the trees of the Kruger National Park*, struik, Cape Town.
- MacFarlane DM, Kotze DC, Ellery WN, Walters D, Koopman V, Goodman P and Goge C. 2007. *WET-Health: A technique for rapidly assessing wetland health*. WRC Report TT 340/08. Water Research Commission, Pretoria.
- Louis du Preez (2017), *frogs of Southern Africa A Complete Guide*, Struik nature, Cape Town South Africa.
- Nancy J et al (2018), *guidelines for mapping wetlands in South Africa*; SANBI biodiversity series 28; South African National Biodiversity Institute, Pretoria.
- Ollis D.J et al (2013), *classification system for wetlands and other aquatic ecosystems in South Africa*, SANBI series 22, South African National Botanical Institute, Pretoria.

Douglass Macfarlane and Ian Bredin (2017), buffer zone guidelines for wetlands, rivers and estuaries Report No. TT 715/2/17, Water Research Commission, South Africa.

Ian Bredin et al, (2019), a procedure to develop and monitor wetland resource quality objectives; WRC Report No. TT795/19, Water Research Commission, South Africa.

LR Minter et al (2004), Atlas and red data book of the frogs of South Africa, Lesotho and Swaziland, The Smithsonian Institution, and the Avian demography unit. United States of America.

Ernst S et al (2007), Trees and shrubs of Mpumalanga and Kruger National Park, Jacana Media, Johannesburg South Africa.

Kanz W.A., O'Connor T.G., Richardson J., Nel G, Nel, W. The uThukela District Municipality Biodiversity Sector Plan. Unpublished report, Ezemvelo KZN Wildlife, Pietermaritzburg.