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VEGETATION

IMPACT ASSESSMENT:

For the Proposed Construction of a Sewer Reticulation in Ntuzuma B, in the eThekweni Municipality of KwaZulu-Natal.

AUGUST 2020

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- As per the requirements of Section 32 (3) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations 2014 as per Government Notice No. 38282 Government Gazette, 4th December 2014, as amended.
- In accordance with Section 13: General Requirements for Environmental Assessment Practitioners (EAPs) and Specialists as well as per Appendix 6 of GNR 982 - EIA Regulations (2014), as amended and the National Environmental Management Act (NEMA), 1998.
- Independently of influence or prejudice by any parties.

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LIST OF ABBREVIATIONS

ACRONYM	EXPANSION
CBA	CRITICAL BIODIVERSITY AREA
DAFF	DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES
EAP	ENVIRONMENTAL ASSESSMENT PRACTITIONER
ECO	ENVIRONMENTAL COMPLIANCE OFFICER
EIA	ENVIRONMENTAL IMPACT ASSESSMENT
EMPR	ENVIRONMENTAL MANAGEMENT PROGRAMME
GIS	GLOBAL INFORMATION SYSTEMS
GPS	GLOBAL POSITIONING SYSTEM
I&AP	INTERESTED AND AFFECTED PARTY
IAPS	INVASIVE ALIEN PLANT SPECIES
IUCN	INTERNATIONAL UNION FOR CONSERVATION OF NATURE
KM	KILOMETRES
KSEMS	KSEMS ENVIRONMENTAL CONSULTING
KZN	KWAZULU-NATAL
M	METRES
NBA	NATIONAL BIODIVERSITY ASSESSMENT
NEMA	NATIONAL ENVIRONMENTAL MANAGEMENT ACT
NEM:BA	NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT
NEMPAA	NATIONAL ENVIRONMENTAL MANAGEMENT PROTECTED AREAS ACT
NO.	NUMBER
NFA	NATIONAL FOREST ACT
SANBI	SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE
SANRAL	SOUTH AFRICAN NATIONAL ROADS AGENCY
SCC	SPECIES OF CONSERVATION CONCERN
SPP	SPECIES
TSCP	TERRESTRIAL SYSTEMATIC CONSERVATION PLAN
VIA	VEGETATION IMPACT ASSESSMENT

GLOSSARY

TERM	DEFINITION
Artificial	Produced by human beings as opposed to naturally occurring.
Biome	A broad community of plants (flora) and animals (fauna) that occupy a distinct region.
Biophysical	The biological and physical components of the environment.
Conservation status	The conservation status of a species is an indicator of how likely the species is to remain existent at present or in the near future before becoming extinct. The IUCN Red List of Threatened Species provides the conservation status of species in nine categories. <ul style="list-style-type: none"> i. Extinct (EX) ii. Extinct in the Wild (EW)

	<ul style="list-style-type: none"> iii. Critically Endangered (CR) iv. Endangered (EN) v. Vulnerable (VU) vi. Near Threatened (NT) vii. Least Concern (LC) viii. Data Deficient (DD) ix. Not Evaluated (NE)
Critical Biodiversity Area (CBA)	Terrestrial (land) and aquatic (water) areas that are required to have their natural or near-natural state (function and structure) safeguarded to conserve biodiversity and maintain ecosystem functioning. The maps are spatial plans that stipulate biodiversity priority areas that are important for the long-term ecological functioning of ecosystems.
Critically endangered (CR) Ecosystem	Ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation
Degradation	Lowering the quality of the environment and integrity of ecosystems.
Ecosystem	A complex, interconnected system of interacting biotic (flora and fauna) and abiotic (soil, water etc.) components.
Ecosystem goods and services	The benefits people obtain from the natural processes in ecosystems which can be provisioning, regulating, cultural and supporting. The benefits derived from ecosystems are in accordance with the structure and functionality of that ecosystem. Aquatic ecosystems are renowned to provide water supply, flood attenuation and habitat for a range of aquatic biota.
Endangered (EN) Ecosystems	Ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems
Endemic plant species	Plant species that have adapted to a specific set of abiotic factors i.e. habitat and climate, which therefore become restricted to that geographical region and are therefore a common species associated with that region specifically.

Environmental Control Officer (ECO)	An individual appointed to ensure the implementation of the EMPr and ensure environmental management practices are implemented and carried out on site for the duration and following the project.
Environmental Management Programme (EMPr)	Provides an overall environmental framework and guidelines upon which a contractor must carry out their operations throughout the project, from pre-construction through to post construction phases. This includes the activities, potential impacts, responsibilities and mitigation measures.
Erosion	The process by which soil and rock are removed from the Earth's surface by natural processes such as wind or water and then transported to and deposited in other locations.
Habitat	The natural environment in which biota live. Biota are commonly adapted to the physical environment in which they live and changes in the environmental conditions can change the composition of biota (richness and diversity).
Hazardous waste	Substances or a mixture of substances, products or materials that are harmful to people and the environment as stipulated under Section 2(1) of the Hazardous Substance Act No. 15, 1973.
Hydrophytic vegetation	Plant species that are adapted to living in soils that are either periodically or permanently saturated/ inundated and hence are adapted to anoxic conditions.
Indigenous	Animal and plant species that are endemic or native to a certain geographical area.
Invasive Alien Plant Species (IAPS)	Plant species that establish and disperse outside of their natural habitat range and are therefore tolerant of conditions (i.e. droughts) and threaten the naturally occurring species and other habitats in the area.
Mitigation	A practical means of minimising or reducing the impacts of a particular activity on biota and the environment.
Protection	In relation to a water resource, refers to(NWA) (Section 1 1.(1)(xvii), No. 36 of 1998) – (a) maintenance of the quality of the water resource to the extent that the water resource may be used in an ecologically sustainable way; (b) prevention of the degradation of the water resource; and (c) the rehabilitation of the water resource.
Protected Ecosystems	Ecosystems that are of high conservation value or of high

	national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable
Rehabilitation	Refers to the methods and measures of restoring the integrity, functionality and natural characteristics of degraded ecosystems that have mostly been disturbed by anthropogenic activities.
Re-vegetation	The process of reinstating natural vegetation in areas that were disturbed or degraded throughout various phases of the project. It mostly entails planting indigenous plant species.
Species of Conservation Concern (SCC)	Species of high conservation importance in preserving South Africa's high floristic diversity and include species classified as Threatened, Protected, Critically Endangered (CR), Endangered, (EN), Vulnerable (VU), Extinct in the Wild (EW), Regionally Extinct (RE), Near Threatened (NT), Critically Rare, Rare, Declining and Data Deficient - Insufficient Information (DDD).
Terrestrial	Pertains to dry land and is outside the boundaries of aquatic ecosystems.
Threat status	The threatened species are those that fall within the three categories of the IUCN Red List of Threatened Species: <ul style="list-style-type: none"> i. Critically Endangered (CR) ii. Endangered (EN) iii. Vulnerable (VU)
Vulnerable (VU) Ecosystems	Ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems
Watercourse	Refers to: <ul style="list-style-type: none"> i. a river or spring; ii. a natural channel in which water flows regularly or intermittently; iii. a wetland, lake or dam into which, or from which, water flows; and iv. any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse. v. where relevant, a watercourse includes its bed and banks. As referred to in Section 1 (1) (xxiv) of the NWA No. 36 of 1998.

EXECUTIVE SUMMARY

KSEMS Environmental Consulting (KSEMS) were appointed by eThekweni Municipality, to conduct a Vegetation Impact Assessment (VIA) as part of the environmental application process for the proposed construction of the Ntuzuma B Sewage Infrastructure Project, located within Ntuzuma B, in the eThekweni Municipality of KwaZulu-Natal, hereafter referred to as the proposed development.

The proposed site occurs within the Ntuzuma B district of KwaZulu-Natal, overlooking the J section of KwaMashu. The surrounding area is dominated by a mixture of informal settlements and residential houses, only being separated by large drainage lines (rivers) where the construction of houses would be both impractical and unsafe. All slopes within the study area move gradually from north-west to south-east, increasing drastically when traversing any drainage line. The current sewage treatment/ handling technology within the study area are notably outdated, and in many instances non-existent. In most instances, septic tanks and pit latrines are used, which are likely to already pose significant environmental risks and which have contributed to the evident deteriorated ecological status of the area.

It was confirmed at a desktop level that the proposed site does not fall within any protected areas, nor has it been included in the D'MOSS system. However, the proposed site does fall within a Threatened Ecosystem, listed within the Schedule of Threatened Terrestrial Ecosystems in South Africa (promulgated under NEMBA, Government Notice 1002 of 2011). Furthermore, the site was recorded to fall within three (3) of the categories listed within the KwaZulu-Natal Systematic Conservation Plan (2012), namely Critical Biodiversity Area 1, Biodiversity Area and 100% Transformed.

According to Mucina and Rutherford (2006), the proposed development area falls within one (1) vegetation unit, namely KwaZulu-Natal Coastal Belt (CB 3) which is classified as endangered, with approximately 50% of the original extent having already been transformed. No primary vegetation known to be associated with this vegetation unit was identified, but rather has been replaced by Invasive Alien Plant Species (IAPS) and more common grass spaces and therefore the proposed construction is unlikely to affect the conservation targets which may be associated with this vegetation unit. A total of 13 different invasive species were linked to the site, all of which can be found in large numbers throughout the site.

During the assessment, it was identified that the study area currently demonstrates a low plant species diversity (16 indigenous species), with many of the indigenous species being found within gardens and built up areas. However, one (1) protected species was found within the study (*Dietes grandiflora*) which is specifically protected in terms of the Provincial Nature Conservation ordinance of 1974. As these specimens were located within a residential garden, it is unlikely that they will be affected, however caution must be exercised when constructing the pipeline tie-in points to avoid these plants. Should this be unavoidable, a permit must be applied for and issued by Ezemvelo KZN Wildlife, prior to their removal and safe relocation nearby.

Overall the Vegetation Impact Assessment (VIA) impact section concluded that the associated impacts could be maintained at “low”, provided that recommendations and mitigation techniques are followed in their entirety. During the assessment, portions of the site (river channels) were identified as a no-go area. As a result of these findings, the development footprint must avoid direct excavation within a river, unless practically impossible due to the safe design requirements of this development. It is recommended that the Developer maintain as much of the current vegetation cover as possible, to assist in reducing downslope impacts associated with the proposed development (sedimentation, erosion, increase surface water runoff etc.) and that IAPS are carefully managed throughout the construction phase and through to end of the defect liability period.

The VIA concluded from a vegetation perspective, that there were no evident fatal flaws that would prevent this development from being authorised, nor being conducted in a sustainable manner. The overall impact rating would be considered “low” if all of the recommendations and mitigation techniques are implemented in conjunction with appropriate and well monitored rehabilitation efforts. Therefore, the specialist did not object to the development and has identified potential positive impacts that could arise after the decommissioning and rehabilitation phases for this proposed site.

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1. INTRODUCTION

1.1 Background to Vegetation Impact Assessments (VIAs)

Since the start of human settlement, there has been significant loss of, and changes to indigenous vegetation globally. Anthropogenic activities have caused widespread habitat loss, alterations to ecosystem structure and function, climate change, reduced water quality and quantity, changes in the distribution and composition of flora and fauna and species extinction (Wilson et al., 2014). As the human population is projected to grow exponentially, the demand for natural resources will expand beyond the ability of nature to supply those demands. This emphasises the need to protect habitats that provide ecosystem services, carry out ecological processes and support high species diversity and endemic, indigenous and conservative species (Wilson et al., 2014). Land use planning tools, like those set out in the National Development Plan (NDP) 2030 (NDP, 2013), are crucial in ensuring natural resources are utilised and protected in a sustainable manner to enable development whilst ensuring social and ecological well-being is maintained. Legislation such as the National Environmental Management Act, No. 107 of 1998 (NEMA), the National Environmental Management: Biodiversity Act, No. 10 of 2004 (NEM:BA); National Environmental Management Protected Areas Act, No. 57 of 2003 (NEMPA); National Forests Act, No. 84 of 1998 (NFA) and the National Water Act, No. 36 of 1998 (NWA) guide land use and conservation planning. The NEMA requires that an environmental authorisation be issued by a Competent Authority (CA) prior to the commencement of a listed activity in terms of the Environmental Impact Assessment Regulations (2014, as amended), with the purpose of these regulations to avoid negative impacts on the environment or where they cannot be avoided, ensure mitigation and management of the impacts to acceptable levels, while optimising positive environmental impacts.

Vegetation provides an array of Ecosystem Services (ESS) through the provision of food and shelter for many biota, they provide timber, fuelwood and pharmaceuticals, they sequester carbon, play a role in the water cycle through evapotranspiration, provide a canopy for sensitive species below them, they provide surface roughness to reduce splash erosion and regulate the flow of water through their root systems (Daily et al., 1997). The affinity of plant species' to a specific habitat reflects their morphological and physiological traits and adaptations (Coles-Ritchie et al., 2007). Therefore, if we are to understand the habitat requirements and sensitivity of species to land transformations, it requires undertaking VIAs at a landscape level, which can provide protection at an ecosystem level. A landscape approach recognises that almost all ecosystems are modified to some extent by human activities and form an integral part of the landscape, there will be activities / land uses not compatible with biodiversity conservation and therefore identifying impacts, mitigating impacts to as far an extent as possible and offsetting, where necessary, is essential.

Assessments conducted at a landscape level can be extrapolated to an ecosystem level which allows for an integrated and holistic view of interactions between people and the environment. Ecosystems undergo natural variations, however, humans have induced disturbances to the extent that thresholds are surpassed and ecosystem processes, structure and function are altered. Maintaining the ecological structure and function of ecosystems, recognising lag effects and variations over spatial and temporal scales, maintaining and striving towards a balance between sustainable utilisation and protection of ecosystems and their biodiversity are all factors to be taken into account at an ecosystem level.

When carrying out VIAs it is important to take note of the following (DEA, 2011):

- High diversity areas which are divided into two primary components: species richness (the number of species within a community) and species composition (the identity of the species that make up a community);
- High number of endemic and indigenous plant species;
- Relatively natural areas;
- Species of conservation concern;
- Areas under potential threat;
- Tolerance of species to disturbance;
- Successful establishment and survival requirements;
- Conservative versus non-conservative species;
- Areas of cultural, social, economic or environmental importance;
- Areas that are representative of evolutionary processes;
- The ecological processes and ecosystem services that are provided;
- Past, current and potential future land uses in areas, and
- Niches and unique habitats.

1.2 Background to Project

KSEMS Environmental Consulting (KSEMS) were appointed by the eThekweni Municipality, to conduct a Vegetation Impact Assessment (VIA) as part of the environmental application process for the proposed construction of the Ntuzuma B Sewage Infrastructure Project, located within Ntuzuma B, in the eThekweni Municipality of KwaZulu-Natal, hereafter referred to as the proposed development (Figure 1 below).

The proposed project will be to construct and install a sewer reticulation system within various pockets of Ntuzuma B (Ward 38, 41 and 45). The proposed pipeline system will have an approximate length of 13 kilometres (KM) with a total diameter of 160mm which will be positioned near potential clients and will involve tie-in points to each household which is to be serviced.

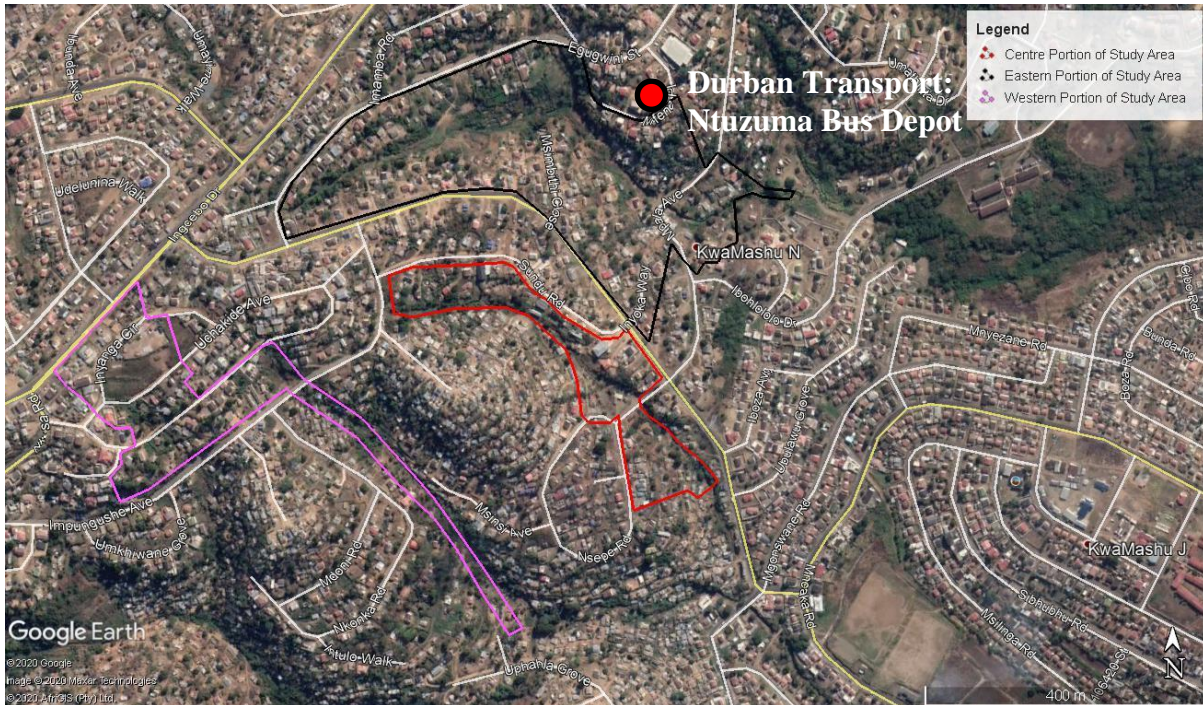


Figure 1: Locality map of the proposed study area (Google Earth, 2020)

1.3 Scope of Work

The VIA was undertaken to:

- Identify the national conservation and threat status of the vegetation units.
- Determine threatened species and species of conservation concern at a regional and national scale.
- Determine conservation priority areas according to authorised Critical Biodiversity Areas (CBAs).
- Identify and list plant species with specific habitat preferences (i.e. distribution, likelihood of occurrence, sensitivity and likelihood of being at risk) and those that require rescue and relocation.
- Identify areas/habitats that will be significantly impacted upon (ecological footprint) by the proposed development with a description of the manner in which they will be impacted upon, including the direct, indirect and cumulative impacts.
- Distinguish between and record indigenous and Invasive and Alien Plant Species (IAPS).
- Identify and assess the potential impacts associated with a proposed development.
- Determine, according to professional judgement, the likelihood of occurrence, nature, magnitude, extent and duration of potentially significant impacts.
- Recommend mitigation measures to minimise or eliminate potential negative impacts and enhance potential positive impacts.
- Apply the precautionary principle in the assessment of impacts where there is major uncertainty, low levels of confidence in predictions and poor data or information.
- Provide a revised significance rating of assessed impacts after the implementation of mitigation measures.

- Recommend an appropriate, site specific monitoring and review programme to ensure the effective implementation of proposed mitigation measures.
- Recommend buffer zones from sensitive vegetation units based on functionality.

2. METHODOLOGY

The Scope of Work is in accordance with the specific Terms of Reference supplied by KSEMS and required a two-phased approach as described below:

2.1 Phase 1: Initial Screening Assessment

This phase is carried out at a desktop level prior to entering the proposed development site. Table 1 below provides a list of literature utilised to gain background information on the study area.

Table 1: Data utilised and its applicability to the proposed development.

LITERATURE	SOURCE	APPLICATION TO PROPOSED DEVELOPMENT
KwaZulu-Natal vegetation type description.	Scott-Shaw and Escott (2011).	This literature coincided with the SANBI biomes and vegetation communities dataset. This document was consulted on a desktop level and its applicability confirmed through the use of a detailed floristic field survey of the study area. This was consulted with other vegetation impact assessments carried out in the area and province.
Vegetation of South Africa, Lesotho and Mpumalanga.	Mucina and Rutherford (2012).	This literature elaborated on the biomes and vegetation communities identified within the study area on a desktop level using the SANBI vegetation dataset. The literature provided details on the topography, climate, geology, distribution/locality and list of biologically important and endemic taxa in relation to each plant community.
Alien and Invasive Species Lists in National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004).	Department of Environmental Affairs (DEA) (2016).	Legislation was consulted for invasive and alien plant species identified within the study area. The category assigned to each alien and invasive plant species dictated their legislative requirements.
South African National Spatial Biodiversity Assessment 2004 Summary Report	Driver et al. (2005) and Driver et al. (2017)	Status of ecosystems in South Africa, protected ecosystems, land use and conservation targets.

GNR 982, 983, 984 and 985 Government Gazette No. 38282 EIA Regulations promulgated in terms of the NEMA (No. 107 of 1998).	RSA (2014)	Provides a list of the triggering activities and procedures for acquiring environmental authorisation
List of protected tree species in the National Forests Act (NFA), 1998 (No. 84 of 1998).	Department of Agriculture, Forestry and Fisheries (DAFF) (2017).	Protected tree species within the study area.
National Environmental Management: Biodiversity Act (NEM: BA) (Act No. 10 of 2004), as amended 2014.	Republic of South Africa (RSA) (2004).	Protected plant species within the study area.
National list of ecosystems that are threatened and in need of protection in NEMA, 2004 (Act No. 10 of 2004) as amended 2014.	DEA (2011).	National list of ecosystems that are threatened and in need of protection.
National Environmental Management Protected Areas Act (NEM: PAA), 2003 (No. 57 of 2003) as amended 2014.	RSA (2004).	Protected areas falling within the study area.
National Biodiversity Assessment (NBA) 2011: Synthesis Report, An assessment of South Africa's biodiversity and ecosystems.	Driver et al. (2012).	Biodiversity priority areas, threatened ecosystems and vegetation units across South Africa.
KwaZulu-Natal Biodiversity Sector Plan (2014)	South African National Biodiversity institute (SANBI) (2014).	Determine terrestrial and aquatic CBAs that contain threatened ecosystems, ecological corridors, special habitats, wetlands and priority sub-catchments that will guide bioregional planning.
Google Earth Pro™ Imagery	Google Earth Pro™	Up-to-date satellite imagery of the proposed development, area (size) determination, desktop watershed determination, desktop identification of catchment, altitude and slope, and HGM impacts.
South African Vegetation Map	Mucina and Rutherford (2006 and 2012).	Determine the national vegetation type that falls within the study area.
Quarter Degree Square	SANBI (2018)	Provide a record of plant species previously identified within specific square grids and

		plant species likely to occur in areas given their habitat requirements.
National Biodiversity Assessment (NBA) Threatened Ecosystems	SANBI (2011).	Determine the national threat status of the terrestrial.
Threatened Terrestrial Ecosystems in South Africa	SANBI (2011).	This, in addition to the NEM: BA Government Gazette (No. 34809 of 2011) provided a national list of ecosystems that are threatened and legislated to require protection.
International Union for Conservation of Nature (IUCN) Red List of Threatened Species	IUCN (2018).	The Red List database provided a list of threatened and/or protected plant species and species of conservation concern that required protection within the study area.
Red List of South African Plants	SANBI (2012).	The Red List database provided a list of threatened and/or protected plant species and species of conservation concern that required protection within the study area.

2.1.1. Buffers

To date, there is no legislative buffer for vegetation specifically, but there are a number of determinants that need to be considered when factoring the size of map buffers and these include:

- The rainfall intensity of the area;
- The erodibility of the soils;
- The topography in terms of slope and/or rocky terrains;
- The status of the item buffered in terms of its need for protection, its sensitivity or its tolerance i.e. wetlands are ecosystems of high sensitivity that therefore require high protection;
- Land use in terms of hardened surfaces; and
- The severity of the impact such that larger impacts have larger buffers.

For this study, no buffers were recommended over-and-above those mentioned in the Wetland Assessment Report (KSEMS, 2020).

2.1.2. Criteria for Conservation Status of Ecosystems

Vegetation units may be classified according to their conservation status, that is determined or assessed according to their degree of transformation relative to the expected extent of each vegetation type. The conservation status is therefore the percentage of natural habitat that remains in that vegetation unit. The vegetation units within this report were categorised (conservation status)

according to the NEM:BA National List of Threatened Ecosystems Gazette (Notice 1477 of 2009) in Table 2.

Whilst the abovementioned is the Criteria utilised in Environmental Legislation, the IUCN Red List of Ecosystems criterion may also be utilised to determine the conservation status of ecosystems. Refer to the IUCN website (<https://www.iucnredlist.org>) for further reading.

Table 2: Criteria used to identify threatened terrestrial ecosystems, with thresholds for Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) ecosystems.

Criterion	CR	EN	VU
A1: Irreversible loss of natural habitat	Remaining natural habitat ≤ biodiversity target	Remaining natural habitat ≤ (biodiversity target + 15 %)	Remaining natural habitat ≤ 60 % of original area of ecosystem
A2: Ecosystem degradation and loss of integrity *	≥ 60 % of ecosystem significantly degraded	≥ 40 % of ecosystem significantly degraded	≥ 20 % of ecosystem significantly degraded
B: Rate of loss of natural habitat **			
C: Limited extent and imminent threat *	**	Ecosystem extent ≤ 3000 ha, and imminent threat	Ecosystem extent ≤ 6000 ha, and imminent threat
D1: Threatened plant species associations	≥ 80 threatened Red Data List plant species	≥ 60 threatened Red Data List species	≥ 40 threatened Red Data List plant species
D2: Threatened animal species associations			
E: Fragmentation **			
F: Priority areas for meeting explicit biodiversity targets as defined in a systematic biodiversity plan	Very high irreplaceability and high threat	Very high irreplaceability and medium threat	Very high irreplaceability and low threat
<p>* Because of data constraints, Criteria A2 and C have been applied to forests but not to other vegetation types.</p> <p>** Because of data constraints, Criteria B and D2 are dormant at this stage and thresholds have not been set for these criteria. Further testing of Criterion E is needed to determine whether it is a workable criterion for terrestrial ecosystems.</p>			

2.2. Phase 2: Vegetation In-field Survey

- One (1) site visit was conducted on the 06 August 2020. The site visit was conducted on foot to identify and record the dominant plant species within each plant community on site.

- IAPS within each plant community were recorded.
- Protected and/or threatened plant species for each plant community were recorded and their location marked using the Global Positioning System (GPS).
- Species of Conservation Concern (SCC) for each plant community were recorded.
- All identified plant species found in within the study area were cross-referenced with the IUCN list of threatened species, the IAPS lists, and relevant legislation on protected plant and tree species.

2.2.1. Data Collection

A walkover field survey technique was used to verify the presence or absence of species predicted to occur on the site and record any protected species which may occur within the development footprint. This technique was used, and the entire site was ground-truthed in order for protected and (Species of Conservation Concern (SCC) to be identified, recorded and recommendations provided within the report.

2.2.2. Vegetation Impact Ratings

The objective of impact assessments is to identify and assess all impacts that may potentially arise as a result of undertaking activities associated with the proposed development. The significance of potential impacts will guide local authorities on whether the activity should commence i.e. be authorised, whether it will be subject to the mitigation measures implemented or if it will be denied given the large irreversible potential impact it may have on the environment.

Environmental Impact Assessments (EIAs) are conducted to analyze and predict the nature, extent, duration, magnitude and likelihood of significant impacts on the environment, as a result of the proposed development. Assessing the condition of the environment at an ecosystem level may more effectively represent biological diversity as a whole, than with individual species. Furthermore, the decline in ecosystem status may be more apparent than extinctions of individual species and are less time consuming than assessing communities and species individually.

The below methodology is in accordance with the EIA Regulations (2014, as amended), as well as Chapter 3 (i and j) of the NEMA 1998 (No. 107 of 1998 as amended in 2014), which stipulates the following:

- (i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including-
 - i. a description of all environmental issues and risks that were identified during the environmental impact assessment process; and
 - ii. an assessment of the significance of each issue and risk and an indication of the extent to

which the issue and risk could be avoided or addressed by the adoption of mitigation measures.

- (j) an assessment of each identified potentially significant impact and risk, including-
- i. cumulative impacts;
 - ii. the nature, significance and consequences of the impact and risk;
 - iii. the extent and duration of the impact and risk;
 - iv. the probability of the impact and risk occurring;
 - v. the degree to which the impact and risk can be reversed;
 - vi. the degree to which the impact and risk may cause irreplaceable loss of resources; and
 - vii. the degree to which the impact and risk can be mitigated.

Table 3 below provides a description of the terms/ criteria used in describing impacts.

Table 3: Category of impacts and their description (DEA, 2014).

TERM	DEFINITION
Cumulative	Impacts that are a result of combined previous and current impacts and takes into account foreseeable future impacts.
Direct	Impacts that is strongly associated with an activity such that the impact occurs either at the same time (simultaneously) or directly after the activity is carried out.
Indirect	Impacts that occur as a result of an activity rather than in conjunction with an activity. These are often off site impacts due to cascading effects.

Potential impacts were assigned a significance value according to the following equation:

$$\text{Significance} = (\text{Magnitude} + \text{Duration} + \text{Extent}) \times \text{Probability.}$$

These factors/components were scored according to Table 4 below with a maximum total significance score of 100 being attainable.

Table 4: Criteria used in deriving significance impacts ratings (DEA, 2014).

COMPONENT	DEFINITION AND SCORING SYSTEM	
Magnitude	The intensity or size of the impact:	
	- Small: No visual effects.	0
	- Minor: Impact on processes.	2
	- Low: Minimal effect on ecological processes	4

	- Medium/Moderate: The environment is altered but is able to perform ecological processes in a modified state, despite being negatively affected.	6
	- High: The ecological processes are altered such that they cease due to drastic changes to the structure and function of systems.	8
	- Very high: The ecological processes severely altered and complete destruction of patterns and permanent cessation of processes.	10
Duration	The temporal scale/predicted lifetime of the impact:	
	- Very short term: 0 - 1 years.	1
	- Short term: 2 - 5 years.	2
	- Medium term: 5 -15 years.	3
	- Long term: > 15 years.	4
	- Permanent: Will persist indefinitely unless mitigated.	5
Extent	The spatial scale of the impact:	
	- Specific to site of impact.	1
	- Local scale: Immediate surroundings.	2
	- Regional scale: Province related scale.	3
	- National: Specific to country.	4
	- International: World wide/global.	5
Probability	The likelihood of the impact occurring:	
	- Very improbable: Possibility that will likely never occur.	1
	- Improbable: Some low possibility of occurrence.	2
	- Probable: Distinct possibility.	3
	- Highly probable: Most likely to occur.	4
	- Definite: Impact will occur regardless of any prevention measures.	5

3. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are relevant to this VIA:

- No method statements were provided to the specialist at the time of this reports compilation.
- It has been assumed that no pump stations will be required and that the pipeline will be gravity fed.
- No accurate Geo-referenced Shapefiles, or KMZ files were provided to the specialist. The proposed study area was provided by the client in PDF form and therefore all maps are interpretations of the proposed study area, which may be exaggerated.
- No proposed site camp or laydown areas were provided to the specialist at the time of the assessment. It has been assumed that the applicant will use an existing site nearby, and that no additional vegetation / habitat will need to be cleared.
- It is assumed that the pipeline will be sunk and not aboveground.

- Seasonal variations may pose a limit to certain, more cryptic and rare species that may be found within the study area. However, as the study was conducted near the end of winter an additional assessment is likely to not be required for this site.
- The SANBI (2019) Plants of Southern Africa (POSA) was consulted for plant species historically recorded within the quarter degree squares T2930DB. These plant species may not have been identified during the infield site assessment but may appear in the area over a temporal scale and this must be noted, particularly any SCC.
- Temporal variations in conditions (i.e. soil wetness, human disturbance) can alter the composition of plant species identified at the time of study. In this instance, plant species with a high ecological conservatism will have low tolerances to disturbance and will be the first to disappear compared to species with lower ecological conservatism values that will be more tolerant. Therefore, should temporal variations occur, the species recorded over a different time frame may differ. Further to this, species that are harvested and/or foraged by livestock may cause them to disappear over time.
- The vegetation units identified on a desktop level will differ to those observed and identified in the field, this is attributed to land transformation and due to the scale of the vector data utilised when mapping.
- The assessment of potential impacts and their significance was based on the professional judgement of the specialists, the desktop analysis and results obtained from the fieldwork conducted.
- Plant species display a range of morphological and physiological attributes that determine their growth, reproduction and survival. It is therefore unlikely that all plant species identified on site will remain the same over temporal and spatial scales.
- To accurately record the plant species on site, long-term field assessments would have to be conducted to consider seasonal and temporal variations and provide more accuracy.
- The assessment of impacts and recommendation of mitigation measures were informed by the site-specific issues identified during the infield survey and based on the specialist's knowledge and experience in the study area.
- The list of threatened ecosystems and their conservation status and list of protected plant and tree species were acquired from the latest legislations and assessments carried out to date.
- Maps used to demonstrate the vegetation units were acquired from Mucina and Rutherford (2012). This is not an accurate representation of the land cover area boundaries as over time the land use will cause changes to the area in terms of land degradation and transformation.
- The potential impacts on vegetation were identified on a broad level. It is important to note that different plant species will respond differently to stressors/disturbances and this is further influenced by the nature, intensity and length to exposure the plant had to a particular

disturbance. Impacts were therefore applicable to vegetation on a community and habitat level and not specific to plant species level.

4. APPLICABLE LEGISLATION & POLICIES

Relevant legislation has been put in place to ensure the protection of ecological processes, natural resources, important habitats and biodiversity against anthropogenic activities, which result in the disturbance, degradation and/or destruction of ecosystems. The study was undertaken in accordance with the guidelines provided in the Guidelines Document: EIA Regulations (DEAT, 1998) and the NEMA principles in addition to the legislation provided in Table 4 to provide a holistic framework to guide decision-making on future developments, ensuring the protection and conservation of threatened ecosystems, whilst taking into account the interconnectedness of society and the environment. The following legislation, outlined in Table 5 below, has been deemed applicable to the proposed development.

Table 5: Legislation deemed applicable to the proposed development.

LEGISLATION	APPLICATION TO PROPOSED DEVELOPMENT
DEA, 1998: NEMA (No. 107 of 1998) as amended, 2014 & Government Gazette (No. 37713 of 2014)	Sustainable development requires the consideration of all relevant factors including the following: (i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; (ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; (v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource; (vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and (viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.
DEA, 2004: NEM:BA (No. 10 of 2004) as amended, 2014.	Identification of various protected and endangered plant species which may occur in the study area. Government Gazette (No. 34809 of 2011) provides a national list of ecosystems that are threatened and in need of protection. Government Gazette (No. No. 29657 of 2007) provides a list of critically endangered, endangered, vulnerable and protected species. Government Gazette (No. 26436, Notice No. 700 of 2014) provides alien and invasive species regulations in terms of categories, potential eradication and control techniques and the requirements for the application of permits. Government Gazette (No. 37886, Notice No. 599 of 2014) provides a list of invasive and alien plant species In addition to this, guidelines for monitoring, control and eradication plans as required by Section 76 of the NEM:BA (No. 10 of 2004) for species listed as invasive in terms of Section 70 of this Act Government Gazette (No. 529, Notice No. 40889 of 2017) amendments to appendices i and ii to time convention on international trade in endangered species of wild fauna and flora (cites) regulations.

LEGISLATION	APPLICATION TO PROPOSED DEVELOPMENT
DEA, 2003: National Environmental Management: Protected Areas Act, 2003 (No 57, of 2003) as amended 2014.	The Act seeks to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes.
KwaZulu-Natal Nature Conservation Ordinance No. 15 of 1974	This is the relevant statute in KwaZulu-Natal, which aims to manage the removal and destruction of rare and endangered species. Whilst this ordinance is in need of an update, it provides specialists with a basic tool to highlight both protected and specifically protected species which will require permits to remove or destroy.
National Veld and Forest Fire Act, 1998 (No. 101 of 1998).	This is the primary legislation governing the fires. Fire is used as a biodiversity management tool and control of excessive fires is important for the management of protected areas.

The VIA was undertaken in accordance with the guidelines provided in Section 13 (1) and Appendix 6 of the NEMA, 1998 (No. 107 of 1998) (as amended in 2014), EIA Regulations 2014 (as amended in 2017) and Sections 17(b) and 34 of the Government Gazette No. 33306 (June, 2010).

5. DESKTOP ASSESSMENT

5.1 National and Provincial Conservation Planning

During this assessment not only KZN ESA datasets were consulted, but also datasets which demonstrate ecological corridors, indigenous forest patches and protected areas (both informal and those maintained by the Department of Environment, Forestry and Fisheries (DEFF) Figure 1 below provides an illustration of the proposed site, superimposed on the aforementioned datasets.

The KwaZulu-Natal Systematic Conservation Plan (KZNSCP, 2012) planning product highlights the key priority area for biodiversity conservation, as reflected against a uniformed biome (e.g. freshwater and terrestrial biomes). The purpose of this conservation plan is to facilitate sustainable development within the KwaZulu-Natal Province and guide land-use planning for current and future developments.

Table 6: Explanation of C-Plan categories demonstrated in Figure 2 below (KZN, 2012)

CBA 1 (Mandatory)	The CBA1 designated planning units contain one or more features within an irreplaceability = 1. This means that there are no other localities which we have been able to identify as alternates to try a meet the conservation target for this feature(s). The distribution of this/these features is not always applicable to the entire extent of the PU however (except in the case of certain grassland vegetation types), but is more often than not confined to a specific niche habitat e.g. a forest or wetland. Should this be the case, and special mitigation
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	<p>measures would have to be considered to safeguard this feature is put in place, then the potential for development (dependant on its nature of course) could be permitted in the area. Obviously this is dependent on a site by site, case by case basis. This distribution dynamic outlined above are the same for all 3 CBA's indicated in the MINSET.</p>
CBA 2 (Mandatory)	<p>CBA2 indicate the presence of one (or more) features with a very high irreplaceability score. In practical terms, this means that there are alternate sites within which the targets can be met, but there aren't many. This site was chosen because it represents the most optimal area for choice in the systematic planning process, meeting both the target goals for the features concerned, as well as a number of other guiding criteria such as high agricultural potential area avoidance, falls within a macro-ecological corridor etc. Whilst the targets could be met elsewhere, the revised reserve design (derived through MINSET) would more often than not be slightly more 'land-hungry' in an effort to meet its conservation objectives. The scarcity of the Biodiversity features contained within is, however, still primary driver for this PU's selection in MINSET.</p>
CBA 3 (Optimal)	<p>CBA3 indicate the presence of one (or more) features with a low irreplaceability score. Derived in the same way as outlined for CBA2 described above, the determination vision of these PU's is driven primarily by the guiding layers. The areas not highlighted in MINSET ARE NOT OPEN for wholesale development. Important species are still located within them and should be accounted for in the EIA process. They are not highlighted as the MINSET highlights the 'choice' areas from a biodiversity point of view only. Should one or more of the CBA2 and CBA3 sites be utilised for development, it is obvious that the target for whatever feature(s) where located within that PU will no longer be met. Ideally, MINSET would have to be re-run to calculate the next optimal solution, the new PUs being 'extracted' from the currently blank/un-defined areas.</p>
Biodiversity Areas	<p>The areas not highlighted in MINSET ARE NOT OPEN for wholesale development. Important species are still located within them and should be accounted for in the EIA process. They are not highlighted as the MINSET highlights the 'choice' areas from a biodiversity point of view only. Should one or more of the CBA2 and CBA3 sites be utilised for development, it is obvious that the target for whatever feature(s) where located within that PU will no longer be met. Ideally, MINSET would have to be re-run to calculate the next optimal solution, the new PUs being 'extracted' from the currently blank/un-defined areas.</p>

As demonstrated in Figure 2 below, the study area falls within three (3) terrestrial c-plan categories, namely Biodiversity Area, 100% Transformed and Critical Biodiversity Area 1. Although a large portion of the study area falls within an area which is classified as a CBA 1, it is the specialist opinion that most, if not all this area has been 100% transformed, and that it is highly unlikely that the installation of a sewerage pipeline within these areas would jeopardise the conservation priorities for this area.

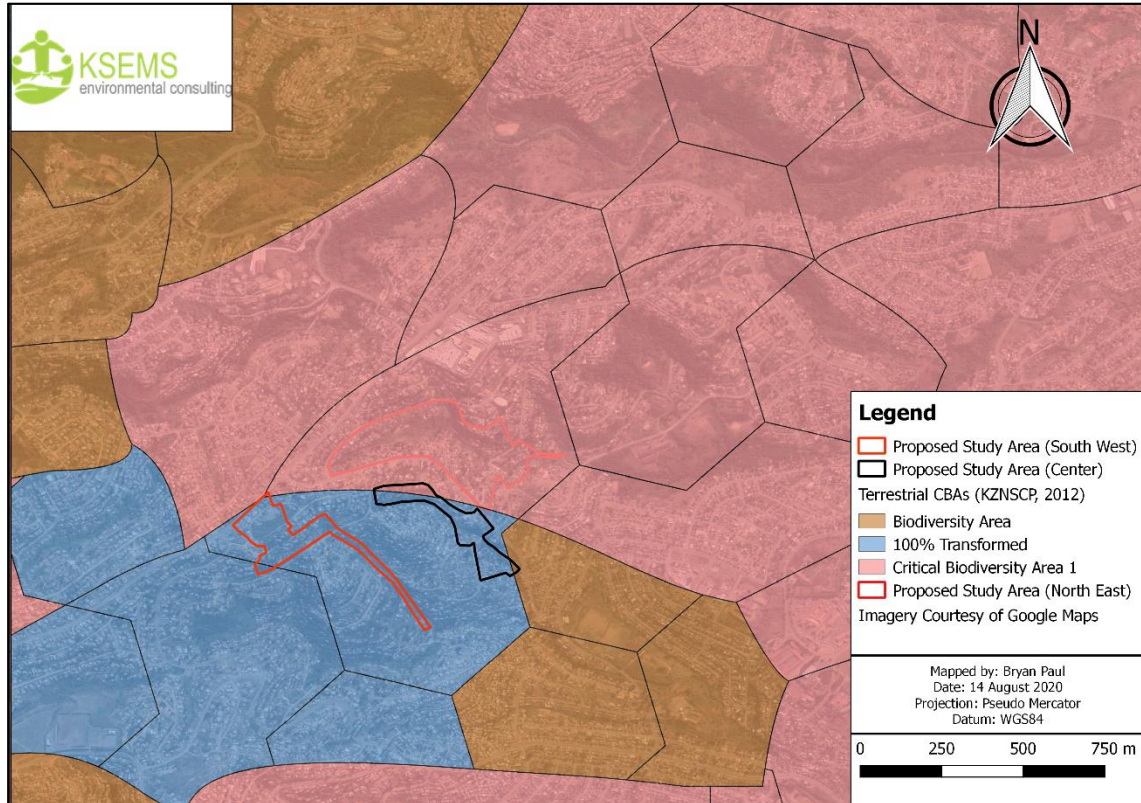


Figure 2: Map illustrating the Terrestrial Systematic Conservation Planning Units that are relevant to the study area (KZNSCP, 2012).

Accordingly, no formally protected areas included in the National Management: Protected Areas Act (Act 57 of 2003), as listed in the Register of Protected Areas (PAR, 2020) were found within close proximity to the site (<10km).

The National Environmental Management: Biodiversity Act (Act 10 of 2004) lists Threatened or Protected Ecosystems, in one of four categories:

- Critically Endangered (CR);
- Endangered (EN);
- Vulnerable (VU); or
- Protected.

The main purpose of listing Threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of Threatened Ecosystems.

There are four main types of implications of listed ecosystems on developments:

- Planning related implications, linked to the requirement in NEMBA for listed ecosystems to be taken into account in municipal IDPs and SDFs;
- Environmental authorisation implications, especially in terms of NEMA and EIA regulations;
- Monitoring and reporting implications, in terms of NEMBA; and
- Proactive management implications, in terms of NEMBA.

According to the 'Schedule of Threatened Terrestrial Ecosystems in South Africa' (promulgated under NEMBA, Government Notice 1002 of 2011), and Figure 3 below, the project area occurs within a Threatened Ecosystem classified as Critically Endangered (Durban Metropole North Coast Grassland). The criterion for categorisation of this area was based on A1 (pertaining to the irreversible loss of natural habitat and the degradation of the structure, composition and function). Criterion A1 indicated that the remaining natural habitat is less than or equal to 60% of the original extent of the ecosystem. This threshold indicated a loss of ecosystem functioning. As such the remaining habitat has a high irreplaceability and a high biodiversity threat status.

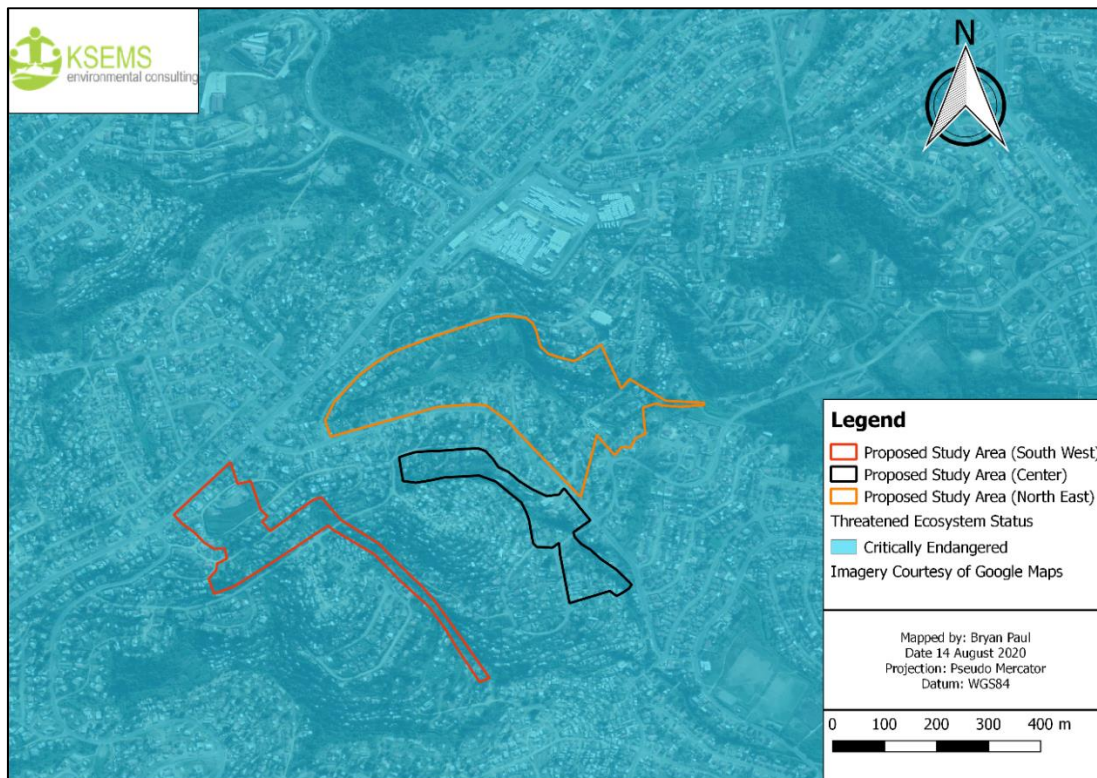


Figure 3: Illustration of the Threatened Ecosystems associated with the proposed study area

5.2 Local Setting and Description of the Benchmark Attributes of the Study Area

The proposed site occurs within the Ntuzuma B district of KwaZulu-Natal, overlooking the J section of KwaMashu. The surrounding area is dominated by a mixture of informal settlements and residential houses, only separated by large drainage lines (rivers) where the construction of houses would be both impractical and unsafe. All slopes within the study area move gradually from north-west to south-east, increasing drastically when traversing any drainage line. The current sewage treatment/ handling technology within the study area are notably outdated, and in many instances non-existent. In most instances septic tanks and pit latrines are used, and which are likely to already pose significant environmental risks and have contributed to the evident deteriorated ecological status of the area.

The following is a list of the benchmark physical attributes existing on, and in close proximity to, the site:

1. Existing informal sanitation systems (pit latrines);
2. Existing sanitation systems (septic tanks);
3. Densely distributed houses and informal settlements;
4. Riparian systems (approximately four);
5. Existing access roads and pathways exist throughout the study area; and
6. An existing site camp is situated within proposed study area.

The Geographic Positioning System (GPS) co-ordinates of the proposed site, assessed in this report is illustrated in Table 7 below.

Table 7: Centre Points for each section of the proposed study area

Description	Centre Point Coordinates	
Centre Point of the Centre Portion	29°44'36.71"S	30°57'20.89"E
Centre Point of the Western Portion	29°44'39.83"S	30°57'3.00"E
Centre Point of the Eastern Portion	29°44'28.19"S	30°57'20.89"E

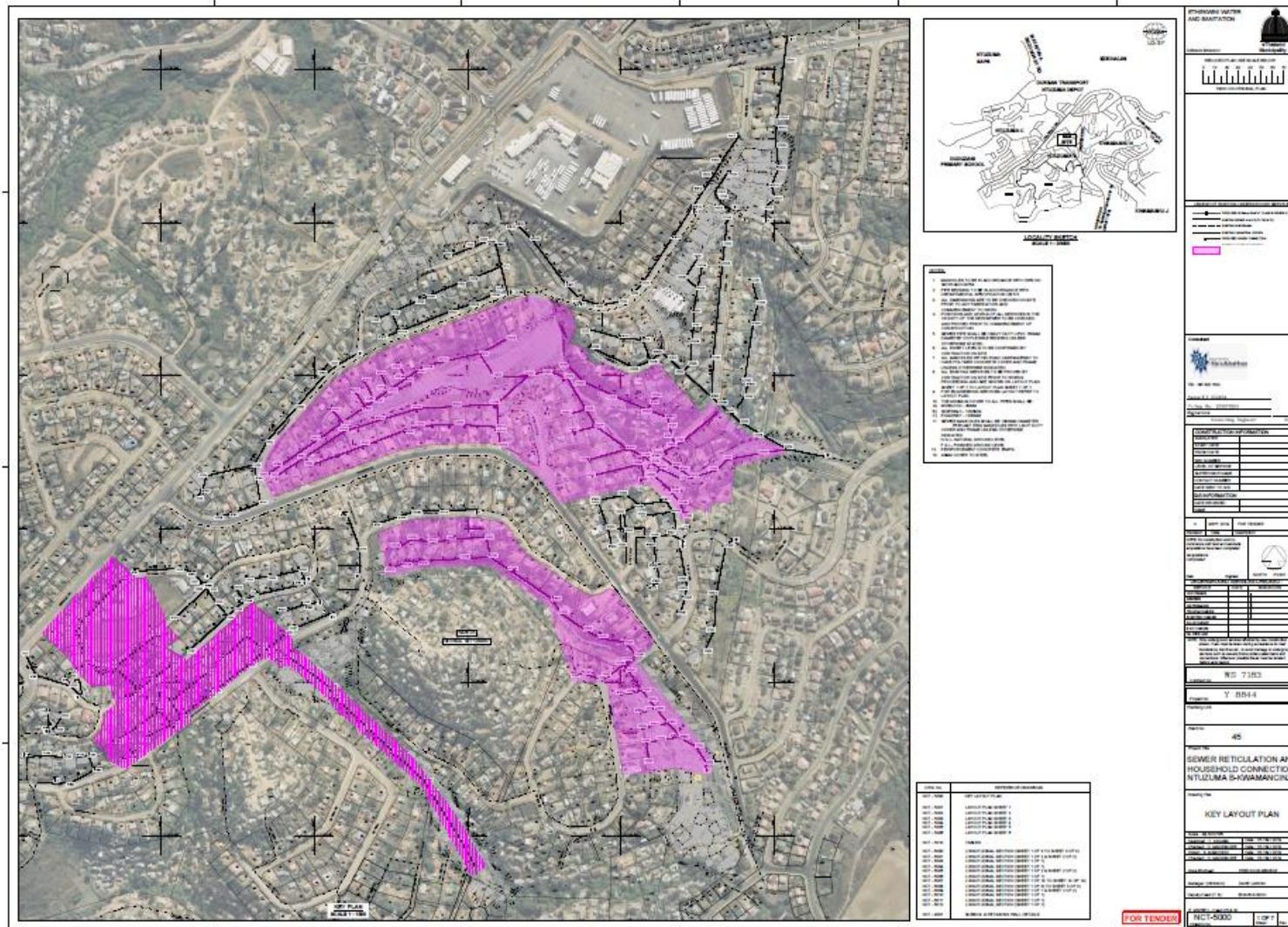


Figure 4: Aerial image of the proposed development (purple - study area; black lines – proposed sewer reticulation).

5.2.1 Vegetation Units

Plant species are often affiliated to specific habitats based on their morphological and physiological traits (Coles-Ritchie et al., 2007). Hence, spatial and temporal variability of habitats is often represented in changes to vegetation. The National Vegetation Map of South Africa (VEGMAP), developed by Mucina and Rutherford (2012), is a geographical classification of plant communities across South Africa that is constantly updated to keep record of changes to the boundaries of vegetation units and their threat status, which is often determined by land use.

Only one (1) vegetation unit was identified at a desktop level, namely KwaZulu-Natal Coastal Belt Grassland (CB 3). According to Mucina and Rutherford (2006) this vegetation unit is distributed in long broad coastal strips along the KwaZulu-Natal coast, from Mtunzini in the north, through Durban to Margate and just short of Port of Edward in the south.

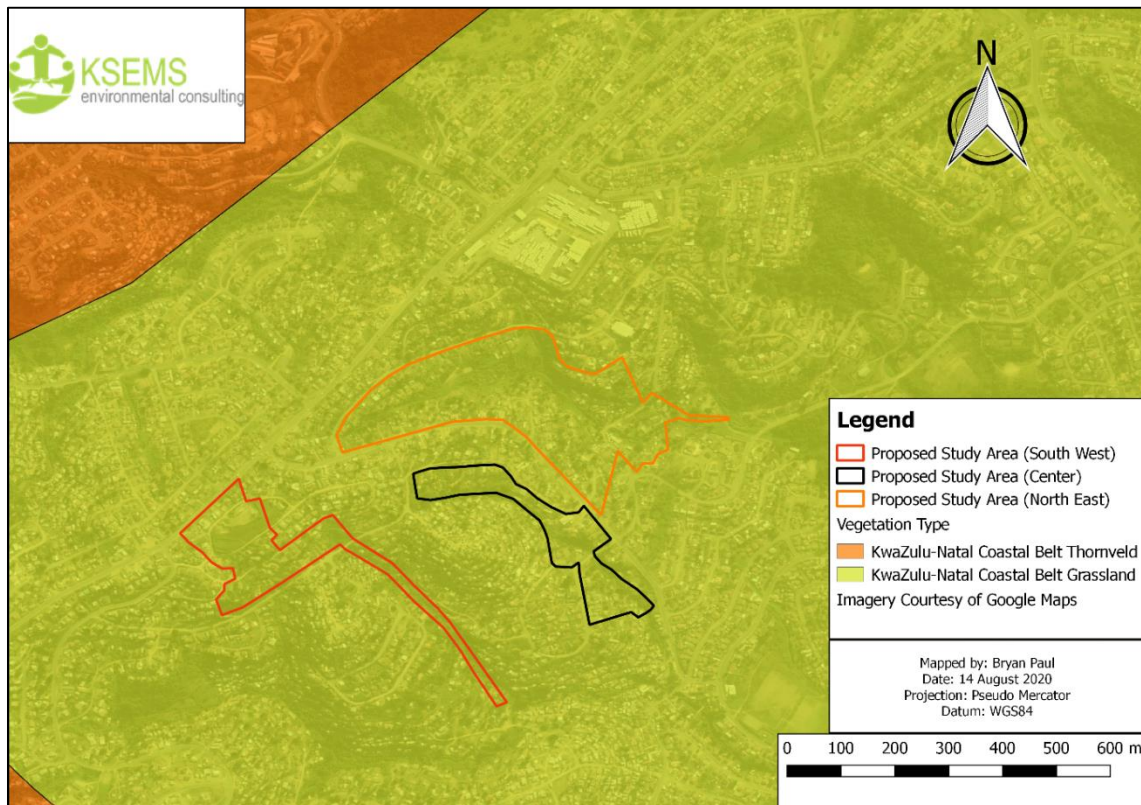


Figure 5: Vegetation unit associated with the study area (Mucina and Rutherford, 2018).

CB 3 is referred to as highly dissected undulating coastal plains which were possibly once covered with various types of subtropical coastal forest. In high rainfall regions, some primary vegetation still exists in hilly regions where *Themeda triandra* still occurs. Natural regimes (fire and grazing) still prevail in these regions, but where anthropologic pressures now exist grassland has been replaced by sugar cane

plantations, timber plantations and coastal holiday resorts.

Table 8: Description of the vegetation unit associated with the site (Mucina and Rutherford, 2012; Scott-Shaw and Escott, 2011).

BIOME	VEGETATION UNIT	CONSERVATION STATUS
Grassland	KwaZulu-Natal Coastal Belt (CB 3)	Endangered with approximately 50% already transformed, as a result of cultivation and urban sprawl and road building.

5.2.2 Protected Areas

According to the Protected and Conservation Areas Database (SAPAD, 2019) the site does form part of any protected area with the exception of DMOSS without 500m of the proposed site.

5.2.3 Soil Description

The soils found within the study area are associated with Lithosols, characterised with shallow soils found on hard or weathering rock. (SANBI, 2018). Soils typically demonstrated minimal development, without intermittent diverse soils. The presence of lime is rare and often absent within the landscape.

5.2.4 Climate

The study area received an above average rainfall during summer, with some occurring during winter (predominately August and September). The climate is cool, with a maximum average of 32.6 °C and a minimum average of 5.8 °C.

6. RESULTS OF SITE INVESTIGATION

The findings of this study were based on fieldwork conducted on the 6th of August 2020 that was guided by the Scope of Works. The time of the year for this assessment occurred during the final month of winter, but would not have a significant effect on the outcome of the assessment, as recent rainfall has occurred, and the site occurs within a higher rainfall region. It is likely that most vegetation (common and rare) would have been recognisable during the field survey.

6.1 Land Cover and Associated Plant Communities

At a broader scale, the site is located within only one (1) vegetation unit, namely KwaZulu-Natal Coastal Belt (CB 3). The field assessment revealed that no primary vegetation exists within the proposed study area, but replaced by plant communities which evidentially have been subjected to prolonged anthropological pressures. Although not often clear and often overlapping, the current land cover has been broken down into four (4) categories and which have been illustrated in Figure 6 below.

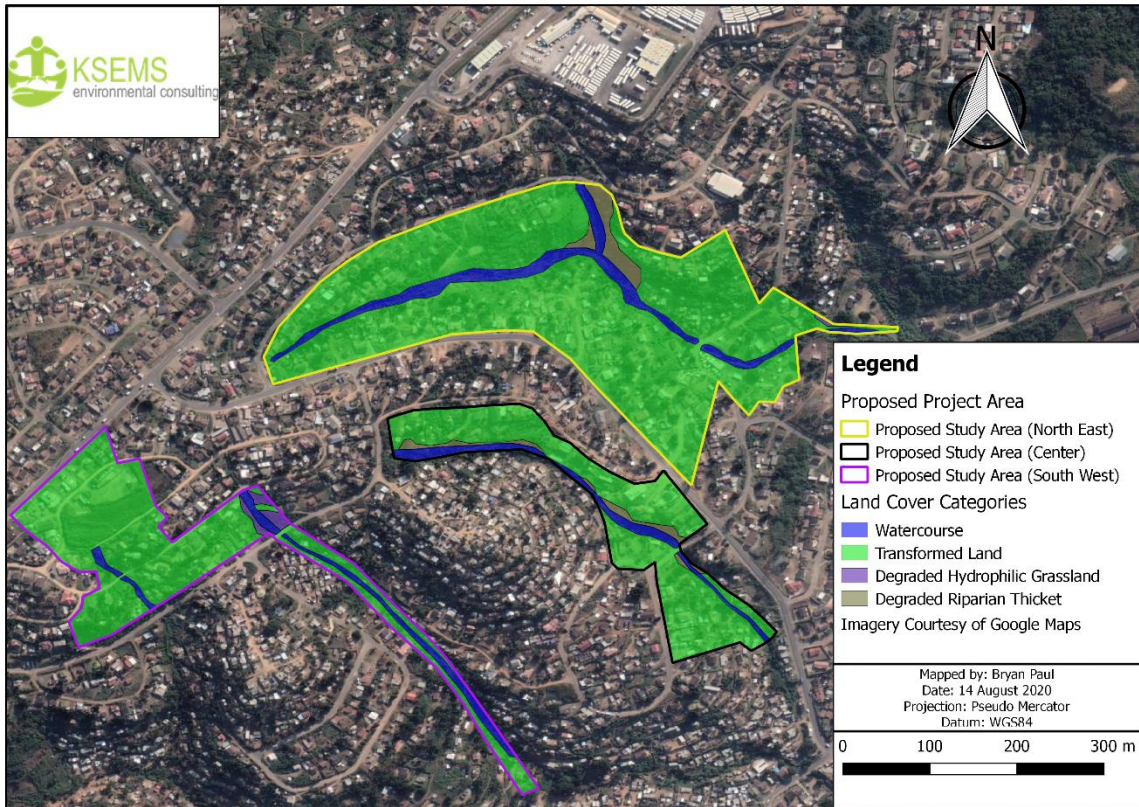


Figure 6: Land Cover map of the Proposed Study Area (KSEMS, 2020)

6.1.1 WATERCOURSES

According to the National Water Act (No. 36 of 1998), a watercourse is a term given to a river or spring, a natural channel or dam (with the egress and ingress of water) and any collection of water which the Minister may, by notice in the *Gazette*, declare to be a watercourse. Under this terminology, a watercourse includes the bed and banks. Although a detailed assessment of all watercourses, within a 500m buffer of the study area will be provided within the Wetland Assessment Report (KSEMS, 2020) the vegetation specialist has noted the presence of watercourses within the study area.

During the field assessment, several riparian systems were observed to be existing within the study area. All of these systems were classified by the presence of flowing water, and the overall presence of woody vegetation on the nearby river banks. However, upon closer inspection, all riparian habitats have regrettably been 100% transformed, with visibly poor water quality and large amounts of litter. In saying this, watercourses are notably the only areas within the study area that are not affected by houses and gardens, either due to inaccessibility as a result of the existing topography, or for safety reasons associated with flooding. Presumably therefore, drainage lines and river systems act as centers of heightened biodiversity (most avifauna) and must not be degraded further. Unlike typical wetland systems however, a minimal amount of plant species was observed within each river channel and depended upon the individual volume of water passing through each system. As illustrated in Figure 6 below, rivers were often bare with sporadic stands of *Canna indica* (Indian Shot) and more water tolerant grass species such

as *Paspalum dilatatum*.



Figure 7: Photographic evidence of riparian habitat within the study area.

6.1.2 DEGRADED RIPARIAN THICKET

The degraded riparian thicket is a land use category which has been allocated to a small area which is found adjacent to the riparian system and which is not entirely transformed and still contains a number of indigenous woody species which form part of certain river bank communities. As demonstrated in Figure 8 below, riparian thickets are only located within two portions of the site, but would have historically occupied most of the river banks, which have now been infested with woody IAPS likely *Schinus terebinthifolia* and *Medea azedarach*. It is likely that many of the original indigenous species were cleared for firewood, building materials and furniture.



Figure 8: Photographic evidence of disturbed riparian thicket.

Although some of the degraded riparian thicket was too dense to traverse during the field assessment, a handful of the indigenous tree species commonly found along riparian banks were observed (*Syzygium*

cordatum and albizia andifolia). It is likely that if no immediate IAPS control occurs within these areas, followed by the active planting of indigenous trees, this habitat will continue to be degraded and further impact upon more important system downstream of the site (Piesang River).

6.1.3 DEGRADED HYDROPHILIC GRASSLAND

Degraded hydrophilic grassland communities although very limited within the study area, are communities which have undergone transformation and severely deviated from their natural state but are dominated by common grasses, which have a high affinity for clayey and hydrophilic conditions such as vleis, wetlands and areas where there is a perched water table as a result of the surrounding land uses.

The grasslands within this study area however, are not species diverse and are composed of only a limited number of more common species like that of *Digitaria eriantha*, *Eragrostis curvula* and *Paspalum dilatatum* among a variety of noxious weeds.



Figure 9: Photographic evidence of degraded hydrophilic grassland present within the study area.

6.1.4 TRANSFORMED AREAS

Transformed areas, are areas which have already gone through severe changes in their land cover and have not retained (even in part) characteristics of the benchmark vegetation unit/s for this area (Mucina and Rutherford, 2012).

A great majority of the study area (if not all) is in fact transformed, likely as a result of the current uses which are taking place within the area, and the clearing of habitat for the expansion of the town of Ntuzuma. As seen in **Figures 10 and 11** below, areas included in the Transformed Areas” Landcover include a variety of different sub-categories, which could not be classified as habitat and / or linked to a natural feature. The following are the structures and or made-made features which are included under “Transformed Areas”:

- Roads and Pathways;
- Houses and informal shelters;

- Gardens and areas densely infested with IAPS;
- Areas of bare soil devoid of vegetation cover.



Figure 10: Photographic evidence of transformed areas observed within the study area.



Figure 11: Photographic evidence of transformed area observed within the study area.

6.2 Plants of Southern Africa (POSA)

A species list from the Plants of Southern Africa (POSA) database has been utilised in this report to provide an additional list of species which may have been found within the study area at some point in time, but may not have been found during the field survey. The database provides a historic list of plant species that have been found within (Quarter Degree Square (QDS) 2930DB. Whilst many of the species identified in POSA were not recorded during the field survey, this list remains relevant as vegetation assemblages are ever changing and species listed below may at any point in time occupy the site by natural means or were simply dormant at the time of the assessment (especially if the site is exposed to a fire regime or cleared of IAPS). The following is a list of species identified for this QDS that are considered to be of conservation importance.

Table 9: Summary of the species that have been found within 2930DB (POSA, 2020)

No.	Common Name	Species Name	IUCN Status
1	Dwarf False-assegai	<i>Maesa alnifolia</i>	LC
2	Eight day grass	<i>Fimbristylis dichotoma</i>	LC
3	Eight day grass sub-species	<i>Fimbristylis dichotoma subsp. dichotoma</i>	LC
4	Forest gasteria	<i>Gasteria croucheri subsp. croucheri</i>	NE
5	N/A	<i>Psammotropha myriantha</i>	LC
6	N/A	<i>Scleria woodii</i>	LC

The SANBI website (<http://redlist.sanbi.org/>) may be consulted for further reading on the conservation status of South African plant species which may be found on this site.

6.3 Indigenous Plant Species

At a broader scale, the site is located within only one (1) vegetation unit, namely KwaZulu-Natal Coastal Belt Grassland (CB 3). Further assessment within the study area on the 6th of August 2020, revealed that the site did not contain any remnants of the benchmark vegetation, as described by Mucina and Rutherford (2006). The vegetation communities present on site mainly consist of IAPS, with only a handful of indigenous species remaining. Much of the non-invader species, were still of an exotic nature and have been intentionally planted by the surrounding residents either for their fruit bearing ability, or their aesthetical appeal. The table (Table 10) below lists the indigenous species found during the field assessment.

Table 10: Indigenous species observed during the field assessment.

NO.	BOTANICAL NAME	COMMON NAME	IUCN STATUS	GENERAL LOCATION
1	<i>Albizia andifolia</i>	Flat-crown albizia	LC	River Bank
2	<i>Agapanthus praecox</i>	Common agapanthus	LC	Garden Plant
3	<i>Aloe arborescens</i>	Krantz aloe	LC	Removed and on refuse pile.
4	<i>Aloidendron barberae</i>	Tree Aloe	LC	Garden Plant
5	<i>Aristida junciformis subsp. Galpinii</i>	Ngongoni three-awn	LC	Throughout study area
6	<i>Chlorophytum comosum</i>	Hen-and-chickens	LC	Garden Plant
7	<i>Cyperus textilis</i>	Mat sedge		Riparian System / Perched water table
8	<i>Dietes grandiflora</i>	Fortnight lily	LC	Garden Plant
9	<i>Digitaria eriantha</i>	Common finger grass	LC	River Bank and terrestrial areas
10	<i>Eragrostis curvula</i>	Weeping love grass	LC	River Bank
11	<i>Erythrina lysistemon</i>	Common coral tree	LC	Garden Tree
12	<i>Paspalum dilatatum</i>	Dallas grass	LC	River Bank
13	<i>Senecio tamoides</i>	Canary creeper	LC	Garden Plant
14	<i>Syzgium cordatum</i>	Umdoni Tree	LC	River Bank
15	<i>Typha latifolia</i>	Broadleaf cattail bulrush	LC	Riparian System
16	<i>Vachellia nilotica</i>	Scrented-pod acacia	LC	Road Side

6.4 Invasive Alien Plant Species (IAPS)

Invasive alien plant species are species of plants which have been classified as non-native species to a country. These species may cause both economic and environmental harm to receiving ecosystems and often out-compete indigenous species. Impacts from IAPS can result in localised extinctions of less resistant plant species and through competition, disrupt ecosystem functions. According to NEM: BA, 2004 property owners have the legal responsibility to control certain species of IAPS (see Appendix 3).

As demonstrated in Table 11 below, a wide variety of IAPS were observed during the field survey. Although IAPS were found throughout the entire study area, IAPS were significantly more dominant within open spaces and drainage lines. In more formal settlements, landscaping efforts by residents has allowed for a greater variety of exotic, non-invasive species to flourish amongst neatly manicured lawns. Overall, IAPS have not been controlled within study area and are expected to proliferate further with the proposed activities associated with the sewer infrastructure development.

Table 11: Alien invasive plant species found during the field survey.

No.	BOTANICAL NAME	COMMON NAME	NEMBA CATEGORY	FREQUENCY ON SITE	PROBLEM AREAS
1	<i>Albizia procera</i>	False lebeck	Category 1b	Common	Riparian Areas
2	<i>Canna indica</i>	Indian shot	Category 1b	Common	Riparian Areas
3	<i>Chromolaena odorata</i>	Triffid weed,	Category 1b	Very Common	Throughout
4	<i>Cortaderia jubata</i>	Pampas grass	Category 1b	Very Common	Throughout
5	<i>Datura stramonium</i>	Downy thorn apple	Category 1b	Very Common	Throughout
6	<i>Lantana camara</i>	Lantana	Category 1b	Very Common	Throughout
7	<i>Melia azedarach</i>	Syringa	Category 1b	Common	Riparian Areas
8	<i>Morus alba</i>	Common Mulberry	Category 3	Common	Riparian Areas
9	<i>Nerium oleander</i>	Oleander	Category 1b	Common	Near Residential Areas
10	<i>Ricinus communis</i>	Castor - oil plant	Category 2	Very Common	Throughout
11	<i>Schinus terebinthifolius</i>	Brazilian pepper tree	Category 1b	Very Common	Riparian Areas
12	<i>Solanum mauritianum</i>	Bug weed	Category 1b	Very Common	Throughout
13	<i>Tithonia diversifolia</i>	Mexican sunflower	Category 1b	Very Common	Throughout



Figure 11: Sensitivity map of the study area

6.5 Sensitivity Map

Vegetation has been used as a common biological indicator to identify the Present Ecological State (PES) or ecological health of ecosystems, given their overall ability to respond rapidly to disturbance. Conservative plant species are the most commonly affected species given their high conservatism status, high sensitivity, narrow distribution ranges and low tolerance to disturbance, these species are the first to be eradicated in disturbed conditions (Rocchio, 2007). As such, areas that are highly disturbed will more than likely have non-conservative species that are not sensitive, have higher tolerance to disturbances and have broad distribution ranges (Rocchio, 2007). The following sensitivity classes were applied (Table 12):

Table 12: Description of the sensitivity classes applied (KEMS, 2020)

CLASS	CRITERIA
Low sensitivity	Areas recorded within the study area which have limited to no natural vegetation present. Areas which are expected to have little or no ecological function, due to a high level of transformation. Development should not be prevented within in these areas.
Moderate Sensitivity	Areas that have disturbed natural and secondary indigenous vegetation. Areas which demonstrate a higher level of tolerance to disturbances. Areas which demonstrate a moderate ecological function, but the present habitat is not unique and is repeated nearby. Areas which are located within close proximity to an important feature and which will provide ecological services to this feature. Areas

	which may be developed in, given that mitigation techniques adequately manage anticipated impacts.
High Sensitivity	Areas that are known to contain the presence of protected and/or threatened species (Critically Endangered, Endangered and Vulnerable), or vegetation types that are provincially protected, or uniquely composed habitats or have a low ability to respond to disturbance and habitats with a unique species composition and narrow distribution, or areas which demonstrate important ecological features (watercourses, forests etc.) and which must be protected. In order to development within these areas, species design technologies must be utilised to avoid permanent impact to these areas.

The following is a sensitivity map, generated and informed by the field assessment conducted in August 2020.

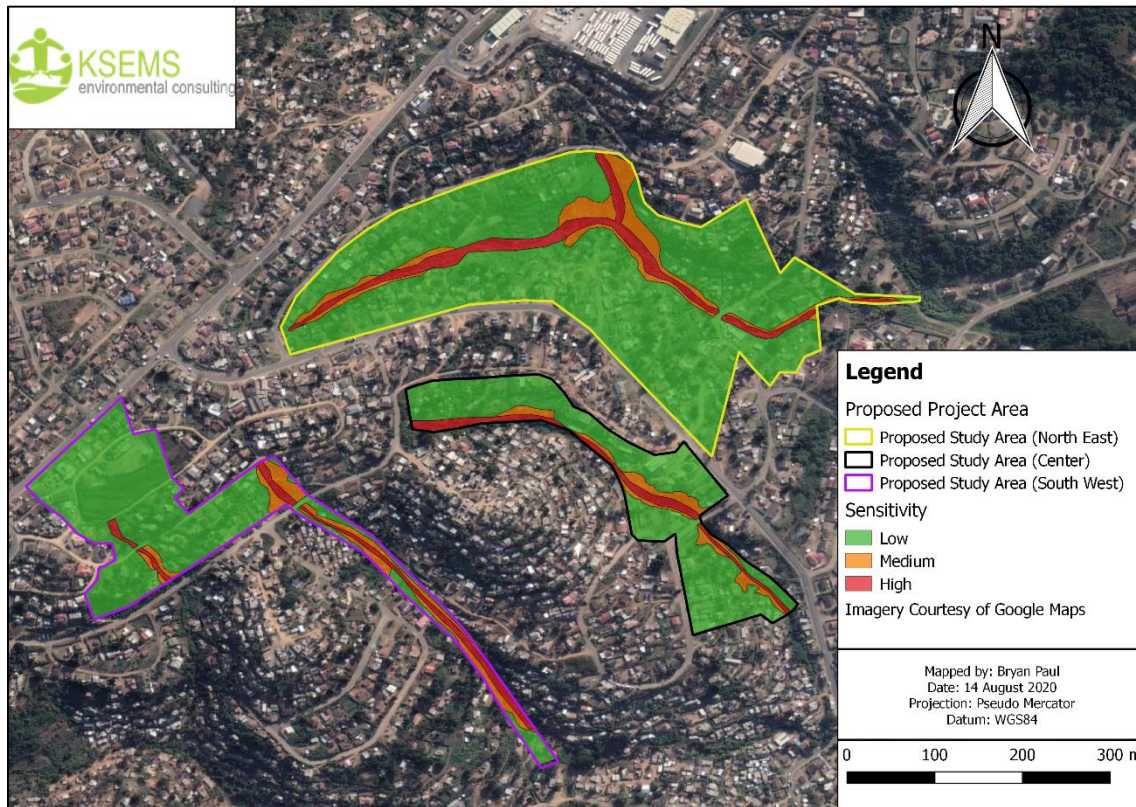


Figure 13: Sensitivity map of the study area

6.5.1 Sensitivity Analysis

- The sensitivity within the study area was predominantly low. Most areas have been disturbed to a level where the current habitat offers little or no ecological function. Species in these areas ranged from being mostly IAPS to common grasses, as a result of localised disturbances.
- Areas which have been mapped as moderately sensitive are portions of the study area which are found adjacent to watercourses and whilst they do not demonstrate unique botanical

assemblages, they are still likely to provide do habitat and ecological services. Furthermore, the overall topography of these areas (often steep and inaccessible) will reduce the overall chance of successful rehabilitation within these areas and therefore have a knock-on effect into other systems downslope.

- Areas which have been mapped as high sensitivity are regarded as areas which should be avoided by the development (no-go areas) where practically possible. The depiction of these areas within Figure 12 may be exaggerated (due to the sheer density of IAPS in some areas), but represents each channel of the watercourses which are found within the study area. Although no protected species, or species of any particular conservation concern were identified, these systems still offer certain ecological services to an already degraded ecosystem and must be preserved.

6.6 Protected Plant Species

In KwaZulu-Natal (KZN), plant protection is often linked to species being sought after commercially, culturally (medicinal plants) and where wild populations are under threat from extinction due to habitat loss. In most cases, KZN endemics, with small geographic ranges will receive a level of protection.

During this vegetation impact assessment (VIA), SCC, TOPS, species listed as threatened according to the IUCN and species conserved under the relevant Provincial Ordinance have been considered. The following protected species listed in Table 13 below, were found during the field survey. The location and co-ordinates for each individual plant is presented below (Table 13):

Table 13; A list of the protected species found within the study area during the field survey

SPECIES NAME	LEVEL OF PROTECTION	NUMBER OF OBSERVATIONS	GPS COORDINATE
<i>Dietes grandiflora</i>	Nature Conservation Ordinance (No. 15 of 1974)	<20	29°44'30.54"S; 30°57'5.83"E

7. POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

Ecosystems are naturally dynamic and subject to long-term stresses and changes to their nutrient, water and sediment supply. The way in which ecosystems respond to such perturbations is complex and variable, depending on the resilience and nature of these systems. According to Walker and Salt (2006), resilience is defined as the ability of a system to retain and maintain its essential structure, function, and feedbacks in the face of disturbance. Increased resilience of a system will reduce the likelihood of regime shifts which entails large, abrupt changes to the structure and function of systems, causing a shift from one stable state to another. Connected systems enable the dispersal of genes, individuals and communities of plant species, which enables high diversity within ecosystems (Evidentiary, 2015). Fragmented ecosystems, which are often the result of road networks, hinder movement of plant species and should disturbance take place, i.e. IAPS

encroachment, plant species become out competed, particularly conservative species that have low resilience or tolerance to disturbances (Evidentiary, 2015).

7.1 Proposed Study Area and Receiving Environment

The study area for the proposed Ntuzuma B Sewer Reticulation project is located within Ntuzuma B section of KwaMashu. This site is located within 15 km of three (3) major areas namely Phoenix, Kloof/ Waterfall and the CBD of Durban. The study area is closely located to Inanda Dam in the west, and all drainage lines from the site meander towards the Piesang River in the east (near the Phoenix Industrial Hub).

Currently the area in which the project is proposed is densely populated, with houses (informal and formal residents) being located throughout, with minimal open space left for natural habitat to exist. However, in saying this, three major green belts are apparent at a desktop level and do dissect the current study area. These drastic changes in land cover are owed to the presence of steep drainage lines, within which vegetation has been allowed to exist. At the base of certain channels, flowing water was observed and at other wet clayey soil was recorded. In the immediate surroundings dense woody vegetation exists, but rarely indigenous and rather of an exotic nature and presumably as a result of the intense anthropologic pressures subjected onto this last remaining nature feature in the area.

According to the layout plan provided, the proposed 160mm diameter HDuPVC sewage pipeline will be positioned in such a way as to make use of the current topography of the area (gravity feed). As result, portions of the proposed pipeline will need to traverse areas which are in close proximity to the aforementioned watercourses and residential areas. Therefore, the following resultant activities are likely to take place in order to construct the proposed sewage reticulation system:

- All areas found within the development footprint will be stripped of topsoil and vegetation.
- Adhoc pathways and/or access roads will need to be constructed to access more remote areas of the proposed site.
- Topsoil and subsoil stockpiles will need to be stored for prolonged periods of time when installing the proposed pipeline.
- A site camp and pipeline storage site will need to be established nearby.
- Watercourse crossings will need to be made in order to connect houses to the main pipeline.
- The construction footprint will need to be rehabilitated back to an acceptable level.
- There will be an influx in plant and construction vehicle for a prolonged period of time.

7.2 Impacts likely to arise from the proposed development

The potential impacts associated with the proposed development were assessed using a quantitative impact assessment methodology (refer to section 2.2.2) which has been formalised to comply with

Regulation 31(2)(l) of the NEMA (No. 107 of 1998). The aim of this assessment was to identify and assess the significance of all the potential impacts which may arise as a result of the proposed development. The methodology employed makes use of the following procedure:

- Identification and assessment of potential impacts;
- Prediction of the nature, duration, extent, likelihood and significance;
- Identification of mitigation measures that could be implemented to reduce the significance of the potential impact; and
- Evaluation of the significance of the potential impacts following the implementation of mitigation measures.

The significance is determined through a synthesis of the characteristics described above. The significance weightings for each potential impact are outlined in the table below (Table 14), with the greatest significant value of 100.

Table 14: Significance weighting, values and description of each arrived significance score.

SIGNIFICANCE VALUE	SIGNIFICANCE WEIGHTING	DESCRIPTION
< 30	Low	This impact has a Low ecological significance, and does not impact on the decision to develop within the area
30-60	Medium	Where the impact could influence the decision to develop in the area unless it is effectively mitigated
>60 - 100	High	Where the impact must have an influence on the decision process to develop in the area

Table 15 below provides the potential impacts of the proposed development and the likely significance of impacts should mitigation measures be implemented.

Table 15: Potential impacts associated with the proposed construction of the sewer reticulation

PHASE	ACTIVITY	RESULTING IMPACTS	IMPACT CATEGORY	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION		PROPOSED MITIGATION	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION	
Pre-Construction/ Construction and Operational Phases	Stripping of topsoil, sub-soil and vegetation for the construction of the sewer pipeline.	<ul style="list-style-type: none"> Decreased topsoil quality resulting in lowered plant growth rate. Loss of indigenous plant species. Habitat destruction. Decrease bank stability. Increased erosion. Increased sedimentation of surface water/ watercourses downstream and on hydrophytes 	Direct and Indirect	Duration	2	<ul style="list-style-type: none"> An ECO must be appointed throughout the various phases. Topsoil monitoring (depth and soil testing) must take place prior to soil stripping and backfilling. The ECO must determine if the quality of soil is satisfactory, prior to backfilling. Topsoil must be sequentially removed in accordance with the requirements on site. All topsoil must be adequately stored: <ul style="list-style-type: none"> On a Flat surface; Below two meters; Suitably covered if stored for prolonged periods of time. Separate from sub-soil and other stockpiles. Not near watercourses Vegetation clearing may only take place within the development footprint. All areas outside of the proposed development footprint must be regarded as no-go areas. All protected species, which have been identified prior to construction, must be relocated or kept within a temporary nursery for later use in the re-vegetation process. A pre-construction walk through by a botanist must take place for accurate 	Duration	2
				Extent	2		Extent	1
				Likelihood	4		Likelihood	4
				Magnitude	4		Magnitude	4
				Significance rating	32 (Medium)		Significance rating	28 (Low)

PHASE	ACTIVITY	RESULTING IMPACTS	IMPACT CATEGORY	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION		PROPOSED MITIGATION	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION	
						marking of species for removal and/or translocation. <ul style="list-style-type: none"> If any SCC or plant species high on the Red List are identified within the proposed footprint, effective rescue and relocation of them must be undertaken by a qualified botanist and in alignment with the Rehabilitation and Translocation Plan No protected species may be removed and/or destroyed without a valid permit. All temporary embankments that are considered sensitive to erosion must be adequately retained and supported (sandbags, fascine work, retaining blocks etc.). Silt traps must be used to control silt from being washed off site and into any watercourses or vegetation. All toilet facilities must be located outside of any sensitive area and must not be found within 50m of a watercourse. Regular servicing will prevent any spillages. 		
Construction, Operational and Post Construction Phases	The ingress and egress of vehicles and/or plant from site.	<ul style="list-style-type: none"> Reduced photosynthesis of nearby vegetation due to dust settling on leaves; Trampling of vegetation 	Direct	Duration	2	- Traffic signs must be erected throughout the site, demarcating the following: <ul style="list-style-type: none"> Speed limits; Sensitive area; and No-go areas - Dust suppression must be implemented on all access roads. This practise must be carefully	Duration	2
				Extent	2		Extent	1
				Likelihood	3		Likelihood	3
				Magnitude	4		Magnitude	4
				Significance rating	24(Low)		Significance rating	21 (Low)

PHASE	ACTIVITY	RESULTING IMPACTS	IMPACT CATEGORY	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION		PROPOSED MITIGATION	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION	
		outside of the development footprint due to vehicle movements; <ul style="list-style-type: none"> • Compaction of fertile soils leading to reduced plant growth and soil quality; and • Plant die-offs due to hydrocarbon spills from vehicles. 				monitored by the ECO and all water usage must be recorded throughout the project lifespan. <ul style="list-style-type: none"> - All temporary roads must receive rehabilitation prior to the closure of the site (deep-rip, backfilling of topsoil). - Vehicles may only traverse designated areas and access roads. - Heavy duty machinery must be stored in allocated areas and not left out in open spaces. 		
Operational Phase	Utilisation of the sewage infrastructure	<ul style="list-style-type: none"> • Sewage spillages due to pipeline malfunctioning's and/or theft causing contamination of nearby watercourses and vegetation. • Adhoc clearing of vegetation during routine 	Direct and Indirect	Duration	5	<ul style="list-style-type: none"> - No-go areas should be sign posted and communicated to all staff. - Routine maintenance should be conducted along the route during operation, to ensure early detection of any faults and/ or leaks. - All maintenance activities should be limited to authorised service pathways and establish roadways. 	Duration	5
				Extent	2		Extent	1
				Likelihood	3		Likelihood	2
				Magnitude	6		Magnitude	4
				Significance rating	39 (Medium)		Significance rating	20 (Low)

PHASE	ACTIVITY	RESULTING IMPACTS	IMPACT CATEGORY	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION		PROPOSED MITIGATION	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION	
		maintenance of sewer pipeline.						
Construction and Post-construction	Usage and decommissioning of the construction site camp and laydown area.	<ul style="list-style-type: none"> Spillages of oils fuels and chemicals causing the contamination of soils, surface and ground water; Hardened/ compacted soils reduce the vegetation growth; Reinstatement of sub-standard topsoil reduces the growth and success of indigenous vegetation; Proliferation of IAPS on site and into surrounding plant communities; Introduction of exotic species through 	Direct/ Indirect	Duration	1	<ul style="list-style-type: none"> No servicing of machinery and/or plant must take place on site during construction. Drip trays must be used when re-fuelling plant at the site camp. All plant, structures, waste and equipment must either be off-hired or adequately removed from site. All documentation resulting from this activity must be kept by the Contractor and the ECO. All waste generated by the activity must be adequately transported off site and disposed of at a registered waste receiving facility. Rehabilitation must be conducted on site, by adequately backfilling topsoil and reinstating indigenous vegetation. All access roads must be deep-ripped and adequately rehabilitated. Rehabilitation of the site must be monitored by an ECO. 	Duration	1
				Extent	2		Extent	1
				Likelihood	4		Likelihood	3
				Magnitude	4		Magnitude	4
				Significance rating	28 (Low)		Significance rating	18 (Low)

PHASE	ACTIVITY	RESULTING IMPACTS	IMPACT CATEGORY	SIGNIFICANCE RATING OF IMPACTS PRIOR TO MITIGATION		PROPOSED MITIGATION	SIGNIFICANCE RATING OF IMPACTS AFTER MITIGATION	
		<p>uninformed re-vegetation efforts.</p> <ul style="list-style-type: none"> Exposed, unsupported soil being eroded and causing erosion gullies; Unmanaged grazing by livestock, inhibiting successful rehabilitation practises; Poor rehabilitation throughout the construction and defect liability period. Poor stormwater runoff, leading to erosion on site. 				<ul style="list-style-type: none"> Natural berms and contours must be reinstated by the Contractor prior to the closure of site. Fire-fighting equipment must be available on site at all times. Spill kits must be available on site at all times and must be suitably equipped to deal with spills. Stockpiles must be cleared of IAPS and this must be checked before infill. No stockpiles must be left behind after the construction phase, but rather must backfill and/or removed from site. 		

7.3 Impact Assessment Conclusion

The Environmental Impact Assessment Regulations (2014, as amended) require an assessment of the impacts that may arise from the undertaking of an activity. The findings of the VIA are used to inform the Competent Authority's (CA) decision as to whether the activity should be permitted, permitted subject to conditions that will mitigate the impacts to within acceptable levels, or whether the proposed development should be refused. When considering the potential impacts of a proposed development, the following factors must be taken into account:

- The temporal boundaries (i.e. seasonality) of the impact;
- The spatial boundaries (i.e. site specific, local, regional) of the impact;
- Variables to be measured (i.e. soil and water quality through pH, nitrates and phosphates);
- Relationship between the variables (i.e. effect of sediment and turbidity on water quality);
- The magnitude/severity of the impact;
- The frequency and duration of the impact;
- The reversibility of the impact; and
- The probability of reducing or mitigating the impact.

Based on the above-mentioned activities, and their associated impact scores, it is apparent that without mitigation, the proposed development will result in a no net biodiversity loss outcome and will cause a medium to low impact to the receiving environment. The following causal factors were identified as being moderately significant and would cause a detrimental effect to the current environment if left unmitigated:

- Utilization of the constructed sewage pipeline.
- Excavation and removal of nutrient rich soils;
- Stripping of indigenous vegetation.

A precautionary approach must be taken, in order to achieve a "no net loss" outcome at the end of the project lifespan. This is possible, as the proposed activities will not result in a permanent above ground structure and whilst the pipeline servitude will be maintained for maintenance purposes, vegetation may regrow successfully over the construction footprint and offer similar habitat prior to construction. Furthermore, the proposed route of the sewage reticulation follows an area which is already highly transformed and therefore from a vegetation perspective, it is highly likely that the existing vegetation communities will be able to re-establish post-construction in a similar and potentially less disturbed manner after construction (with the implementation of IAPS control).

The highest risk associated with this proposed development therefore, would be the operation of a sewage

pipeline. Although the pipeline will be constructed according to the latest engineering designs and standards, the possibility of an accidental leak cannot be ruled out and therefore has been accounted for in the table above. However, the overall impact score associated with this potential phenomenon was somewhat reduced in significance, as the current sewage handling capabilities of the study area are unsuitable and it is likely that raw, untreated sewage currently contaminates the surrounding soils and watercourses. It is likely therefore that significant positive social and wetland impacts are likely to be recorded.

The mitigation suggested in table 14 above, will reduce the anticipated impact score from “**medium**” to “**low**”. This conclusion of the impacts score has been based on the following contributing factors:

1. Residents within the proposed study area currently use pit latrines and septic tanks. The installation of an appropriate sewage reticulation system is required throughout this region.
2. Most of the habitat found within the proposed study area is made up of IAPS, with little to no natural vegetation present;
3. The site has limited sensitive areas, which can be avoided by the developer through certain design technologies.
4. The present plant communities appear to comprise of species with higher tolerance levels and are likely to maintain their current structure and composition with the implementation of mitigation techniques;
5. The proposed project will not result in an aboveground permanent footprint and all affected areas may be successfully rehabilitated after construction; and
6. All recommendations and mitigation techniques will be followed by the Developer and/or professional team.

The impact assessment, described in Table 15 above describes components of the proposed development that would result in moderately significant impacts, if not mitigated. It was identified that causal factors were not linked to one specific phase of the project, but rather likely to occur throughout the lifespan of the development. The overall severity of these impacts was initially (pre-mitigation) reduced, as a result of the current state of the site. Through the recommendation of appropriate mitigation techniques, the associated impacts could not be avoided, but significantly reduced to an acceptable level (low significance).

Reduced growth rates will lead to reduced basal cover and surface roughness, which will indirectly exasperate soil erosion. This is particularly noteworthy in areas with a steep topography. It is the specialist's opinion that whilst a site specific rehabilitation plan will not be required, rehabilitation effort must be implemented carefully and success must be monitored by an ECO until, the appointed ECO is satisfied with the rehabilitation efforts along the route.

In conclusion, it is unlikely that impacts associated with the proposed development will result in any permanent damage to the surrounding floral communities and ecosystems. This statement is only valid, if all mitigation techniques are strictly adhered to and systematically implemented throughout the projects lifespan.

8. RECOMMENDATIONS

8.1 Permits

If any protected plant species are found during the construction phase of the development, they must first be protected and the correct procedure followed. Should destruction / removal be an unavoidable option, then the prescribed process must be followed.

Species Protected Under the National Forest Act, 1998 (No. 84 of 1998):

In terms of the National Forests Act, 1998 (No. 84 of 1998) and Government Notice 1339 of 6 August 1976 (promulgated under the Forest Act, 1984 (No. 122 of 1984), the removal, relocation or pruning of any protected plant species requires a license. An application, to the Department of Agriculture, Forestry and Fisheries must be made prior to any such activities. The Department reserves the right to comment and may make offset recommendations. Conditions set within the issued permit are legally binding and proof must be submitted to the Department.

Species Protected Under the Provincial Nature Conservation ordinance of 1974:

Protected indigenous plants are controlled under the relevant provincial Ordinances. In KwaZulu-Natal, all protected indigenous species fall under the protection of the Provincial Nature Conservation Ordinance of 1974. Stipulated under this Ordinance, a permit must be obtained from Ezemvelo KZN Wildlife (eKZN) to remove any plants listed in the Ordinance.

8.2 General Recommendations

- An ECO must be appointed to oversee that the conditions stipulated in the Environmental Authorisation are carried out.
- Pre-construction environmental induction for all construction staff on site must be conducted, this will include the following as a minimum requirement to be covered:
 - Dust suppression – Agreed practical methods confirmed by the Contractor;
 - All water use on site must be recorded throughout the lifespan of the project.
 - Demarcation of no-go areas (surrounding properties and nearby watercourses);
 - Expected conduct of staff on site – not harvesting vegetation, usage of fire on site, reporting incidents, and relationship with ECO.

- Objectives and conditions of the approved EA, EMPr, Method Statements, ECO Audit Reports and Recommendations etc.
 - Spill Protocol (small and large spills); and
 - Emergency Numbers (ECO, Snake Expert, SAPS etc.).
- All areas earmarked to be cleared, must be adequately staked and inspected by the ECO to ensure that no vegetation has been overlooked.
 - An accurate account of water usage (drinking, dust suppression etc.) must be kept by the Contractor.
 - All construction vehicles should adhere to clearly defined and demarcated roads. No adhoc roads may be constructed without prior permission of the ECO and Engineers.
 - Dust suppression and erosion management should be an integral component of the construction process.
 - No dumping or burying of building waste or spoil material from the development should take place on areas other than a licenced landfill site.
 - All hazardous materials should be stored appropriately to prevent contamination of the proposed development site. Any accidental chemical, fuel and oil spills that occur at the project site should be cleaned up appropriately as related to the nature of the spill.
 - An Environmental Incident Register must be kept throughout the project lifecycle; this will be used to record the following:
 - Accidental spills of hazardous substances;
 - Observed die-offs of vegetation (on site and nearby);
 - Accidental removal of plants;
 - Complaints from Interest and Affected Parties/ Persons (I&APs);

8.3 Floral Recommendations

- No excavation should take place within any river channel, or on any steep gradients.
- A suitably qualified ECO must be appointed before construction to manage the implementation of the plant rescue process, and the final route walkthrough to ensure that no specifically protected species are found along the route.
- Regular toolbox talks must take place visual demonstrating protected species that are likely to occur on site throughout the lifespan of the project.
- Should any tree removal and/or protected plant permits be required, these must be applied for at least three months prior to the start of construction on site to avoid delays.
- Weed control measures must be applied to eradicate the noxious weeds (Category 1a and 1b species) on disturbed areas throughout the project lifecycle.
- Unnecessary vegetation clearance must be prohibited and indigenous vegetation must remain intact where and for as long as possible (erosion reduction, maintain habitat and surface roughness).

- Staff must be trained on common SCC and TOPS which may occur within the area and must report on these plant species to the contractor or ECO on site, should they be identified on site throughout the project lifecycle. This training may be in the form of visual aids and conducted during regular toolbox talks and inductions.
- Due to the highly transformed nature of the site, an offset is not recommended but rather that the site is adequately rehabilitated after construction. Rehabilitation must be conducted con-currently with construction and must make use of indigenous species, which are locally sourced.
- It is recommended that the pipeline route is installed along previous disturbed routes and pathways where practically possible. The installation of the pipeline within close proximity to the watercourse should be done using labour intensive methodology where practically possible as opposed to large plant (excavators and TLBs) to limit the construction footprint within the any watercourse system. Furthermore, where practically possible the design engineer should investigate horizontal drilling and/or the use of a pipeline pier when crossing any watercourse.

9. CONCLUSION

The proposed sewer reticulation project within the Ntuzuma B area, triggered the need for a vegetation assessment to take place. KSEMS conducted a field visit on the 6th of August 2020 to ground-truth the proposed construction footprint (exaggerated) and confirm the present vegetation assemblages which exist within this area.

The study area was considered highly modified and transformed to such an extent whereby little to no natural vegetation exists within the study area (with exception of gardens and roadsides). The proposed pipeline route has been designed according to the requirements certain household within the study area and therefore no site alternatives or route alternatives were identified. However, design alternatives were not proposed at the time of the assessment, in terms of traversing and/or working within close proximity to watercourses and therefore recommendations have been made within this report. Furthermore, this assessment was undertaken with the understanding that working within close proximity to watercourses was unavoidable, due to design and the no-go alternative (not constructing the pipeline) would be more detrimental than installing it. The VIA found that most of the development site would be suitable for installation of a pipeline, whilst some portions of the site, like that of watercourses and areas with steep topography would require stricter procedures to be put in place. It was recommended by the specialist that either horizontal drilling or a pipeline pier is investigated as a design alternative when the route crosses any watercourse to prevent the need for direct excavation.

According to Mucina and Rutherford (2006), the proposed development area falls within one (1) vegetation unit, namely KwaZulu-Natal Coastal Belt (CB 3) which is classified as endangered, with approximately 50% of the original extent having already been transformed. As discussed previously, no primary vegetation known to be associated with this vegetation unit was identified, but rather has been replaced by IAPS and more common grass

spaces and therefore the proposed construction is unlikely to affect the conservation targets which may be associated with this vegetation unit.

According to the 'Schedule of Threatened Terrestrial Ecosystems in South Africa' (promulgated under NEMBA, Government Notice 1002 of 2011), the project area occurs within a Threatened Ecosystem classified as Critically Endangered (Durban Metropole North Coast Grassland). Although comments from the Department of Environment, Forestry and Fisheries (DEFF) will have scope on this finding, it is the specialist opinion that this should not have any scope of the decision, as the current condition of the site is significantly degraded.

The VIA found that no portions of the proposed site were included in the D'MOSS database, however, the site was recorded to fall within three (3) of the categories listed within the KwaZulu-Natal Systematic Conservation Plan (2012), namely Critical Biodiversity Area 1, Biodiversity Area and 100% Transformed. It was concluded that it was unlikely from a botanical perspective, that the construction of a sewage pipeline within the study area would impact upon the conservation priorities of the region at the study area as none of the vegetation species (*Barleria natalensis*, *Vernonia Africana*) and/ or features (North Coast Grassland) responsible for this area being included as a CBA, were identified at the time of the field assessment.

During the assessment, it was identified that the study area currently demonstrates a low plant species diversity, which many of the indigenous species being found within gardens and built up areas. However, one (1) protected species was found within the study (*Dietes grandiflora*) which is specifically protected in terms of the Provincial Nature Conservation ordinance of 1974. As these specimens were located within a residential garden, it is unlikely that they will be affected, however caution must be exercised when constructing the pipeline tie-in points to avoid these plants. Should this be unavoidable, a permit must be applied for and issued by Ezemvelo KZN Wildlife, prior to their removal and safe relocation nearby.

This assessment concluded that the associated impacts could be maintained at "low", provided that recommendations and mitigation techniques are followed in their entirety. During the assessment, portions of the site (river channels) were identified as a no-go area. As a result of these findings, the development footprint must avoid direct excavation within a river, unless practically impossible due to the safe design requirements of this development. It is recommended that the Developer maintain as much of the current vegetation cover as possible, to assist the development in reducing downslope impacts of the proposed development (sedimentation, erosion, increase surface water runoff etc.) and that IAPS are carefully managed throughout the construction phase and through to end of the defect liability period.

The early appointment of an ECO during all of the phases of this development will ensure that proposed establishment and utilisation of the site will be both sustainable and beneficial to the surrounding community.

Based on the outcome of this assessment, there are no evident fatal flaws that would prevent this development from being authorised, nor being conducted in a sustainable manner. Therefore, the specialist does not object to this development and has identified potential positive impacts that could arise after the decommissioning of this proposed development and upon completion of the rehabilitation efforts that will be associated with this development.

10. REFERENCES

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1. APPENDIX 1: IDENTIFIED PLANT SPECIES

Table 16: Plant species identified within the study area during the field survey

NO.	BOTANICAL NAME	COMMON NAME	THREAT STATUS	FREQUENCY ON SITE
1	* <i>Albizia procera</i>	False lebbek	N/A	Common (>10)
2	* <i>Canna indica</i>	Indian shot	N/A	Common (>10)
3	* <i>Cortaderia jubata</i>	Pampas grass	N/A	Very Common
4	* <i>Datura stramonium</i>	Downy thorn apple	N/A	Very Common
5	* <i>Morus alba</i>	Common Mulberry	N/A	Common (<10)
6	* <i>Nerium oleander</i>	Oleander	N/A	Common (<10)
7	* <i>Ricinus communis</i>	Castor - oil plant	N/A	Very Common
8	* <i>Schinus terebinthifolius</i>	Brazilian pepper tree	N/A	Very Common
9	* <i>Tithonia diversifolia</i>	Mexican sunflower	N/A	Very Common
10	<i>Agapanthus praecox</i>	Common agapanthus	LC	4
11	<i>Agave angustifolia</i>	Agave	N/A	3
12	<i>Albizia adianthifolia var. adianthifolia</i>	Flat-Crown albizia	LC	Rarely Observed (2)
13	<i>Aloe arborescens</i>	Krantz aloe	LC	5 (dead)
14	<i>Aloidendron barberae</i>	Tree aloe	LC	1
15	<i>Aristida junciformis</i>	Ngongoni Three-awn	LC	Very Common
16	<i>Aristida junciformis subsp. Galpinii</i>	Ngongoni three-awn	LC	Common
17	<i>Beta vulgaris</i>	Beetroot	N/A	<20
18	<i>Bidens pilosa</i>	Black jack	N/A	Very Common
19	<i>Brunfelsia pauciflora</i>	Yesterday-today-and-tomorrow.	N/a	2
20	<i>Carica papaya</i>	Papaya	N/A	<10
21	<i>Chlorophytum comosum</i>	Hen-and-chickens	LC	5
22	<i>Chromolaena odorata</i>	Triffid weed	N/A	Very Common
23	<i>Codiaeum variegatum</i>	Purple Croton	N/A	2
24	<i>Cynodon dactylon</i>	Couch Grass	LC	Common
25	<i>Cyperus textilis</i>	Mat sedge	LC	1
26	<i>Dietes grandiflora</i>	Fortnight Lily	LC	<20
27	<i>Digitaria eriantha</i>	Digit Grass	LC	Very Common

28	<i>Duranta repens</i>	Golden Dewdrop	N/A	Common
29	<i>Eragrostis curvula</i>	Weeping love grass	LC	Very Common
30	<i>Erythina lysistemon</i>	Common coral tree	LC	1
31	<i>Lantana camera</i>	Lantana	LC	Very Common
32	<i>Litchi Chinesis</i>	Litchi	N/A	<10
33	<i>Mangifera indica</i>	Mango Tree	N/A	Very Common
34	<i>Melia azedarach*</i>	Syringa	N/A	Rarely Observed (3)
35	<i>Musa spp.</i>	Banana	N/A	Very Common
36	<i>Paspalum dilatatum</i>	Dallas grass	LC	Very Common
37	<i>Senecio tamoides</i>	Canary creeper	LC	Common
38	<i>Solanum mauritianum*</i>	Bug weed	N/A	Very Common
39	<i>Syzygium cordatum</i>	Water berry/ Umdoni Tree	LC	Rarely Observed (2)
40	<i>Tagetes minuta</i>	Kaki bush	LC	Very Common
41	<i>Typha latifolia</i>	Bulrush	LC	Very Common in two locations.
42	<i>Vachellia nilotica</i>	Scrented-pod acacia	LC	1

* Denotes IAPS

2. APPENDIX 2: NEM:BA, 2004 (ACT NO. 10 OF 2004) IAPS CATEGORIES AND LEGISLATION

NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT 2004 (ACT NO. 10 OF 2004) ALIEN AND INVASIVE SPECIES REGULATIONS, 2014

2. Category 1a Listed Invasive Species
 - 1) Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combatted or eradicated.
 - 2) A person in control of a Category 1a Listed Invasive Species must-
 - a) comply with the provisions of section 73(2) of the Act;
 - b) immediately take steps to combat or eradicate listed invasive species in compliance with sections 75(1), (2) and (3) of the Act; and
 - c) allow an authorised official from the Department to enter onto land to monitor, assist with or implement the combatting or eradication of the listed invasive species.
 - 3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must combat or eradicate the listed invasive species in accordance with such programme.
3. Category 1b Listed Invasive Species
 - 1) Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled.
 - 2) A person in control of a Category 1 b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act.
 - 3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.
 - 4) A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act.
4. Category 2 Listed Invasive Species
 - 1) Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.
 - 2) Unless otherwise indicated in the Notice, no person may carry out a restricted activity in respect of a Category 2 Listed Invasive Species without a permit.

- 3) A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit.
 - 4) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.
 - 5) Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1 b Listed Invasive Species and must be managed according to Regulation 3.
 - 6) Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.
5. Category 3 Listed Invasive Species
- 1) Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.
 - 2) Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3.
 - 3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme

GOVERNMENT GAZETTE (No. 41445 OF 2018) DRAFT AMENDMENTS TO THE ALIEN AND INVASIVE SPECIES LISTS

NOTICE 1:

General exemption of listed invasive species:

1. All dead specimens of any listed invasive species are exempted from requiring a Permit for any restricted activity.
2. Notwithstanding any prohibition in Notice 1 or Notice 3 below, but subject to paragraph 1 above, any person in possession of a listed invasive plant species which is utilised as biomass is hereby exempted from requiring a permit for and may undertake the restricted activities of:
 - (a) conveying, moving or otherwise translocating any specimen of a listed invasive plant species; and
 - (b) selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen of a listed invasive plant species; provided such person complies with any norms and standards relating to biomass, published in terms of the Act.

3. Notwithstanding any prohibition in Notice 1 or Notice 3, any person conveying, moving or otherwise translocating any specimen of a listed invasive species for disposal or treatment as waste, is hereby exempted from requiring a permit for and may undertake such restricted activity, provided such person complies with any norms and standards relating to disposal of listed invasive species, published in terms of the Act.

4. Notwithstanding any prohibition in Notice 1 or Notice 3 below, any authorised official, is hereby exempted from requiring a permit for and may undertake any restricted activity necessary to perform their functions in terms of the Act or the National Environmental Management Act.

5. An extension to a plantation is exempted from undertaking a risk assessment in terms of section 71(2) of the Act, prior to applying for a permit in terms of the Act and Alien and Invasive Species Regulations, 2014, provided the application for an environmental authorisation in terms of the National Environmental Management Act included an invasive species risk assessment.

Note that the species-specific exemptions and prohibitions in Notice 3 take precedence over Notice 1, in the event of any conflict.

Restricted Activities as defined in the Act	Category 1a	Category 1b	Category 2	Category 3
a. Importing into the Republic, including introducing from the sea, any specimen of a listed invasive species.	Prohibited	Prohibited	Permit Required	Prohibited
b. Having in possession or exercising physical control over any specimen of a listed invasive species.	Exempted	Exempted	Permit Required	Exempted
c. Growing, breeding or in any other way propagating any specimen of a listed invasive species, or causing it to multiply.	Prohibited	Prohibited	Permit Required	Prohibited
d. Conveying, moving or otherwise translocating any specimen of a listed invasive species.	Prohibited	Prohibited	Permit Required	Prohibited
e. Selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen of a listed invasive species.	Prohibited	Prohibited	Permit Required	Prohibited
Restricted Activities as defined in Regulation 6				
f. Spreading or allowing the spread of any specimen of a listed invasive species.	Prohibited	Prohibited	Permit Required	Prohibited

NOTICE 2: NOTICE IN TERMS OF SECTION 66(1) – EXEMPTED ALIEN SPECIES

1. The following categories of alien species that are within the Republic when this Notice comes into effect, are exempted from the provisions of section 65(1) of the Act:

a. Dead specimens of any alien species, including:

g. Releasing any specimen of a listed invasive species.	Prohibited	Prohibited	Permit Required	Prohibited
h. The transfer or release of a specimen of a listed invasive fresh-water species from one discrete catchment system in which it occurs, to another discrete catchment system in which it does not occur; or, from within a part of a discrete catchment system where it does occur to another part where it does not occur as a result of a natural or artificial barrier.	Prohibited	Prohibited	Permit Required	Prohibited
i. Discharging of or disposing into any waterway or the ocean, water from an aquarium, tank or other receptacle that has been used to keep a specimen of an alien or a listed invasive species.	Prohibited	Prohibited	Permit Required	Prohibited
j. Catch and release of a specimen of a listed invasive fresh-water fish or listed invasive fresh-water invertebrate species.	Prohibited	See Notice 3	See Notice 3	See Notice 3
k. The introduction of a specimen of an alien or a listed invasive species to off-shore islands.	Prohibited	Prohibited	Prohibited	Prohibited
l. The release of a specimen of a listed invasive fresh-water fish species, or of a listed invasive fresh-water invertebrate species, into a discrete catchment system in which it already occurs.	See Notice 3	See Notice 3	See Notice 3	See Notice 3

- (i) dead specimens imported, kept, or removed from one area to another as taxonomic reference specimen;
 - and
 - (ii) dead specimens used as derivatives in products, including food, cosmetics and detergents.
- b. Subject to e, any alien species that has been legally introduced into the Republic, or was introduced into the Republic prior to any legal requirement for such introduction, for agricultural purposes, and any new cultivar, variety, or hybrid of any species legally imported for agricultural purposes (excluding those which are already listed as invasive).
- c. Subject to e, any alien species, other than an alien species introduced for agricultural purposes as contemplated in paragraph (b) above, that has been legally introduced into the Republic, or was introduced into the Republic prior to any legal requirement for such introduction, prior to the commencement of this Notice.
- d. Any invasive species listed in terms of section 70(1)(a) of the Act.
- e. All alien fresh-water fish, except for the release of alien freshwater fish into rivers, wetlands, natural lakes and estuaries.
2. The following categories of alien species that are not within the Republic when this Notice comes into effect and comes into the Republic from outside of the Republic are exempted from the provisions of section 65(1) of the Act:
- a. Any alien species that-
 - (i) has been subjected to a risk assessment and authorised for importation in terms of the Act; and
 - (ii) is listed in a register of alien species legally imported into the Republic for the first time after the date of publication of the Alien and Invasive Species Regulations, 2014 and this Notice, which register is established and maintained by the Institute.
 - b. Dead specimens of any alien species including:
 - (i) dead specimens imported, kept, or removed from one area to another as taxonomic reference specimens; and
 - (ii) dead specimens used as derivatives in products, including food, cosmetics and detergents.
 - c. Any invasive species listed in terms of section 70(1)(a) of the Act.

3. APPENDIX 3: SPECIALIST DECLARATION OF INDEPENDENCE



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	
NEAS Reference	
Number: Date Received:	

Application for integrated environmental authorisation and waste management license in terms of the-

- (1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014; and
- (2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 921, 2013

PROJECT TITLE

Vegetation Impact Assessment: For the Proposed Construction of a Sewer Reticulation in Ntuzuma B, in the eThekweni Municipality of KwaZulu-Natal.

Specialist:
Contact person:
Postal address:
Postal code:
Telephone:
E-mail:
Professional affiliation(s) (if any)

Bryan Paul (Author) and Kerry Stanton (Senior Specialist)		
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3603	Cell:	
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ksems@ksems.co.za		
- SACNASP Accredited Natural Scientist (no. 400167/12) – Kerry Stanton		
- SACNASP Certificated Botanical Scientist (119552) Bryan Paul		

Project	KSEMS Environmental Consulting (Pty) Ltd		
Consultant:	Simone Lewis		
Contact person:	Simone Lewis		
Postal address:	PO Box 396	Cell:	082 893 7059
Postal code:	3603	Fax:	086 535 5281
Telephone:	063 684 9195		
E-mail:	Simone@ksems.co.za		

4.2 The specialist appointed in terms of the Regulations_

I, Bryan Paul, declare that --

General declaration:

I act as the independent specialist in this application;

I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;

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

I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;

I will comply with the Act, Regulations and all other applicable legislation;

I have no, and will not engage in, conflicting interests in the undertaking of the activity;

I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;

All the particulars furnished by me in this form are true and correct; and

I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of Section 24F of the Act.



Signature of the specialist:

KSEMS Environmental Consulting (Pty) Ltd

Name of company (if applicable):

14 August 2020

Date: