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## FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

**THE PROPOSED DEVELOPMENT OF ROYPOINT HOUSING  
UNITS WITHIN THE NEWCASTLE LOCAL MUNICIPALITY,  
AMAJUBA DISTRICT, KWA-ZULU NATAL.**

**REF NO: DC25/003/2020: KZN/EIA/0001310/2020**

**OCTOBER 2020**

**Prepared for:**



**On Behalf of**



**Newcastle Local Municipality**

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## LIST OF ACRONYMS

ADM	Amajuba District Municipality
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GA	General Authorisation
GIS	Geographic Information Systems
I&AP	Interested and Affected Parties
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act
NLM	Newcastle Local Municipality
PES	Present Ecological Sensitivity
PPP	Public Participation Process
SCC	Species of Conservation Concern

## PROJECT DETAILS

### Developer (DEV)

Name of the Developer	Newcastle Local Municipality
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### Environmental Assessment Practitioner (EAP) Details

Name of Consultancy	Emvelo Quality and Environmental Consultant (PTY)Ltd
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## GLOSSARY OF ITEMS

**DEVELOPMENT:** the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

**BIODIVERSITY:** The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

**BASIC ASSESSMENT:** The process of collecting, organizing, analyzing, interpreting and communicating information that is relevant to the consideration of the application.

**DEVELOPMENT FOOTPRINT:** any evidence of physical alteration as a result of the undertaking of any activity.

**CONTRACTOR:** companies and or individual persons appointed on behalf of the client to undertake activities, as well as their sub-contractors and suppliers.

**ENVIRONMENTAL CONTROL OFFICER:** an individual nominated through the client to be present on-site to act on behalf of the client in matters concerning the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities as prescribed in NEMA.

**ENVIRONMENT:** in terms of the National Environmental Management Act (NEMA) (No 107 of 1998) (as amended), Environment means the surroundings within which humans exist and that are made up of:

- ✚ the land, water, and atmosphere of the earth;
- ✚ micro-organisms, plants and animal life;
- ✚ any part or combination of (i) of (ii) and the interrelationships among and between them;
- ✚ the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence;
- ✚ Human health and wellbeing.

**ENVIRONMENTAL IMPACT:** the change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services.

**MITIGATION:** the measures designed to avoid reduce or remedy adverse impacts.

**ENVIRONMENTAL MANAGEMENT PROGRAMME:** a detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of the project. This EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

**POLLUTION:** the National Environmental Management Act, No. 107 of 1998 defined pollution to mean any change in the environment caused by the substances; radioactive or other waves; or noise, odors, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience, and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

**WATER POLLUTION:** the National Water Act, 36 of 1998 defined water pollution to be the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful (a) to the welfare, health or safety of human beings; (b) to any aquatic or non-aquatic organisms; (c) to the resource quality; or (d) to property.

**REHABILITATION:** rehabilitation is defined as the return of a disturbed area to a state which approximates the state (wherever possible) which it was before the disruption.

**WATERCOURSE:** can be a) a river or spring; b) a natural channel or depression in which water flows regularly or intermittently; c) a wetland, lake or dam into which, or from which, water flows; and/or d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

**WETLAND:** the land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.



**INDIGENOUS VEGETATION:** refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

**GENERAL WASTE:** waste that does not pose an immediate hazard or threat to health or the environment, and includes -

- domestic waste;
- building and demolition waste;
- business waste; and
- inert waste.

**HAZARDOUS WASTE:** hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste have a detrimental impact on health and the environment.

**GENERAL WASTE LANDFILL SITE:** a waste disposal site that is designed, managed, permitted and registered to allow for the disposal of general waste.

**ARCHAEOLOGICAL RESOURCES:** includes (a) material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures; (b) rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation; wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artifacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

**INTERESTED AND AFFECTED PARTY:** for the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, an interested and affected party contemplated in Section 24(4) (a) (v), and which includes (a) any person, group of persons or organization interested in or affected by such operation or activity; and (b) any organ of state that may have jurisdiction over any aspect of the operation or activity.

## EXECUTIVE SUMMARY

The Newcastle Local Municipality (NLM) intends to formalize 780 low-income housing units for the Roypoint informal settlement. The formalization will include the development of single-story residential dwellings (Low-cost housing), road infrastructure and the installation of bulk services such as water, sewage, electricity and storm water systems. The total development footprint will be 38 hectares.

The property in which the proposed development is to be undertaken is owned by the Newcastle Local Municipality. The proposed site is situated, approximately 7 km southeast of the Newcastle town. The current zoning of the property is Residential.

Envelo Quality and Environmental Consultant (PTY) Ltd has been appointed by the Newcastle Local Municipality (the applicant), as the independent Environmental Assessment Practitioner (EAP), to facilitate the Scoping/Environmental Impact Assessment Process required in terms of the National Environmental Management Act ,1998 (Act. No. 107 of 1998) for this application.

The site is located within the V31K quaternary catchment and is bordered by two river systems; the Ingagane river on the west and an unnamed non-perennial stream on the south. The highly sensitive areas include the small portion of the study area that is covered by the Eastern Temperate Freshwater Wetlands, two NFEPA wetlands and the catchment area that has been earmarked for conservation by the KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP).

The terrain (site) is relatively flat with the vegetation cover classified as KwaZulu-Natal High Thornveld (National Threat Status: Least Threatened) and consists of an open natural grassland mainly dominated by *Hyparrhenia hirta*. The ecological impact study identified a total of 20 species of grasses and forbs and no species of conservation concern.

The Cultural Heritage field survey for the proposed project identified no site, features or objects of cultural significance known to exist in the study area. There are also no graves that were identified within the proposed study area. The local community bury their deceased at the Roypoint cemetery (27°47'14.62" S, 29°59'07.02" E), on a different portion of the Roypoint farm.

The National Environmental Management Act, 1998 (Act. No. 107 of 1998), and the Environmental Impact Assessment Regulations of 2014 as amended in 2017, govern the process of applying for environmental authorization for certain developments. A provision in the EIA Regulations is made for two forms of assessment: Basic Assessment and Scoping and EIA. The EIA regulations specify that: Activities identified in Listing Notice 1 and 3 (GNR 327 and 324 of 2017) requires Basic Assessment while Activities identified in Listing Notice 2 (GNR 325 of 2017) are subject to a Scoping and EIA.

The proposed development triggers some “listed activities” as defined by the National Environmental Management Act (107 of 1998), and the Environmental Impact Assessment Regulations of 2014 as amended in 2017. Listed activities are activities, which have the potential to induce detrimental impacts on the environment and therefore require environmental authorisation from the relevant authorising body. The proposed Roypoint Housing development project occurs in the KwaZulu-Natal Province and thus the KZN Department of Economic Development, Tourism and Environmental Affairs is the responsible regulatory authority. The listed activities associated with the proposed development include Listing Notice 2 Activity 15, therefore, this application will follow a Scoping/EIA process.

The Public Participation Process for both the Scoping and Environmental Impact Assessment were undertaken in accordance with chapter 6 of GN No. 326 (7 April 2017). The following section outlines steps to be followed during the EIA.

## Scoping

Scoping Phase
Interested and Affected Parties (I&APs) have been identified throughout the process. Initial identification of I&APs includes immediate landowners, ward councilors, local and district municipalities, and relevant state departments and organs of state.
Notification letters have been posted to all identified I&APs informing them of the proposal, the opportunity to comment and the availability of the Scoping Report.
The A3 notices have been placed at random locations within and around the proposed site, in order to notify the local residents of the settlement.
A site notice measuring A3 has been set up at the entrance to the site and to other locations around the site.
An advertisement was placed on the Newcastle advertiser (15/11/2019).
A public meeting was held with community members (30/11/2019).

Copies of the report were delivered or sent via an email to relevant State Departments and Organs of State. Their comment were requested in terms of section 24 of NEMA.

All comments received during this commenting period were included in the Final Scoping Report before submission to EDTEA.

A Comments and Response Table was also included – this table summarises the comments received, and how each comment is responded to.

## EIA

### EIR PHASE

Received approval for the Scoping Report and the Plan of Study for EIA.

Compile Draft Environmental Impact Report (EIR) for public comment based on specialist information.

Submit copies of the Draft EIR to EDTEA and relevant State Departments and Organs of State and notify them of the commenting period (in terms of Section 24 of NEMA).

Registered I&APs were notified of the opportunity to comment on the Draft EIR.

The Draft EIR was made available for a 30-day commenting period.

Comments on the Draft EIR were received and recorded on the Stakeholders engagement report, attached as appendix D9 of this Final EIR.

The final EIR has been prepared for submission to EDTEA including proof of the Public Participation Process, comments received and our responses to these comments, which can be found under Appendix D.

A Scoping Report was compiled where the main objectives were to identify key issues of concern as highlighted by the relevant authorities, Interested and/or Affected Parties (I&AP), the professional judgement by the Environmental Assessment Practitioner (EAP) and to identify anticipated impacts, particularly those, which require specialist investigations.

This Environmental Impact Assessment report combines the results of the specialist studies, a full assessment of the impacts (including cumulative) and proposed alternatives. An Environmental Management Programme (EMPr), environmental impact statement and an authorisation opinion conclude this EIA Report.

The key environmental issues that were identified during the scoping phase are:

- Soil degradation
- Impact on fauna, flora and ecological functioning
- Impacts on water resources

- Social impact (economic and educational opportunities)
- Impact on heritage resources
- Visual impact

As a result of the afore-mentioned anticipated impacts, a number of specialist studies were undertaken. The main aim for conducting such studies is to enhance the understanding of the systems processes and all potential impacts (both positive and negative) of the proposed development; The specialist studies undertaken for this application are listed below;

- Geotechnical Impact Assessment
- Traffic Impact Assessment
- Ecological impact assessment
- Wetland impact assessment
- Heritage impact assessment
- Paelontological Impact Assessment

The specialist studies undertaken on the proposed site all concluded that the proposed development may proceed on site provided that the recommendations are properly implemented. All other foreseeable negative Impacts identified were assessed for their significance and most of them can be brought down to a low significance if the appropriate mitigation measures recommended are implemented precisely.

The proposed development is perceived to have a great positive impact on improving the socio-economic status of the area in question. Therefore, provided that the recommendations included in this report are adhered to and implemented, all stakeholders should approve of and support the development.

This final EIA Report is currently being released to be reviewed by the competent authority (EDTEA – Amajuba District), for an Environmental Authorization decision for the proposed project. All comments received throughout the public participation process have been summarized and included in this final EIA Report, attached as Appendix D.

## **1. INTRODUCTION**

Emvelo Consultant has been appointed by the Newcastle Local Municipality, to undertake the Environmental Impact Assessment (EIA) for the Proposed Development of Roypoint housing units, within the Jurisdiction of the Newcastle Local Municipality, Amajuba District, Kwa-Zulu Natal Province.

This will include the facilitation of the Scoping/Environmental Impact Assessment processes required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for this application.

## **2. PROJECT TITLE**

The Proposed Development of Roypoint Housing Units, within the Jurisdiction of the Newcastle Local Municipality, Amajuba District, Kwa-Zulu Natal.

## **3. PROJECT DESCRIPTION**

The project entails the formalization of the existing informal settlement and will consist of 780 housing units. The formalization will include; the development of single-story residential dwellings (Low-cost housing), road infrastructure and the installation of bulk services such as water, sewage, electricity and storm water systems. The total development footprint is approximately 38 hectares.

The current zoning of the property is residential, which is primarily made up of well laid out semi-informal settlement and a number of vacant “stands”.

## **4. GEOGRAPHICAL CONTEXT**

The proposed development is located at the Vezobuhle settlement, portion 22 of the Roypoint farm, within the Newcastle Local Municipality, under the Amajuba District which is in the north-west of the KwaZulu-Natal Province. The site is located southeast of the Newcastle CBD, adjacent to the railway line running into the town.

The proposed site (Roypoint settlement) is bordered by the Ingagane river on the north and west, an unnamed stream on the south, and the vacant land (privately owned) on the east.

Below is the geographical context and locality map of the proposed site, (see figure 1 below).

**Figure 1: Geographical Context and Locality Map**

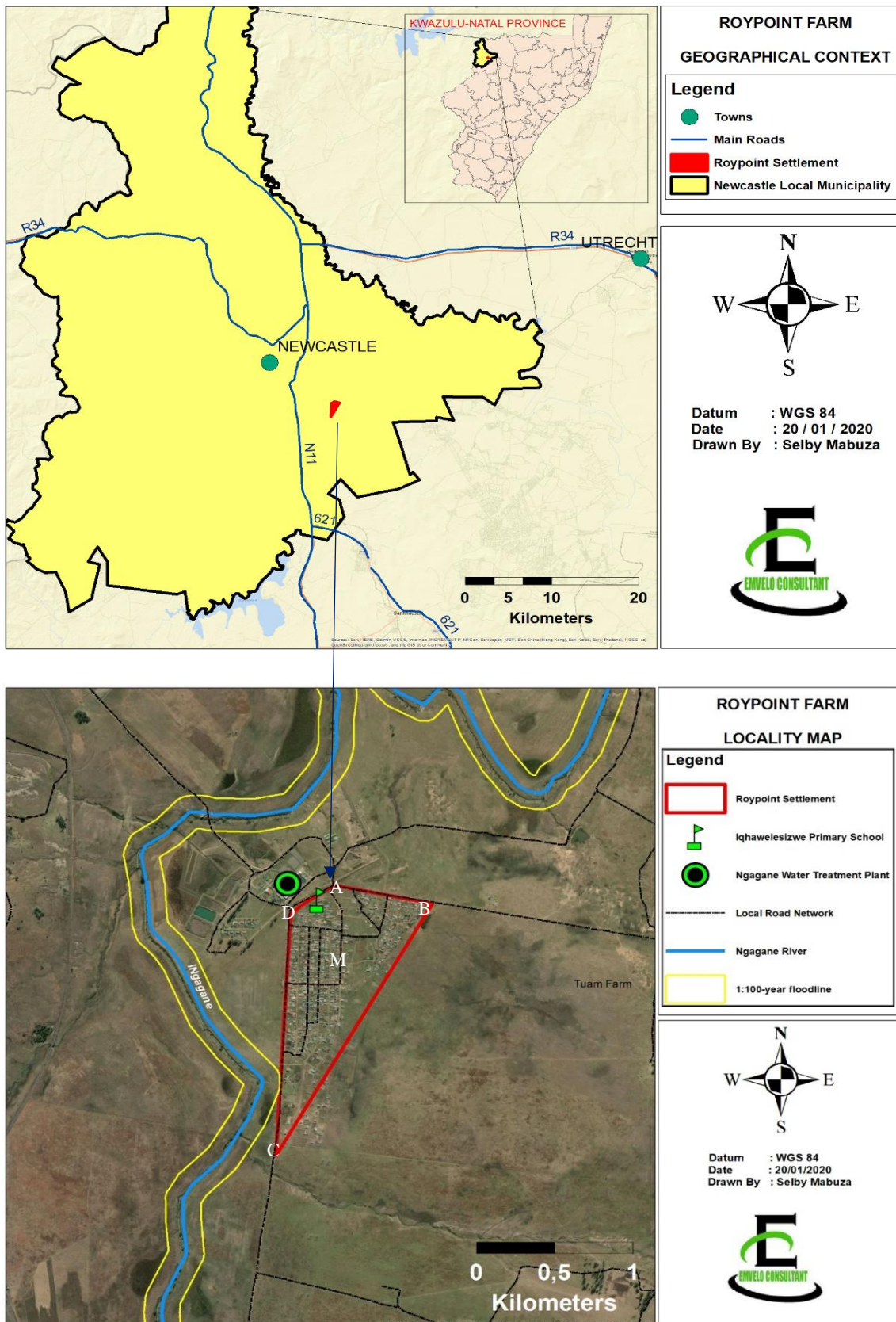


Table 1 below provides the Global Positioning System (GPS) coordinates for the proposed development site.

**Table 1: GPS Coordinates**

Farm Portions		GPS CO-ORDINATES	
	Latitude	Longitude	
Point A	27° 48' 07.61" S	29° 59' 44.48" E	
Point B	27° 48' 11.13" S	30° 00' 05.81" E	
Point C	27° 48' 57.56" S	29° 59' 32.59" E	
Point D	27° 48' 12.29" S	29° 59' 35.29" E	
Mid-Point (M)	27° 48' 28.01" S	29° 59' 41.86" E	

Table 2 below provides the 21-digits Surveyor General Code (SGC).

**Table 2: 21-digits Surveyor General Code**

N	0	H	S	0	0	0	0	0	0	0	0	2	9	5	9	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

## 5. SITE ACCESS

The site takes its access from 3 routes. The first route is from the Newcastle town CBD, via Allen street going south, taking a left to join the N11 national road. Then it continues going to the northeasterly direction for about 900m, before joining the Madadeni road, then to the Karbochem road to the south, going to the Roypoint settlement. Also, the road to the south leads to the industrial area of Chivelston and the residential area of Ngagane, and the road to the east leads to the residential townships of Amajuba.

## 6. CURRENT LAND USE

The zoning of the proposed development site is residential, and it consists of an already established Roypoint Settlement. The site is triangular in shape and it consists of a relatively well laid out informal housing settlement and a number of vacant “stands”.

The surrounding area is predominantly undeveloped, other than the water purification works to the north of the proposed site.



## **7. SERVICES**

The design of the internal services for the proposed development was calculated in accordance with the following Civil Engineering Guidelines:

- Guidelines for Human Settlement Planning and Design, CSIR (Redbook).
- Guidelines and Standards for the Design and Maintenance of Civil Engineering Services (City of Tshwane).
- The National Building Regulations, SANS 0400 – 1990.
- Construction will be specified to be in accordance with SABC/SANS 1200.
- The UTG7 publication, the “Geometric Design of Urban Local Residential Streets”.

### **7.1. Water Supply**

#### **7.1.1. Existing Bulk Water Supply**

Bulk water supply services for the proposed development are available. The area, which is currently made up of “semi-informal” stands, currently supplied with water by a 50kl elevated storage tank. The storage tank distributes the water through standpipes.

The water supply to the proposed development will be supplied from the pipeline supplying water to the Ngagane Village that is running on the Western boundary of the proposed site. The developer will have to do an investigation to check if the line will be sufficient in terms of capacity and pressure. A letter from the municipality confirming the bulk service availability for the proposed project has been obtained, and attached as appendix G (Layout).

#### **7.1.2. Proposed Water Demand**

A proposed water reticulation with a house connection to each stand will be provided. The total average annual daily demand (AADD) and design peak flow for the proposed development are summarized in Table 3 below. The calculations are based on the maximum projected total units that can be developed with each occupied by 5 persons on average and each occupant consuming 500 l/d as specified in “The Red Book”.

**Table 3: Water Demand**

Zoning	No of Stands	Average Water Demand (l/d)	Average Daily demand(l/s)	Peak Factor	Instantaneous Peak flow (l/s)
RESIDENTIAL	780	600	6.250	4.0	25.000
<b>Total Instantaneous Peak Demand</b>					<b>25.000</b>

### 7.1.3. Proposed Internal Water Reticulation.

The pipe sizes and type will be 110mm mPVC class 12. The water mains to be installed will be 0.75m and 2m from the erf boundary forming a loop. Isolating valves will be placed at the reticulation nodes to provide effective isolation of loops.

### 7.1.4. Upgrades.

From the information gathered from the Newcastle municipality water and sanitation department, the developer will have to conduct an investigation to confirm if there is enough capacity and pressure or if there is a need for an upgrade.

## 7.2. Sewer.

### 7.2.1. Existing Bulk Sewer.

The area currently makes use of Ventilated Improve Pit (VIP) toilets and has no waterborne sewerage system. There is also no bulk sewer system in the area. The nearest treatment works is the Kilbarchan. The development will make use of this waste water treatment plant.

### 7.2.2. Proposed Sewage Discharge

A full waterborne sewerage reticulation with a house connection to each stand will be provided. All sewerage on the development will drain through the gravity waterborne system towards a central collection point on the lowest point of the development. The total peak flows for the proposed development are summarized in Table 4 below.

**Table 4: Sewer Design Outflow**

Zoning	No of Stands	Discharge (l/d)	Average Daily Flow Rate(l/s)	Peak Factor	Peak flow rate(l/s)
RESIDENTIAL	780	500	5.208	2.5	13.021
<b>Total</b>				<b>Outflow</b>	<b>13.021</b>
				<b>Total Incl. 15% Extraneous Flow</b>	<b>14.9740</b>

**7.2.3. Proposed Sewer Reticulation**

A full sewerage reticulation and toilets to each erf is required. The pipes will be 160 mm diameter uPVC Class 400 and the manholes will be 1 000 mm diameter precast rings with concrete covers.

**7.3. Electrical Supply**

**7.3.1. Existing Electrical Supply**

The proposed development currently has electricity supply via overhead poles to existing stands.

**7.3.2. Proposed Electricity and Street Lighting**

Due to proposed changes to the current settlement pattern on-site to a formal, approved and promulgated township; there will be a need to redo the existing electrical reticulation to align with a new Township Layout. As such, overhead powerlines with erf connections will be required as well as mast lights for public areas.

**7.3.3. Upgrades**

A new substation for 10MVA transformer will be required for 132KV switching.

**7.4. Roads**

**7.4.1. Existing Roads**

There are no existing tarred roads around the proposed development. The local access road to the proposed development is a gravel road.

#### **7.4.2. Access**

Access will be taken directly from the un-named untarred local distributor Road which starts from Chivelston towers near Ingagane settlement pass by the southwestern direction to the northwestern direction of the site and continues until it ties into another unknown road which connects Madadeni and Osizweni townships.

#### **7.4.3. Proposed Internal Roads**

The roads network will be designed to provide an access point to each residential stand.

### **7.5. Stormwater Systems**

#### **7.5.1. Existing Stormwater**

There is no existing stormwater system around the site. The proposed development will drain from the new Streets on the western side and on the Eastern side to the Northern direction through stormwater pipe system which will discharge into the Ingagane River on the far northern side of the site.

#### **7.5.2. Stormwater Run-off Zones**

The determination of peak flows of the various drainage zones will be calculated. The proposed roadways will form part of the stormwater management system as the surface flow will be utilized as far as possible. A roadway system will carry the minor storms and will discharge into a pipe system that will discharge directly into the natural watercourses (Ingagane River). Concrete stormwater pipes will be allowed where the velocity under the 5-year condition is less than 2.5 m/s.

#### **7.5.3. Proposed Stormwater System**

Stormwater will be collected and transported by means of mountable kerbs drains into the stormwater concrete pipe system and into Ingagane River.

## **8. ACTIVITY MOTIVATION**

### **8.1. Need**

The Vezobuhle settlement is an informal settlement which consists of families who are settled on a farm called Roypoint, at the Newcastle Local Municipality. Within the municipality, especially in low income and poor communities, the population growth rate is in an upward trajectory, with glaringly disturbing inequalities characterized by a large number of informal housing facilities and lack or poor provision of basic services.

As a result, the KwaZulu Natal Department of Human Settlements and the Newcastle Municipality have prioritized the formalization of this settlement as part of the Integrated Residential Development Programme during the 2015/2016 financial year. This project will, therefore, provide access to more formal housing in a municipality that is experiencing population growth and hence higher human settlements demands.

### **8.2. Desirability**

The project seeks to facilitate the provision of housing in line with the national and provincial norms and standards and hence reduce housing back-logs to meet the provincial and national targets. The project will also create more opportunities for the local people, including the creation of jobs and the provision of basic services, as formal roads and sanitation facilities will be installed as part of the development. Also, the formalization of the settlement will attract businesses and services from the government, improving the overall quality of life for the local and surrounding communities.

## **9. CONSIDERATION OF ALTERNATIVES**

The DEA 2006 guidelines on 'assessment of alternatives and impacts' outlines four types of alternatives that need to be considered namely, the no-go, location, activity, and design alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the applicant and EAP, which in some instances culminates in a single preferred project proposal.

### **9.1. Site Alternatives**

The land where the proposed development will take place is owned by the Newcastle Local Municipality (the applicant). From the applicant's perspective, the Roypoint farm is currently made up of informal housing units and some vacant stands that need to be upgraded or be

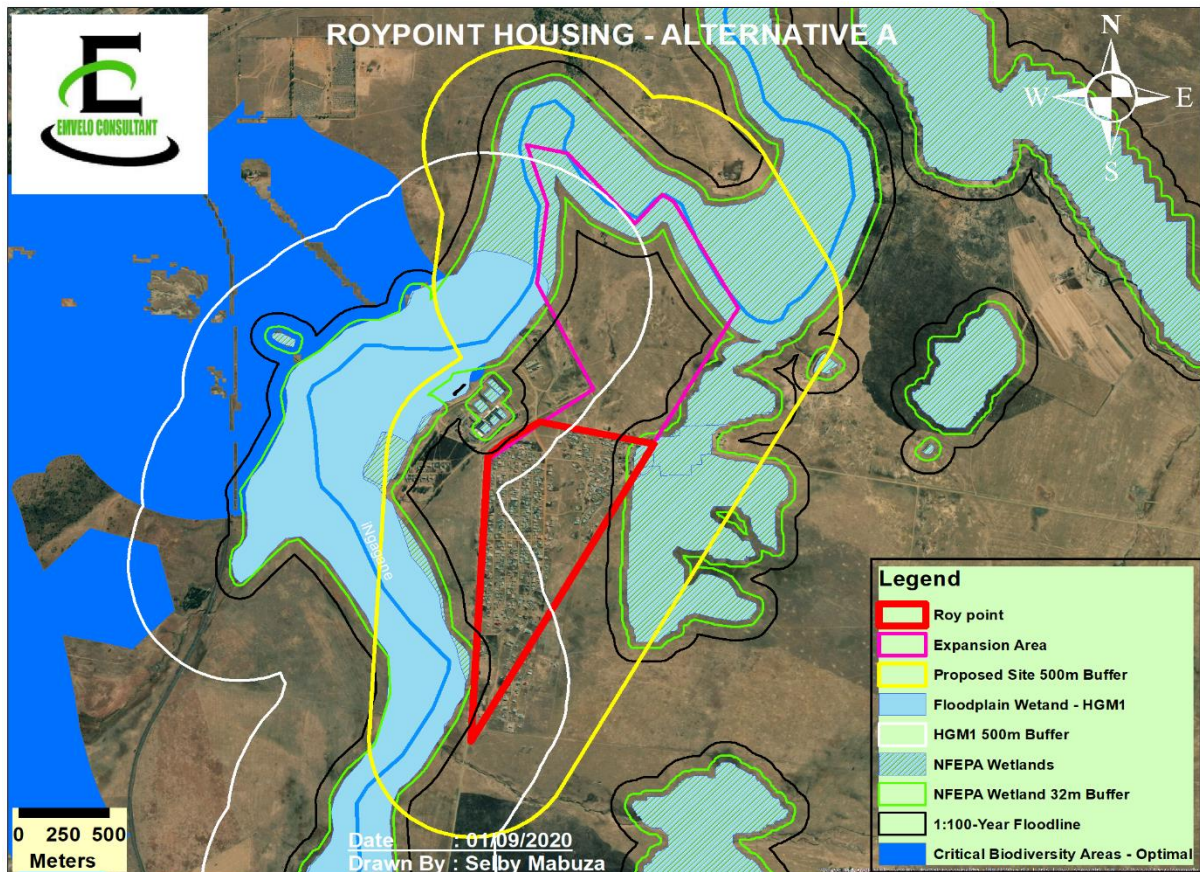
formalized. The site under consideration is next to a pipeline and Eskom servitudes running from the north to the south, and they do not form part of the proposed development footprint.

The Newcastle Local Municipality produced a Spatial Development Framework (SDF) Plan in 2012 to guide development. The SDF refers generally to the need for higher density, and more mixed-use settlements through the promotion of general development principles, including a compact urban form. The formalization of settlements is mentioned in Table 5 of the SDF and the list includes the Roy Point Informal Settlement. Taking the above into consideration, the following development alternatives are proposed for the proposed Roypoint project.

### 9.1.1. Alternative A

This alternative proposes that +/-200 housing units be developed on the wider farm portion, to the north-east of the Roypoint Settlement. The remaining 580 housing units will be developed on the vacant stands that have been identified in the area, as per the initial plan. This alternative will result in the settlement being extended towards the north-easterly portion of the Roypoint farm, which is currently undeveloped, see figure 2 below.

**Figure 2: Alternative A**



However, a GIS environmental desktop study shows that the proposed extension to the north-easterly portion of the farm falls within the 1:100-year flood line, as it is closely bordered by the Ngagane river and it has within it, wetlands that has been identified as National Freshwater Ecosystem Priority Areas - NFEPA. Therefore, this environmental condition does not allow for people to settle in the area, as the place is likely to be flooded during heavy rainfall periods, putting people's lives in danger. Also, this alternative is not desired as it does not comply with the development principle of creating a more compact urban form that is promoted in the Newcastle Municipal SDF (NLM SDF, 2012).

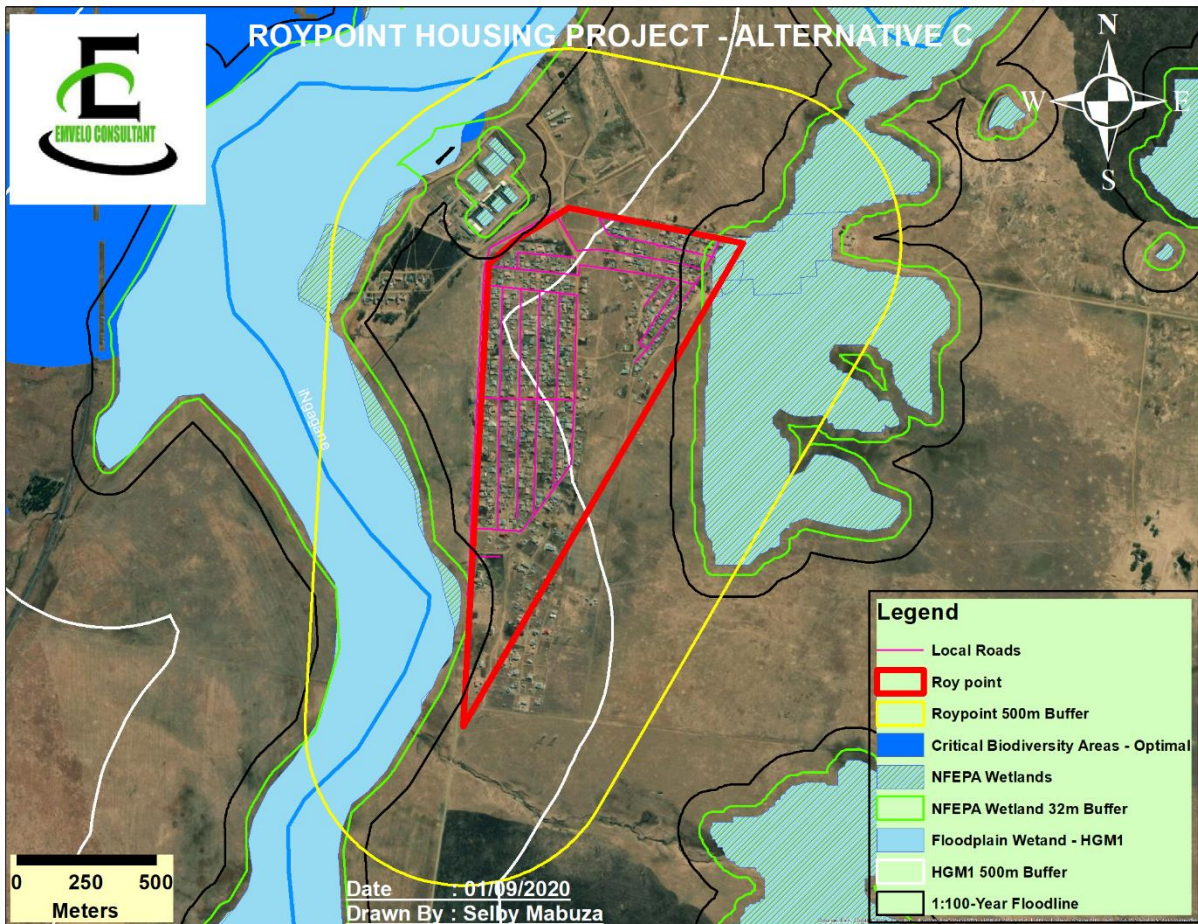
### **9.1.2. Alternative B**

This alternative development option proposes for the relocation of the affected households to a more favorable location. This alternative requires the identification and acquisition of a better site and negotiation with the existing residents, followed by the normal township application and land servicing procedures. This means that a new settlement will be established at an alternative location, other than the one currently existing at the Roypoint farm. This alternative might result in implications, which may be cultural, social, and /or economic for the local people, since the current settlement has already been established, and some people have families, jobs, cultural and social ties with the area.

### **9.1.3. Alternative C**

This alternative proposes the formalization of the existing erven and houses, so to ensure the possibility of retaining most of the ± 780 houses that have been built on the allocated "stands" in the settlement. Houses will only be constructed for those who cannot afford to build their own houses on the vacant stands identified in the area. The alternative also includes the installation of sanitation infrastructure for all the houses, old and new, and the upgrading of local roads. The current state of the settlement includes an informal layout of the roads and "stands" that are not organic and are relatively structured, entailing the necessity to follow a township establishment procedure.

## **Figure 3: Alternative C**



From an environmental perspective, alternative C is the most preferable alternative. This is due to the minimal environmental impacts that might be expected during the course of the project, as there will be a minimum clearance of vegetation. Also, upgrading the already existing houses will maximize the provision of basic services through the installation of adequate sanitation infrastructure and the upgrading of the local roads within the community. This will improve the overall standard of living for the local people of the Roypoint settlement.

It is however important to note that there are wetland systems around the proposed site, with the north-eastern corner of the proposed site boundary, transversing on a valleyhead seep wetland. Should this alternative be considered, a proposed 32m buffer must be established around this wetland and all the other wetland unit systems around the area.

## 9.2. No-Go Option

This alternative considers the option of 'doing nothing' and maintaining the status quo. This means that no housing units will be constructed for the local people of the Roypoint area. This will ensure that the current state of the area is maintained, including its ecological and social makeup. However, there will also be no positive impacts associated with the project, for



instance, the provision of formal housing facilities, adequate sanitation infrastructure, the provision of job opportunities and skills development, etc. In this case, if the proposed development does not happen, the above-mentioned positive impacts will not be achieved.

## 10. LEGISLATION AND GUIDELINE CONSIDERED

The legislation that has a possible bearing on the proposed project from an environmental perspective is captured in Table 5 below. Note: this list does not attempt to provide a detailed explanation, but rather represents an identification of the most appropriate sections from pertinent pieces of legislation.

**Table 5: Environmental Statutory Framework**

Legislation	Relevance and Relevance
Constitution of the Republic of South Africa, (No. 108 of 1996)	<ul style="list-style-type: none"> <li>➤ Chapter 2 – Bill of Rights.</li> <li>➤ Section 24 – Environmental Rights.</li> </ul>
National Environmental Management Act (NEMA) (No. 107 of 1998)	<ul style="list-style-type: none"> <li>➤ Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment).</li> <li>➤ Section 28 – Duty of care and remediation of environmental damage.</li> <li>➤ Environmental management principles.</li> <li>➤ Authorities – Department of Environmental Affairs (DEA) (national) and Department of Economic Development Tourism and Environmental Affairs (provincial).</li> </ul>
GN No. 326 (7 April 2017)	<ul style="list-style-type: none"> <li>➤ Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing, and consideration of, and decision on, applications for environmental authorizations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimize positive environmental impacts, and for matters pertaining thereto.</li> </ul>
GN No. 325 (7 April 2017) (Listing Notice 2)	<ul style="list-style-type: none"> <li>➤ Purpose - identify activities that would require environmental authorizations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA.</li> <li>➤ The investigation, assessment, and communication of the potential impact of activities must follow the procedure as prescribed in regulations</li> </ul>

	<p>21, 22, 23 and 24 of the EIA Regulations published in terms of section 24(5) of the Act unless otherwise indicated by the Minister in a government notice.</p> <p>➤ Activities under Listing Notice 2 that are relevant to this project are as follows:</p>	<p><b>GN No.325-Activity no 15:</b></p> <p>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for;</p> <p>(i) The undertaking of linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>The proposed development requires the clearance of more than 20 hectares of indigenous vegetation, as approximately 38 hectares in total will have to be cleared.</p>
<p>National Water Act (Act No. 36 of 1998)</p>	<ul style="list-style-type: none"> <li>➤ Chapter 3 – Protection of water resources.</li> <li>➤ Section 19 – Prevention and remedying effects of pollution.</li> <li>➤ Section 20 – Control of emergency incidents.</li> <li>➤ Chapter 4 – Water use.</li> <li>➤ Authority – Department of Water and Sanitation (DWS).</li> </ul>		
<p>National Environmental Management Air Quality Act (Act No. 39 of 2004)</p>	<ul style="list-style-type: none"> <li>➤ Air quality management</li> <li>➤ Section 32 – Dust control.</li> <li>➤ Section 34 – Noise control.</li> <li>➤ Authority – EDTEA.</li> </ul>		
<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</p>	<ul style="list-style-type: none"> <li>➤ Management and conservation of the country's biodiversity.</li> <li>➤ Protection of species and ecosystems.</li> <li>➤ Authority – EDTEA.</li> </ul>		
<p>Occupational Health &amp; Safety Act (Act No. 85 of 1993)</p>	<ul style="list-style-type: none"> <li>➤ Provisions for Occupational Health &amp; Safety</li> <li>➤ Authority – Department of Labour.</li> </ul>		
<p>National Heritage</p>	<ul style="list-style-type: none"> <li>➤ Section 34 – protection of structure older than 60 years.</li> <li>➤ Section 35 – protection of heritage resources.</li> <li>➤ Section 36 – protection of graves and burial grounds.</li> </ul>		

Resources Act (Act No. 25 of 1999)	➤ Authority – KwaZulu Natal Heritage Resources Authority (KZHRA)
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### 10.1. National Environmental Management Act

According to Section 2(3) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), “*development must be socially, environmentally and economically sustainable*”, which means the integration of these three factors into planning, implementation, and decision-making so as to ensure that development serves present and future generations is critical.

The proposed development of the Roypoint housing units will require authorization in terms of NEMA. The EIA is being undertaken in accordance with the EIA Regulations of 2014 as amended in 2017. The project triggers activities under Listing Notices 2 and thus it would be subjected to a Scoping and EIA process. The listed activities triggered are explained in the context of the project in Table 5.

### 10.2. National Water Act

The purpose of the National Water Act, 1998 (Act No. 36 of 1998) is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which consider amongst other factors:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial and gender discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Providing for the growing demand for water use; protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and droughts.

Part 1 of Chapter 4 (Use of Water) of the NWA sets out general principles for regulating water use. In general, water use must be licensed unless it is listed in Schedule I, as an Existing Lawful Use, is permissible under a General Authorisation, or if a responsible authority waives

the need for a license. The Minister may limit the amount of water that a responsible authority may allocate. In making regulations the Minister may differentiate between different water resources, classes of water resources.

The project entails the following activities that constitute water uses in terms of Section 21 of the NWA:

- Section 21(c) - Impeding or diverting the flow of water in a watercourse (instream works associated with access roads' crossings and placing towers within the regulated area of a watercourse); and
- Section 21(i) - Altering the bed, banks, course or characteristics of a watercourse (instream works associated with access roads' crossings and placing towers within the regulated area of a watercourse); and
- Separate approval for water uses will be sought from the DWS.

### **10.3. Guidelines**

The following guidelines were considered during the preparation of the Scoping Report:

- Integrated Environmental Management Information Series, in particular, Series 2 – Scoping (DEAT, 2002);
- Guideline on Alternatives, EIA Guideline and Information Document Series (DEA&DP, 2010a);
- Integrated Environmental Management Guideline Series 5: Companion to the EIA Regulations 2010 (DEA, 2010a);
- Integrated Environmental Management Guideline Series 7: Public Participation in the EIA Process (DEA, 2010b); and
- Guidelines for Involving Specialists in the EIA Processes Series (Brownlie, 2005).

### **10.4. Regional Plans**

The following regional plans were or will be considered during the execution of the EIA (amongst others):

- The municipal Spatial Development Framework (SDF);
- The municipal Integrated Development Plan (IDP);
- Amajuba District Municipality Biodiversity Plan, 2015; and
- Other relevant national, provincial, district and local policies, strategies, plans, and programs.

## 11. EIR PROCESS

### 11.1. Environmental Assessment Practitioner

In accordance with Appendix 3, Section 3(1)(a) of GN No. 326 (7 April 2017), this section provides an overview of Emvelo Consultant and the company's experience with EIAs, as well as the details and experience of the EAPs that form part of the project.

Emvelo Consultant is an independent quality and environmental practitioners' firm, specializing in Environmental Impacts Assessment studies, Environmental Monitoring and Auditing, Surface and Groundwater Monitoring just to name a few. The company is directed by a competent, experienced and capable Environmental Scientist.

The core members of Emvelo Consultant that are involved with the Scoping and EIA process, as well as the appointed Specialists for the project, are captured in table 6 and 7 below, and their respective Curriculum Vitae is contained in Appendix F.

**Table 6: Scoping and EIA Team**

Name	Qualification	Experience (Years)	Duties
Phumzile Lembede <b>Pr.Sci.Nat. Registered EAP.</b>	<ul style="list-style-type: none"> <li>BSc Honours in Environmental Management.</li> <li>B Tech in Quality Management.</li> <li>Dip in Chemical Engineering.</li> </ul>	16	<ul style="list-style-type: none"> <li>Project Manager</li> <li>Quality Control</li> <li>EIA Process</li> <li>Scoping &amp; EIR Report</li> </ul>
Selby Mabuza	<ul style="list-style-type: none"> <li>BSc Honours Candidate in Environmental Management.</li> <li>B Soc Scie in Geography and Environmental Management.</li> </ul>	1	<ul style="list-style-type: none"> <li>Scoping &amp; EIR report</li> <li>EIA process</li> </ul>
Nokulunga Goqo	<ul style="list-style-type: none"> <li>MSc candidate in Biological Sciences.</li> <li>BSc Honours in Biological Sciences.</li> <li>BSc. Environmental Sciences.</li> </ul>	2	<ul style="list-style-type: none"> <li>Quality Review</li> <li>Technical Inputs</li> </ul>

Dumisani Myeni	<ul style="list-style-type: none"> <li>• BSc Honours in Environmental Management</li> <li>• BA Environmental Planning and Development</li> </ul>	6	<ul style="list-style-type: none"> <li>• Quality Review</li> <li>• Technical Inputs</li> </ul>
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**Table 7: Specialists**

Name	Qualification	Experience (Years)	Duties
Nhlakanipho Zondi <b>Pr.Sci.Nat.</b>	<ul style="list-style-type: none"> <li>• BSc Honours in Hydrology</li> <li>• BSc in Hydrology</li> </ul>	9 years	Wetland Impact Assessment Specialist
Dr Sindiso Chamane <b>Pr.Sci.Nat.</b>	<ul style="list-style-type: none"> <li>• PhD in Grassland Science</li> <li>• MSc in Grassland Science</li> <li>• BSc Honours in Biological Sciences</li> <li>• BSc in Biological Sciences</li> </ul>	10 years	Terrestrial Ecological Impact Assessment
Roy Muroy	<ul style="list-style-type: none"> <li>• Hon Archaeology Cultural Heritage and Museum Studies</li> <li>• BA in Archaeology, Cultural Heritage and Museum Studies</li> </ul>	5 years	Heritage Impact Assessment

## 11.2. Environmental Assessment Triggers

Based on the type of activity involved, the extent and the biophysical environment within which it is set to occur as reflected in **Table 5 above**, the required environmental assessment for the project is a Scoping and EIR process. Refer to **Section 10** for the project's legal framework and specifically the activities triggered by the project in terms of Listing Notices 1, 2 and 3 of the EIA Regulations of 2014 as amended in 2017).

## 11.3. Environmental Assessment Authorities

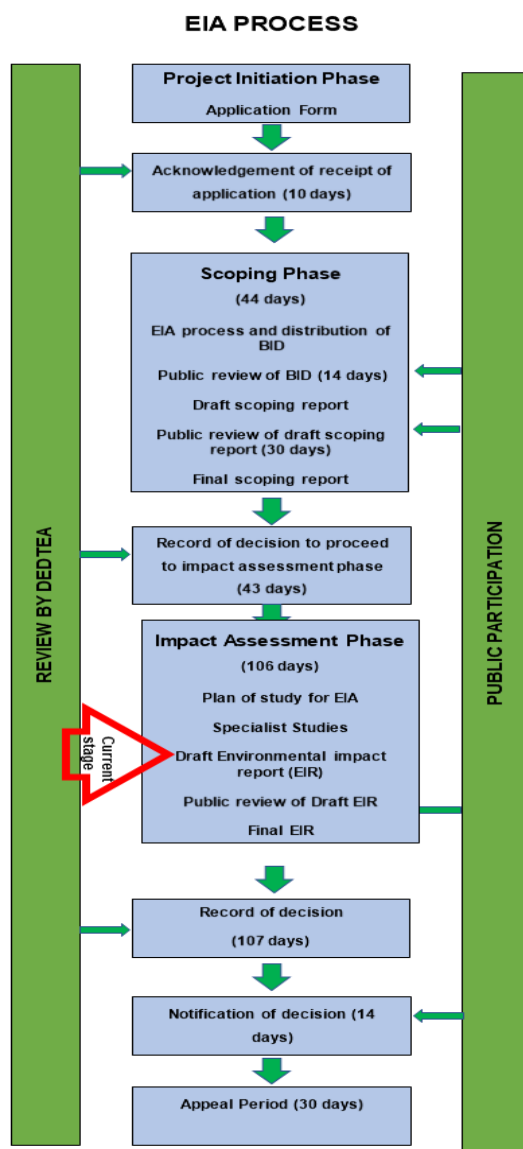
In terms of NEMA, the lead decision-making authority for the environmental assessment is EDTEA.

Various other authorities with jurisdiction over elements of the receiving environment or project activities (refer to **Section 10**) have also been consulted during the course of the EIA. Refer to the database of Interested and Affected Parties (IAPs) contained in Appendix D3 for a list of the government departments that were notified during the EIA process to date.

#### 11.4. Environmental impact assessment Process

The process for seeking authorization under NEMA is being undertaken in terms of the prevailing EIA Regulations of 2014 as amended in 2017.

An outline of the EIA process for the proposed planting of pomegranate trees is provided in **Figure 4 below**.



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**Figure 4: EIA Process**

The EIA consists of various phases as demonstrated in figure 4 above. The proposed development is currently in the Impact assessment phase. It is in this stage where all the issues that were identified and raised during the scoping phase are investigated.

#### 11.4.1. Application Phase

A copy of the Application Form was submitted to EDTEA PMB Office and the reference number has been obtained (DC25/003/2020: KZN/EIA/0001310/2020).

#### 11.4.2. Scoping and EIA Phase

Details of the proposed development were made available to all stakeholders (The public, Authorities, various organisations and specialists) through, Newspaper advert, Public meeting, distribution of BIDs, Draft scoping report, Final scoping report and the Draft Environmental Impact Report by emails, hand deliveries and courier.

**Table 8: Scoping and EIA phase steps.**

Chronology of events for EIR	
Date	Action/ Task
21/11/2019	Distribution of BID
30/11/2019	Public meeting
15/11/2019	Advertisement of EIA on Newcastle advertiser, release of newspaper
13/02/2020	EDTEA Acceptance of Application for Scoping & EIR.
18/02/2020	Distribution of Draft scoping report to all I&Aps
19/03/2020	Comment period closes for Draft Scoping Report
20/03/2020	Amended Final scoping report submitted to EDTEA
20/03/2020	EDTEA acknowledges receipt of amended final scoping report
11/06/2020	EDTEA Approves Final scoping report and Plan of study
04/09/2020	Draft Environmental Impact report (DEIR) made available to registered I&Aps
10/10/2020	Comment closes for DIER
16/10/2020	Final EIR Submission to EDTEA



The potential environmental impacts associated with the proposed project were identified in the screening and scoping phase through consideration of the following:

- Proposed locations and the extent of the proposed development, which included site investigations as well as a desktop evaluation with a Geographical Information System (GIS) (various data sources) and aerial photography;
- Site sensitivity report through the national screening tool provided by Department of Environmental affairs (appendix O)
- Activities associated with the project life-cycle (i.e. Pre-construction, construction and operational phase)
- Profile of the receiving environment and the potential sensitive environmental features and attributes;
- Input received during public participation from authorities and IAPs; and
- Legal and policy context.

The findings of the Scoping Phase were presented in a Scoping Report, which was submitted to the Competent authority (EDTEA) for approval, and also to Interested and Affected Parties (I&APs) for review and comment on the 18th February 2020. The environmental authorities approved the Scoping report on the 11<sup>th</sup> of June 2020, of which after, the environmental impact assessment phase commenced, and a draft EIR was compiled and circulated for a period of 30 days, resulting in the compilation of this final environmental impact assessment report.

The EIR is aimed at evaluating all significant environmental issues identified during the scoping phase by providing a detailed quantitative impact assessment which has been conducted via contributions from the project team and requisite specialist studies, and through the application of the impact assessment methodology contained in **Section 11**. The quantitative assessment is carried out so that suitable mitigation measures are identified. Therefore, identifying ways to manage (i.e. prevent, reduce, rehabilitate and/or compensate) the environmental impacts, and provide feasible mitigation measures that will be implemented during the preconstruction, construction and operational phase of the project and provide an EMPr which will guide the daily activities.

## **12. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE ACTIVITY**

This section provides a general description of the status quo of the receiving environment in the project area. This serves to provide the context within which the Scoping exercise was conducted. It also allows for an appreciation and identification of sensitive environmental features and possible receptors of the effects of the proposed project.

Where necessary, the regional context of the environmental features is also explained, with an ensuing focus on the local surrounding environment. More in-depth discussions on the receiving environment are provided in this EIA Report, where the findings of the requisite specialist studies have been incorporated into the document.

A brief overview is also provided on the way the environmental features may be affected (positively or negatively) by the proposed development. Significant environmental issues are discussed further in **Section 14**. This EIA report provide a comprehensive evaluation of the potential impacts and will quantify the effects on the environment based on the methodology presented in **Section 14**.

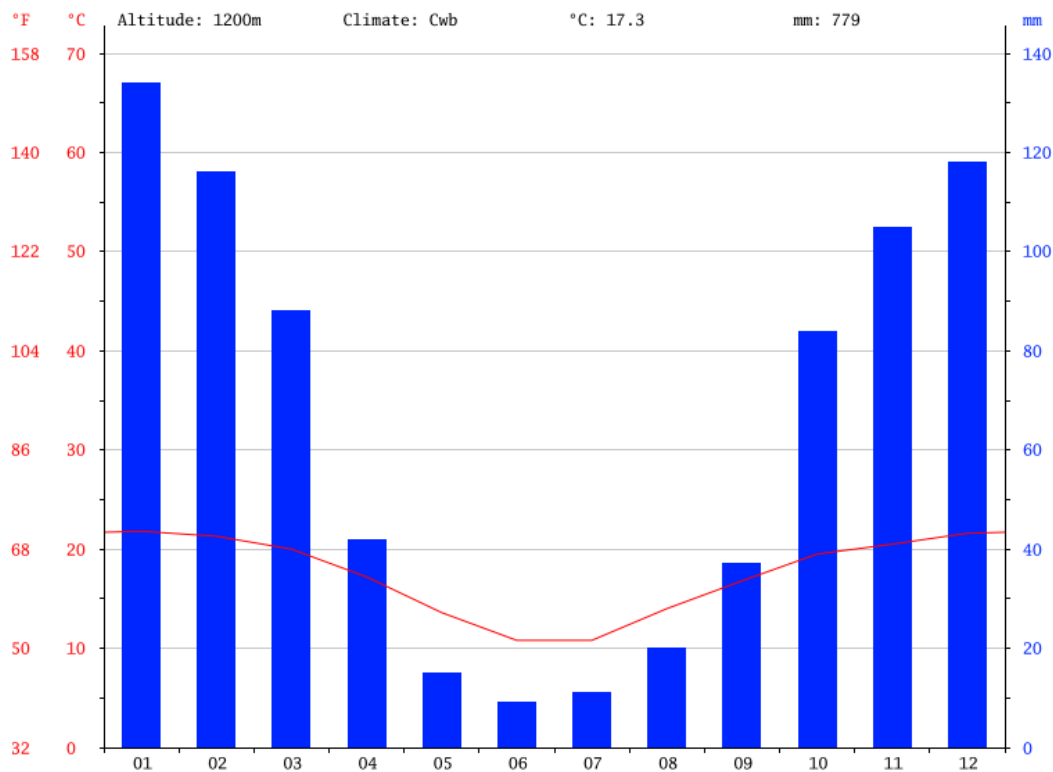
### **12.1. Climate**

The regional climatic conditions vary considerably between winter and summer months. The region (Amajuba) usually experiences very cold weather conditions in winter dropping up to less than -1 degrees Celsius and very hot weather conditions in summer reaching 30 degrees Celsius and above. The average annual rainfall is estimated to be between 504mm and 1149mm and this is consistent throughout the district with no major deviation between the local municipal regions (Amajuba District Biodiversity Sector Plan,2014).

Newcastle's Local Municipality climate is classified as warm and temperate. The summer months are much rainier than the winter months. This location is classified by Köppen and Geiger as Cwb. The average annual temperature in Newcastle is 17.3 °C and the variation in temperatures throughout the year is 11.0 °C (Climate-Data.Org).

Throughout the year the average annual rainfall is 779 mm. The variation in the precipitation between the driest and wettest months is 125 mm. Of all months the least amount of rainfall occurs in June. The average rainfall in this month is estimated to be 9 mm. The greatest amount of precipitation occurs in January, with an average of 134 mm (Climate-Data.Org).

**Figure 5: Climatic Graph**



### 12.1.1 Potential Impacts

There are no direct adverse impacts foreseen in terms of the project to climate. However, measures to reduce the project’s carbon footprint have been considered further in the EMPr.

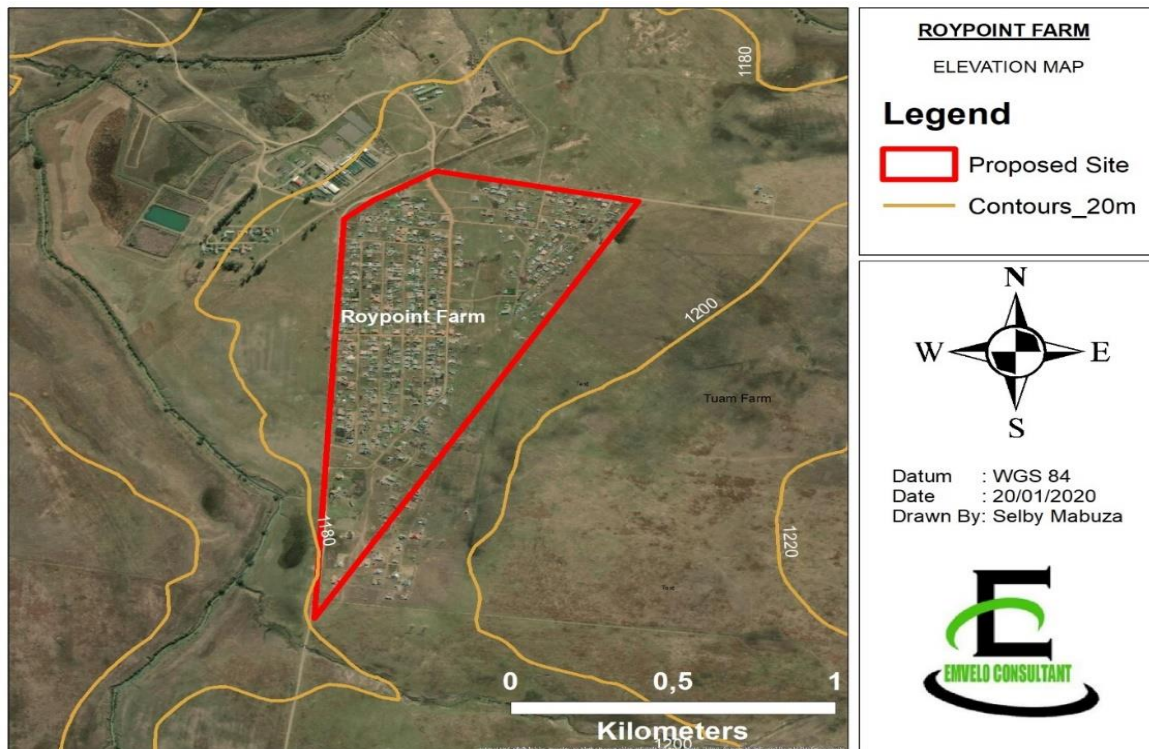
Climate change may impact on the project through extreme floods, which may pose a risk to the housing units.

### 12.2. Topography

The Newcastle Local Municipality (NLM) is characterized by two distinct physical features which almost separate the area into two distinct topographical settings. The eastern region is characterized by flat to gentle surfaces. Whereas the western regions are characterized by gentle to steep surfaces. According to the NLM IDP 2012/2017, the elevated region on the west is referred to as the Drakensburg range.

The development site is located between 1180 and 1200 meters above sea level on the eastern section of the municipality, which is characterized by gentle to flat surfaces as described above (refer to figure 6 below).

**Figure 6: Topography**



### 12.2.1 Potential Impacts

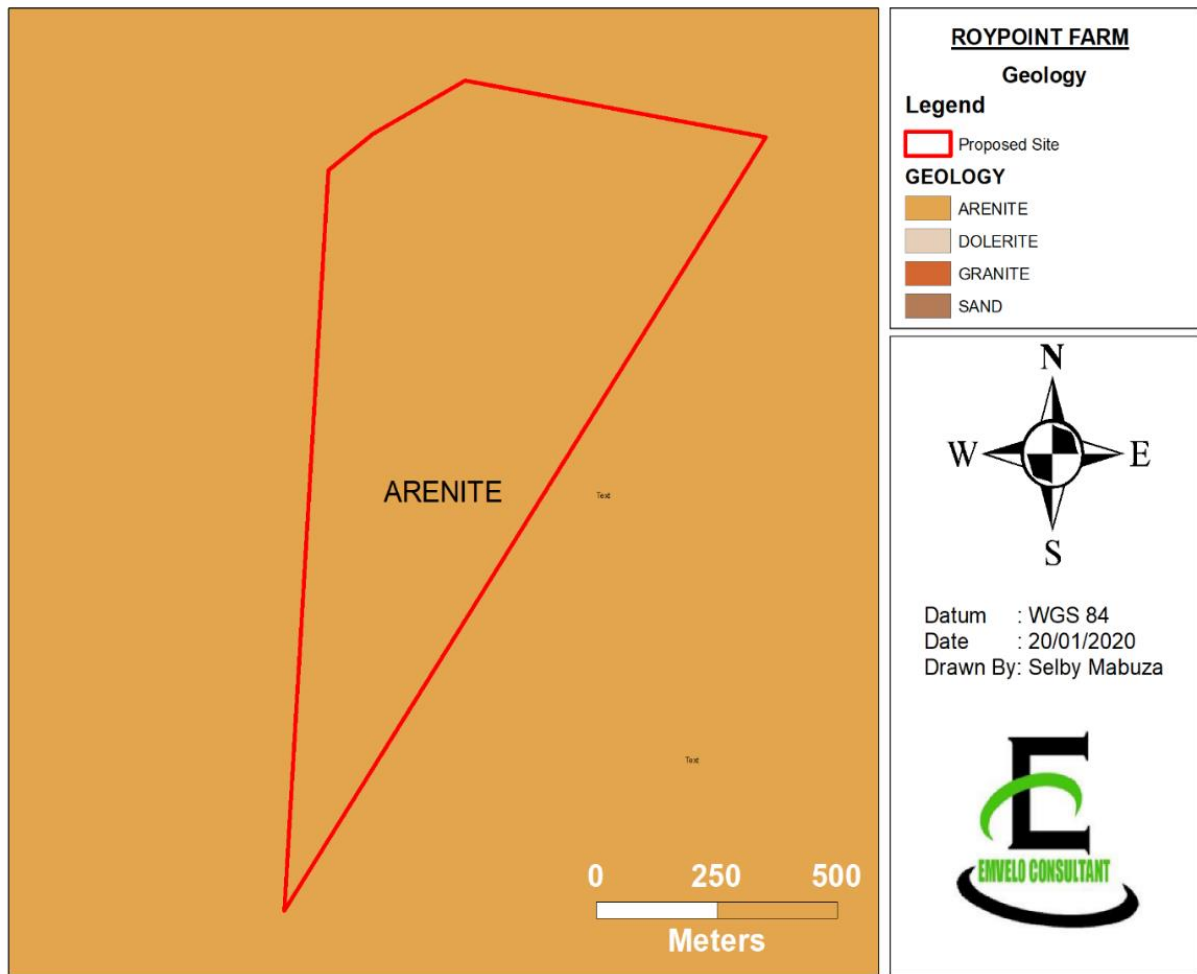
The visual impact of the proposed development will be insignificant as the project is expected to blend in with the existing settlements. The visual impact would only be felt during the construction period, due to construction activities taking place i.e. Movement of delivery vehicles possibly generating dust.

### 12.3. Geology and Soils

According to the Amajuba District Environmental Management Framework (EMF) of 2019, the site is comprised of the Karoo Supergroup which is mainly represented by the Ecca and the Beaufort Groups. Of these, the Ecca Group is by far the best represented, by the Vryheid Formation. The local geology of the proposed site area is underlain by the Arenite rock type, which is a sedimentary clastic rock with sand grains.

The Paleontological Assessment study also found that there are Quaternary sediments, karoo supergroup as well as the Ecca group – Vryheid formation. According to the study if there is the presence of Karoo Supergroup strata the palaeontological sensitivity can generally be **LOW** to **VERY HIGH**, and locally, **VERY HIGH** for the Vryheid Formation and **LOW** for the Quaternary sediments.

**Figure 7: Geology**



### 12.3.1 Potential Impacts

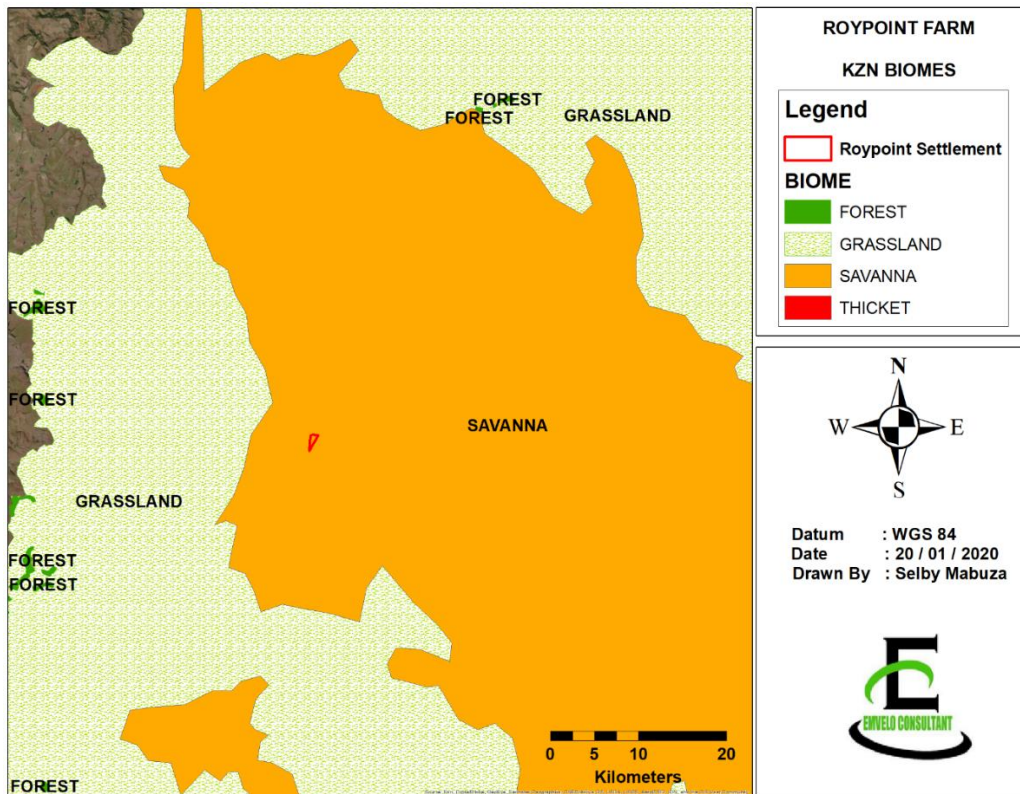
The clearing of vegetation and the use of heavy machinery could cause soil erosion and compaction respectively. The inappropriate handling and storage of hazardous substances, spillages from equipment and plant and poor management of waste, wastewater and cement mixing could cause soil contamination.

### 12.4. Flora

#### 12.4.1. Biomes

The Amajuba District Municipality (ADM) has the following types of biomes: Forest, Savanna, Grasslands, and wetlands.

**Figure 8: Biomes**



The proposed development site is located within the Savanna Biome.

#### 12.4.2. Vegetation types

Within the biomes of the Amajuba District Municipality, there are 14 different vegetation types (Scott-Shaw and Escott 2011). A list of the vegetation types around the proposed site and their conservation status is set out in the table below.

**Table 9: Local vegetation types**

Vegetation type	Conservation status	Historical Area (Ha)	2008 Area (Ha)	Percentage lost (Ha)
<b>Forest Biome</b>				
Eastern Mistbelt Forests	Endangered	5444.14	5289.56	2.84
<b>Savanna Biome</b>				
KwaZulu-Natal Highland Thornveld	Least Threatened	73206.077	54468.829	25.60
Thukela Thornveld	Least Threatened	21.38	21.38	0
<b>Grassland Biome</b>				
Wakkerstroom Montane Grassland	Least Threatened	128535.034	116688.917	9.22
Amersfoort Highveld Clay Grassland	Least Threatened	13214.733	10086.585	23.67
Eastern Free State Sandy Grassland	Least Threatened	268.915	268.915	0
Income Sandy Grassland	Vulnerable	149900.447	94294.226	37.10
Low Escarpment Moist Grassland	Least Threatened	62941.885	56930.63	9.55
Northern KwaZulu-Natal Moist Grassland	Vulnerable	157172.37	109620.616	30.25
Paulpietersburg Moist Grassland	Vulnerable	35547.935	23674.717	33.40
Northern Zululand Mistbelt Grassland	Vulnerable	7007.729	6582.965	6.06
<b>Wetlands Biomes</b>				
Freshwater Wetlands: Eastern Temperate Wetlands	vulnerable	24481.368	20339.582	16.92
Alluvial Wetlands: Temperate Alluvial Vegetation	vulnerable	32996.645	23114.188	29.95
Alluvial Wetlands: Temperate Alluvial Vegetation: Midland Floodplain Grasslands	Least threatened	422.644	361.367	14.50

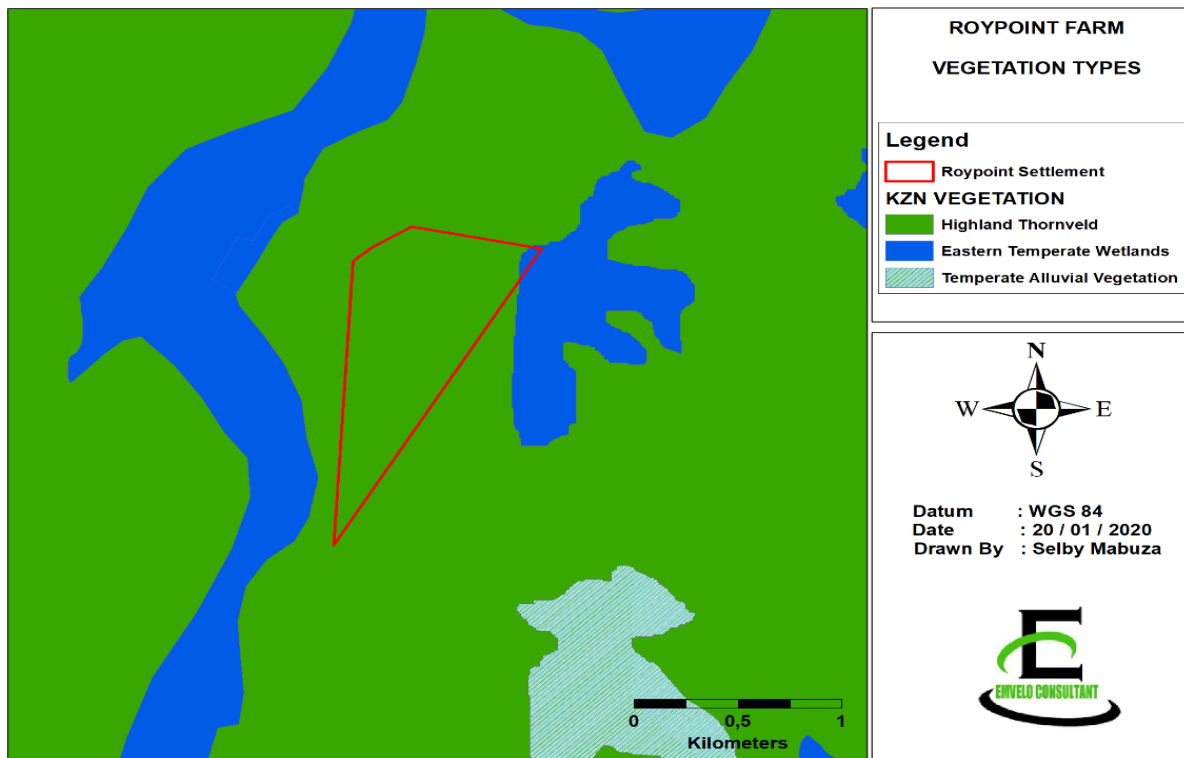
(Source: Amajuba District Biodiversity Sector Plan, 2014:20)

Over the years mainly between 1990 to 2014 the district has seen a major decline of these vegetation types in terms of their spatial coverage as a result of land-use change. However, the major impact has been largely on grasslands such as Income sandy grassland, Paul Pietersburg moist grassland, Northern KZN moist grassland, and Amersfoort Highveld Clay grassland (ADM EMF,2019).

The proposed development site is located on the Kwazulu-Natal Highland Thornveld of the Savanna biome with a national threat status of Least Threatened (LT), see figure 9.

The vegetation at the site consists of an open natural grassland mainly dominated by *Hyparrhenia hirta*. A total of 20 species of grasses and forbs were identified and no species of conservation concern (SCC) were located onsite. The vegetation condition of the study site is relatively okay, with some alien invasive species.

**Figure 9: Vegetation Types**



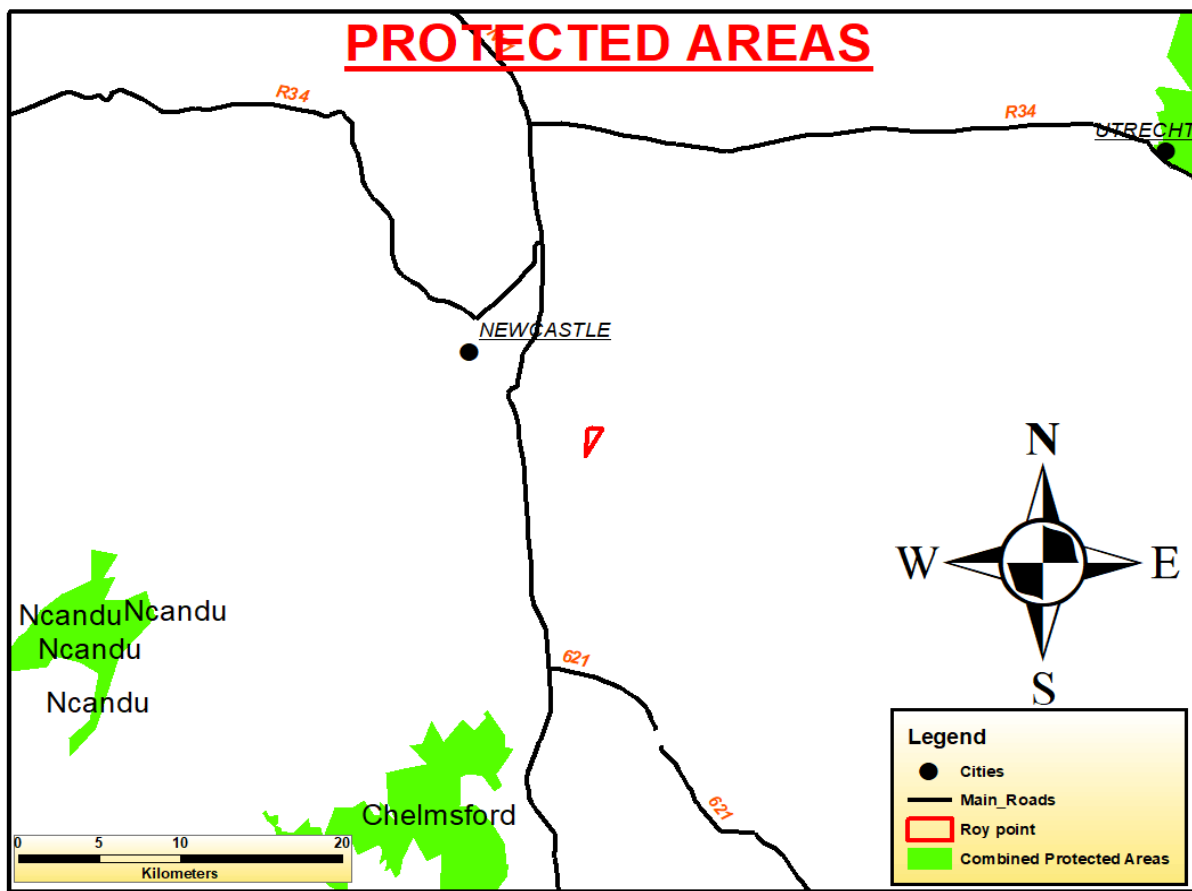
Also, the north eastern corner of the proposed site falls on the Eastern Temperate Wetlands, which has a national threat status of vulnerable.

### 12.4.3. Protected Areas

In South Africa, a 'protected area' is defined as areas of land (e.g. a national park) or ocean (e.g. a marine protected area) that is legally protected and managed for the conservation of biodiversity, as per the National Environmental Management: Protected Areas Act (No. 57 of 2003) (Department of Environmental Affairs 2009).



Figure 10: Protected Areas



The proposed development does not fall within any of the protected areas. The nearest protected area from the site is the Chelmsford Nature Reserve, located at approximately 19km to the southwest.

#### 12.4.4. Biodiversity

According to the Amajuba Biodiversity Sector Plan, the following terminologies describe features on the Biodiversity Plan. These definitions were adapted from the Document describing the Conservation Planning Terms for the Ezemvelo KZN Wildlife Spatial Planning Product (EKZNV, 2014). They include; Critical Biodiversity Areas (Irreplaceable and optimal), Ecological Support Areas (ESA), Ecological Infrastructure (EI), as well as other natural areas.

##### 12.4.4.1 Critical Biodiversity Areas (CBA).

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. The CBAs can be divided into two subcategories, namely Irreplaceable and Optimal (Ezemvelo KZN Wildlife, 2016).

The CBA: Irreplaceable Areas are identified as having an Irreplaceability value of 1. These Planning Units (PU's) represent the only localities for which the conservation targets for one or more of the biodiversity features contained within can be achieved, i.e. there are no alternative sites available.

Optimal Areas are areas that represent the best localities out of a potentially larger selection of available PU's that are optimally located to meet both the conservation target but also the criteria defined by either the Decision Support Layers or the Cost Layer.

#### **12.4.4.2 Ecological Support Areas (ESAs)**

Functional but not necessarily entirely natural areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the critical biodiversity areas. These areas also contribute significantly to the maintenance of ecological infrastructure.

#### **12.4.4.3 Ecological Support Areas: Species**

Terrestrial modified areas that provides support function to threatened or protected species, for example, agricultural land.

#### **12.4.4.4 Ecological Infrastructure (EI)**

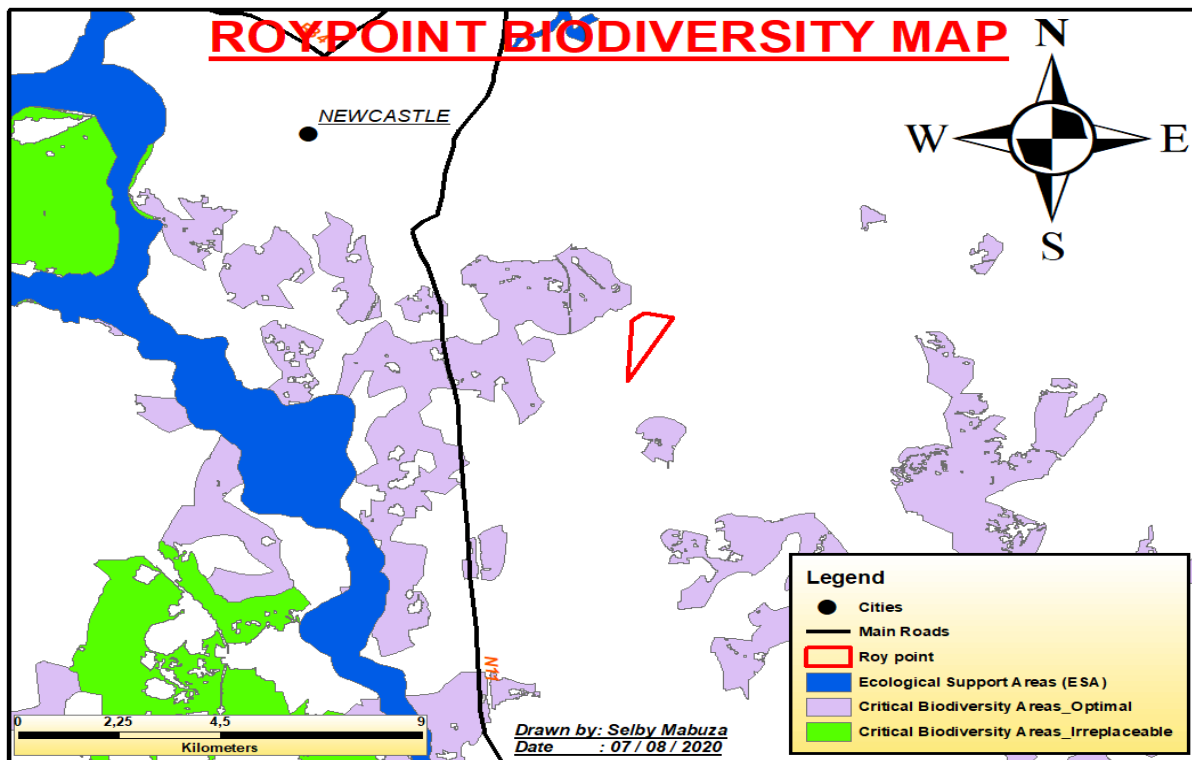
Ecological Infrastructure (EI) refers to the functioning ecosystems, within landscapes, that provide environmental services that contribute positively to the economy and human welfare. The ecological infrastructure that provides such services includes healthy and well-maintained wetlands, rivers, catchments, coastal dunes, grasslands and forests (Amajuba BSP, 2014:46).

Services provided include the promotion of water security through for example the provision of clean water and increased lifespan of dams; reduction in disaster risk through for example the control of flood intensities & coastal erosion; the prevention of soil loss, and climate regulation.

#### **12.4.4.5 Other Natural Areas**

Are natural, near-natural vegetation and functional habitats or landscapes not yet classified as one of the above categories (i.e. CBAs, ESAs, or EI).

Figure 11: Biodiversity Map



Biodiversity in the Amajuba District Municipal Area has been positively influenced by the conservation areas (ADM IDP 2019/20).

There are no Critical Biodiversity Areas (Irreplaceable or optimal), no threatened ecosystems and no ecological support areas (ESAs) within the proposed development site. The nearest CBA is the CBA Optimal which is located at approximately 345m northeast from the proposed site, as shown in figure 10 above.

#### 12.4.5 Potential Impacts

Potential impacts to vegetation resulting from the construction of the proposed housing units include the clearance of vegetation within the proposed footprint. Once the housing units have been allocated to people, the adjacent vegetation is also at risk of being degraded by community members.

Also, If the biodiversity and related ecosystem services are badly reduced, it could have direct negative consequences for the economy and social structures. These consequences could have a detrimental effect on efforts to reduce poverty, inequity, and unemployment in the Amajuba District Municipal Area.

#### **12.4.6 Specialist Study Triggered**

An Ecological Impact Assessment study was undertaken and the aim of the study was to identify habitats of critical importance and significant flora species to be affected by the development. Recommendations and mitigations measures have been provided and they form part of this EIR and the EMP.

#### **12.5. Fauna**

To determine the fauna likely to occur on-site, the lists for the Quarter Degree Square within which the proposed location is contained were obtained from the FitzPatrick Institute of African Ornithology virtual museum. These lists include all fauna previously recorded from the area. Although it is unlikely that all of these species will be found on-site, primarily due to the influx of people and other anthropogenic disturbance, there are some areas of the site which form suitable habitat for faunal species. A list of expected species can be found in Appendix N.

##### **12.5.1. Species of Conservation Concern (SCC)**

SCC that are likely to occur on site include birds, mammals, and herpetofauna (reptiles and amphibians). Only two mammal species of conservation importance have been recorded from the areas surrounding the proposed site and include; *Dasymys incomtus* (Common Dasymys) and *Otomys auratus* (Southern African Vlei Rat), which are both classified as near threatened.

The ecological impact assessment findings record that no species of conservation concern (SCC) were located onsite.

##### **12.5.2 Potential Impacts**

- Fragmentation, reduction, and loss of Habitat as a result of vegetation clearance
- Migration of animals away from the areas
- Poaching and willful harming of animals by construction workers

#### **12.6. SURFACE WATER**

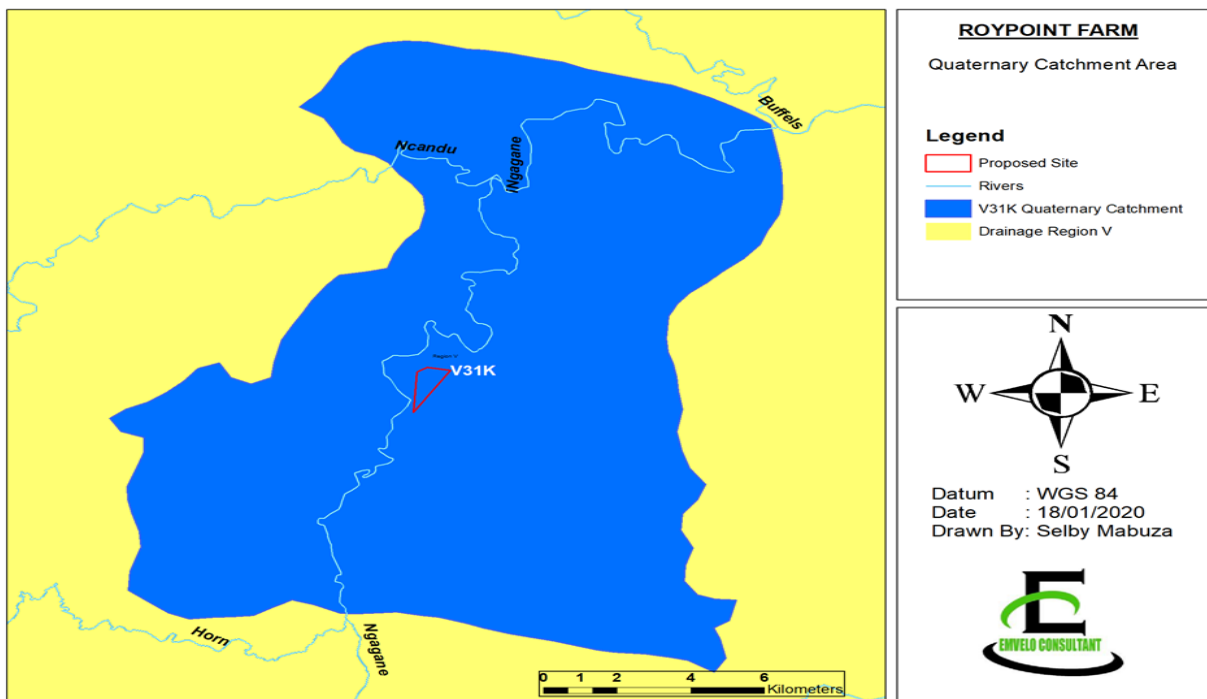
In general, most river sources within the district are at risk of degradation, and if deterioration takes place it is likely to result in poor water yield and water quality to the detriment of development. Development planning in these areas should, therefore consider riparian management requirements and suitable flood lines. An example of this is the implementation of development outside flood line areas (1:100-year flood line), which must always be maintained in order to protect the catchment within the area (ADM IDP 2019/20).

### 12.6.1. Hydrology

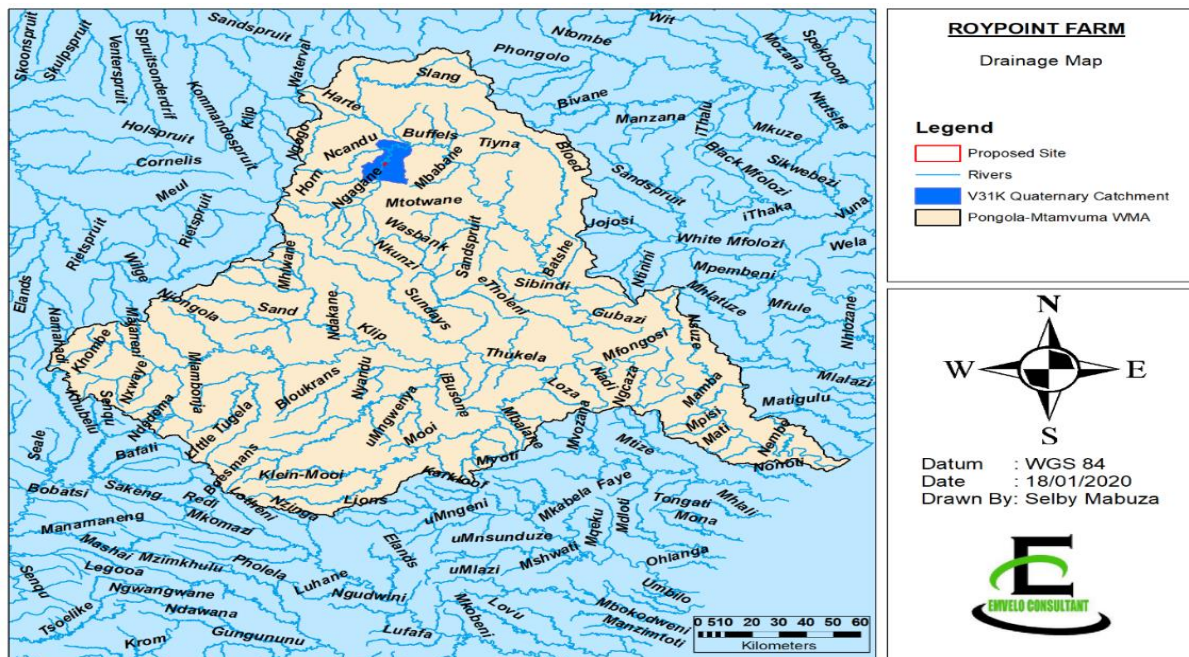
The Amajuba District Municipality (ADM) falls entirely into two primary catchments namely the Thukela and Pongola catchments. The Ngogo, Ncandu, Horn and Ngagane Rivers are important tributaries of the Buffalo River draining from the western highlands while the Slangspruit, Doringspruit, and Dorpspruit form the main tributaries in the north. The headwaters of the Pongola River (including the Bivane River) are found in the high lying north-eastern areas of the ADM and drain eastwards out of the District” (ADM EMF,2019:14).

The project area is situated along the Ingagane tributary, which falls within the V31K quaternary catchment and Pongola-Mtavuma Water Management Area (see Figures 12 & 13). The Ingagane River flows into the Buffalo River which is one of the major rivers in the Thukela Water Management (Newcastle Local Municipality IDP 2016/2017).

**Figure 12: V31K Quaternary Catchment**



**Figure 13: Drainage Map**



### 12.6.2. Water Quality

There is a complete contrast of water quality between the high lying mountainous areas to the lower-lying Buffalo River Basin within ADM. This is attributed to various human activities (domestic, mining, agricultural and industrial activities) taking place, particularly within Newcastle and Dannhauser. Acid mine drainage has been singled out as a real threat to water quality within the district (ADM EMF, 2019).

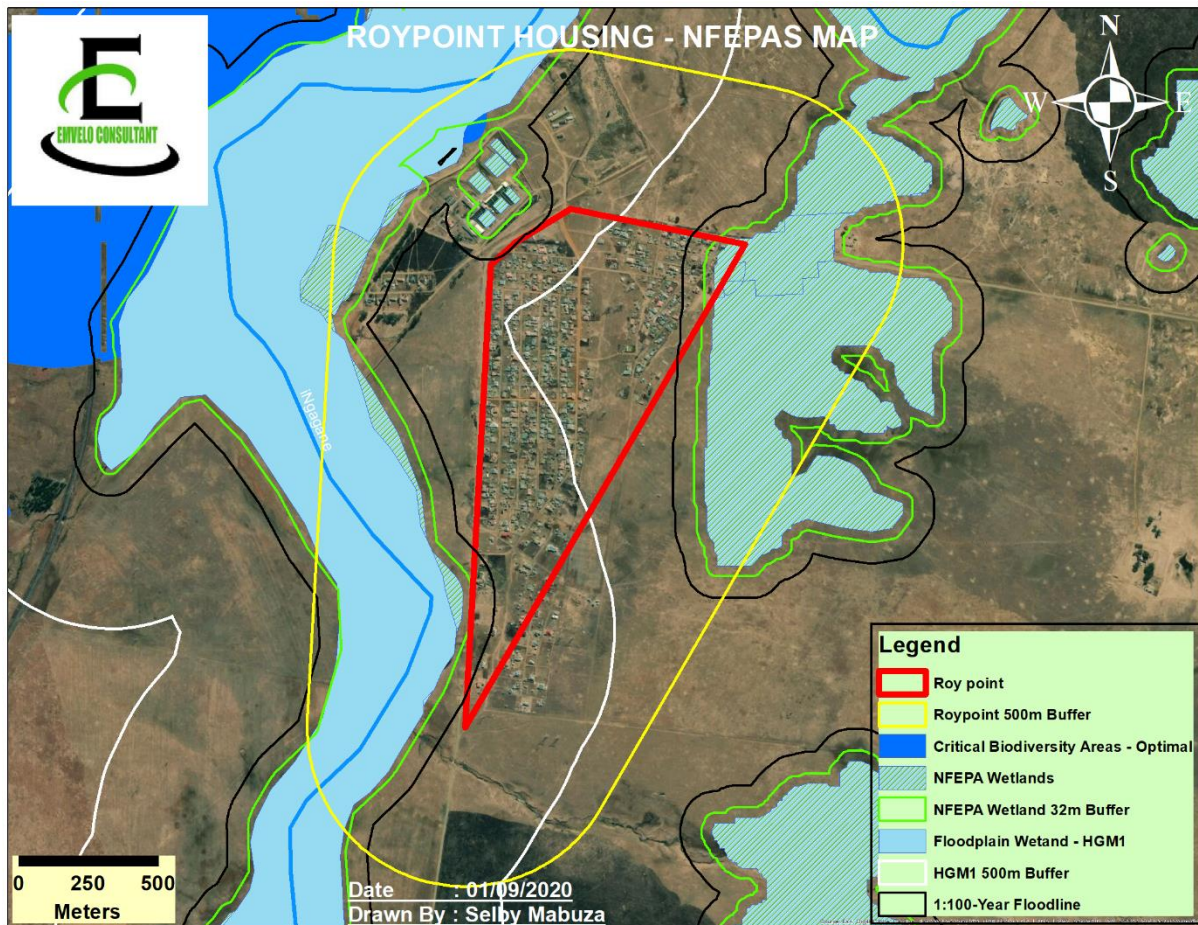
Within the Newcastle local Municipality, the water quality is mainly affected by poor performing Wastewater Treatment Works or urban run-off with total coliforms and faecal coliforms (NLM IDP 2016/2017).

The Ingagane river catchment which runs along the proposed site is mainly affected by industrial activities located alongside the river (NLM IDP 2016/2017).

### 12.6.3. National Freshwater Ecosystem Priority Areas (NFEPAs)

With reference to the National Freshwater Ecosystem Priority Areas (NFEPAs) GIS dataset, the proposed location has several NFEPAs wetlands within 500m which can be classified as valleyhead seep, flat and floodplain wetlands systems, all with a PES of Natural or Good and natural land cover  $\geq 75\%$ . Also, the study shows that some of the sections of the proposed area fall within the 1:100-year flood line. Furthermore, the Ingagane river runs along the proposed location, from the north section, down to the south, please refer to figure 14 below.

Figure 14: NFEPA Map



A Wetland Impact Assessment was conducted. The field delineation of the wetlands areas was conducted and a total of one (1) hydrogeomorphic (HGM) unit was identified. The overall Present Ecological Sensitivity (PES) is Category C - Moderately Modified (i.e. impact score of 2.2), indicating that a moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact. Overall, the health of the HGM 1 unit is expected to remain the same in the next five years.

#### 12.6.4 Potential Impacts

The impacts on wetlands systems are expected to be minimal, this is partly because almost the entire site is not sitting on these systems except the north eastern corner which has already been developed. Nonetheless, the following can be anticipated; A contaminated surface run-off from sidewalks, driveways, site camp has the potential of polluting the adjacent freshwater ecosystems. Recommendations and mitigation measures also form part of the environmental management programme.

## 12.7. Visual-Environment and Land Use Character

Along the proposed site, on the north and west sections, runs the Ingagane river flowing to the south. In the north section, a few meters from the river there is the Water Treatment Plant. The site is located within a residential area that is owned by the local municipality. Some parts of it are vacant stands that are covered in vegetation. Prior to the formalization of the housing units, there will be the clearance of vegetation (refer to figure 15 below).



Figure 15: Case Images

### 12.7.1 Potential Impact

Potential visual impacts during the soil preparation phase include the clearing of vegetation around the existing houses and the increase in the number of vehicles as there will be more construction vehicles operating around the area.

## 12.8. Heritage and Cultural Aspects

A desktop study was conducted using the SAHRIS website for palaeontological fossils sensitivity of the proposed site. As per the findings shown in figure 16 below, the site falls within high sensitivity, as result a field assessment and protocol for finds is required.





**Figure 16: Palaeo Sensitivity** (Source: <https://sahris.sahra.org.za/map/palaeo>)

A heritage impact assessment was conducted in the proposed area, and the findings record that no standing structures older than 60 years occur in the study area, there are also no record any archaeological sites.

The are also no graves that were identified within the proposed study area. The local community bury their deceased at the Roypoint cemetery (27°47'14.62" S, 29°59'07.02" E), on a different portion of the Roypoint farm.

However, the heritage findings verified that the study area lies within a “Very High” Paleontological resources area, therefore requiring a Phase 1 Paleontological study to be conducted.

**THE PALEONTOLOGICAL STUDY**

The paleontological study found that there is the presence of the **Volksrust Formation** which consists of a monotonous sequence of grey shale and fossils that are significant, but very rarely recorded. There is also the Ecca Group, **Vryheid Formation** may contain fossils of diverse non-marine trace, *Glossopteris* flora, mesosaurid reptiles, palaeoniscid fish, marine invertebrates, insects, and crustaceans.

The impact is **VERY HIGH** for the Vryheid Formation, and **LOW** for the Quaternary sediments.

**12.8.1 Potential Impact**

Long term impact on the cultural landscape is considered to be negligible as the surrounding area consists of a farms and cultivated lands. Visual impacts to scenic routes and sense of

place are also considered to be low due to the previous developments in the area and the lack of significant sites.

There is a possibility of direct impacts during the construction phase which may be of very low significance. During this phase, graves, and other heritage resources may be discovered. These activities can have a negative and irreversible impact on heritage sites and on the destruction or partial destruction of non-renewable heritage resources.

## 12.9. Social and Economic Environment

### 12.9.1. Population Distribution

Amajuba District is a Category C municipality that is made up of three local municipalities namely, Newcastle (KZN 252), Dannhauser (KZN 253) and the Emadlangeni (KZN 254). The total population within the district is estimated to be at 531 327 people who are accommodated on 117 256 households.

**Table 10: Total population**

Municipality	TOTAL POPULATION			Population Growth Rate (2011 – 2016)
	2001	2011	2016	
Newcastle	332 981	363236	389117	7.1%
Emadlangeni	32277	3442	36869	7.0%
Dannhauser	102779	102161	105341	3.1%
Amajuba DM	468036	499839	531327	6.3%

Source: Statistics SA, Census 2011 & Community Survey 2016

The Newcastle Local Municipality has the highest population which is estimated to be at 389 117 people (90 347 households) within 34 wards.

Immigration and birth rate contribute to the increased number of people within the geographical area, and this is supported by the increase in average household size, especially in the Newcastle Local Municipality.

### 12.9.2. Basic Services (Water and Sanitation)

#### 12.9.2.1 Water

Based on the 2016 Stats SA Community Survey, within the district a total of 111632 of households have piped water supply either to inside the home or on-site, 17 % of households rely on communal standpipes and 7.9% of the households are reliant on boreholes or springs

as opposed to the previous and are reliant on other sources of water. The quality of the water obtained from these sources is unknown and cannot be guaranteed, thus possibly leading to health problems (ADM IDP 2018/2019).

The Newcastle Local Municipality comprises of up to 83% of all households with piped water supply, either to dwelling or on-site.

### 12.9.2.2 Sanitation

About 58% (Community Survey 2016) of the households in the Amajuba DM area has flush toilets that are connected to a sewerage system - an improvement of 4% when compared with figures from the Census 2011. The 2016 figures also indicate only 41% of households in the ADM do not have any form of sanitation.

Over the years it has been evident that more and more communities are having access to waterborne sanitation in the urban areas with a significant decrease in the bucket latrine which has been replaced by Pit latrine in most rural areas.

Out of the three municipal areas, the highest level of service is found in Newcastle Municipality, where over 67.7% of households have either flush, chemical toilets or pit latrines.

### 12.9.3. Unemployment Profile

The unemployment rates are high in the ADM, reflecting a large portion of the working-age population that has either been discouraged from seeking employment due to a lack of opportunities, or who are actively seeking employment but cannot find any opportunities.

**Table 11: Unemployment rates**

Year	Amajuba	Newcastle	eMadlangeni	Dannhauser
2014	31.9%	30.3%	30.3%	40.7%
2015	31.9%	30.3%	30.2%	40.8%
2016	33.7%	32.0%	31.7%	43.0%

Source: KZN Provincial Treasury (HIS Markit: Regional Explorer)

The Newcastle Local Municipality has the second-lowest unemployment rate within the district, after eMadlangeni. However, it is also evident that over the years unemployment rates have been increasing throughout the district.

#### **12.9.4. Energy Source**

In the context of the Amajuba DM, Eskom is the main supplier of electricity, whilst the Newcastle and eMadlangeni Municipalities have the license to supply the electricity in certain areas within their jurisdiction. In all the municipalities, electricity is mainly used for lighting, cooking, and heating.

#### **12.9.5 Potential Impacts**

The proposed development seeks to transform the settlement by providing more formal houses and adequate sanitation facilities for the local people. This will improve the overall standard of living, attracting more people and businesses into the area, thus increasing the overall population of the municipality.

Also, the consideration of local laborers, suppliers in the area and the transferring of skills will help in stimulating the local economy (positive impact).

### **13. SPECIALIST STUDIES**

During the preliminary study, two specialist studies were conducted, and they are;

- Geotechnical Investigation, and
- Traffic Impact Assessment

Other specialist studies, as identified during the screening and Scoping phase of the EIA were aimed at addressing the key issues and compliance with legal obligations, and they include:

- Wetland Impact Assessment
- Terrestrial Ecological/Biodiversity Impact Assessment
- Heritage Impact Assessment

Prior to any work, both general and specific the terms of reference were determined for each specialist study. In determining general Terms of reference for specialist studies, the following guideline was used;

- Guideline for determining the scope of specialist involvement in EIA processes (Münster, 2005)

The subsequent guidelines were also employed in determining the specific terms of reference for respective specialist studies (where appropriate);

- Guideline for involving biodiversity specialists in EIA processes (Brownlie, 2005);
- Guideline for involving heritage specialists in EIA processes (Winter & Baumann, 2005);

In addition to the above guidelines, the relevant specialists need to satisfy specific requirements stipulated by the following key environmental authorities:

- Economic Development Tourism and Environmental Affairs;
- Department of Water and Sanitation;
- Amafa;
- DAFF
- Ezemvelo KZN Wildlife

For the incorporation of the findings of the specialist studies into the EIA report, the following guideline was used:

- Guideline for the review of specialist input in EIA processes (Keatimilwe & Ashton, 2005).

Key considerations includes:

- Ensuring that the specialists have adequately addressed IAPs' issues and specific requirements prescribed by environmental authorities.
- Ensuring that the specialists' input is relevant, appropriate and unambiguous; and
- Verifying that information regarding the receiving ecological, social and economic environment has been accurately reflected and considered.

### **13.1. Terms of Reference – General**

The following general Terms of Reference apply to all the EIA specialist studies that were undertaken for the proposed project:

- Address all triggers for the specialist studies contained in the subsequent specific Terms of Reference.
- Address issues raised by IAPs, as contained in the Comments and Response Report, and conduct an assessment of all potentially significant impacts. Additional issues that have not been identified during Scoping should also be highlighted to the EAP for further investigations.
- Ensure that the requirements of the environmental authorities that have specific jurisdiction over the various disciplines and environmental features are satisfied.
- Approach to include desktop study and site visits, as deemed necessary, to understand the affected environment and to adequately investigate and evaluate salient issues.

Indigenous knowledge (i.e. targeted consultation) should also be regarded as a potential information resource.

- Assess the impacts (direct, indirect and cumulative) in terms of their significance (using suitable evaluation criteria) and suggest suitable mitigation measures. In accordance with the mitigation hierarchy, negative impacts should be avoided, minimized, rehabilitated (or reinstated) or compensated for (i.e. offsets), whereas positive impacts should be enhanced. A risk-averse and cautious approach should be adopted under conditions of uncertainty.
- Consider time boundaries, including short to long-term implications of impacts for the project lifecycle (i.e. pre-construction, construction, operation and decommissioning).
- Consider spatial boundaries, including:
  - (a) The broad context of the proposed project (i.e. beyond the boundaries of the specific site);
  - (b) Off-site impacts; and
  - (c) Local, regional, national or global context.
- The provision of a statement of impact significance for each issue, which specifies whether or not a pre-determined threshold of significance (i.e. changes in effects to the environment which would change a significance rating) has been exceeded, and whether or not the impact presents a potentially fatal flaw or not. This statement of significance should be provided for anticipated project impacts both before and after the application of impact management actions.
- Recommend a monitoring programme to implement mitigation measures and measure performance. List indicators to be used during monitoring.
- Appraisal of alternatives (including the No-Go option) by identifying the BPEO with suitable justification.
- Advise on the need for additional specialists to investigate specific components and the scope and extent of the information required from such studies.
- Engage with other specialists whose studies may have bearing on your specific investigation.
- Present findings and participate in public meetings, as necessary.
- Information provided to the EAP needs to be signed off.
- Review and sign off on the EIA report prior to submission to DEA to ensure that specialist information has been interpreted and integrated correctly into the report.
- Sign a declaration stating independence.
- The appointed specialists must take into account the policy framework and legislation relevant to their particular studies.
- All specialist reports must adhere to Appendix 6 of GN No. 326 (7 April 2017).

## 13.2. SUMMARY OF SPECIALIST STUDIES AND KEY FINDINGS

The findings and recommendations of each study conducted are summarized below. Recommendations or mitigation measures are also incorporated into the EMP.

### 13.2.1. Geotechnical Investigation

The Geotechnical Investigation was done by KONTIGEO

#### a) SUMMARY

- The general soil profile consists of topsoil that is present throughout the site area, with thickness that vary between 0.1 and 0.3m, but generally is 0.2m.
- Transported material comprising medium dense, silt sand, deemed to be potentially collapsible was encountered below the topsoil. The thickness vary between 0.2 and 0.8m in the test pits.
- Groundwater seepage was not encountered in the test pits and it is not expected to be problematic across the site area. Generally, the ferruginisation is an indication of groundwater fluctuations.
- As a good construction practice, damp-proofing must be incorporated into foundation structures.
- An adequate stormwater management system comprising surface and sub-surface drainage should be provided. It must be noted that shallow hardpan ferricrete is present in places.
- A geotechnical engineer should be consulted to evaluate and recommend appropriate solutions to ensure stability of sidewalls required for deep excavations during construction.
- G6 and G7 quality as per the COLTO is available on site. The area investigated is relatively flat. The quantity might not be enough as deep excavations; which are not necessary, will be required to retrieve a substantial amount.
- Based on the Table, Geotechnical Classification for Urban Development (After Patridge, Wood and Brink), generally, the area investigated is assigned as geotechnical classification of 1AC (Any collapsible horizon or consecutive horizons totalling a depth of less than 750mm in thickness and low-heave anticipated).

#### b) RECOMMENDATIONS:

##### Bulk Earthworks

Any backfilling/filling should be brought up to level in layers not exceeding 150mm, with each layer wetted to optimum moisture content and adequately compacted to specification.

Fill materials for structure purposes must conform to at least G6 quality as per the COLTO specifications. It could be imported from external sources.

### Structural Buildings

Considering a residential site class designation of C1/C2, the following foundation solutions are proposed, according to the SAICE/IstrctE 1995. Code of Practice: Foundations and Superstructures for a Single Storey Residential Building of Mansory Construction as adopted by the National Home Builder Registration Council (NHBRC);

Modified Normal, Stiddened Strip Footings, Stiffened or Cellura Raft, as well as Soil Raft.

### Layerworks Preparations

Layerworks must be designed and placed based on an analysis of the volume and type of traffic expected.

The following generic layerworks is proposed;

- Remove topsoil material, typically 0.2m thick and excess materials to achieving designs levels. Rip and re-compact 150mm deep to 93% Modified AASHTO density, to form the subgrade.
- Construct a 150mm thick stabilised subbase type material and compact to 95% Modified AASHTO density at OMC. (C4 as per TRH 14).
- Place and compact a 150mm thick base of G1 (Graded crushed stone), compacted to 88% of the apparent density or G4 (Natural gravel), compacted to 95% Modified AASHTO density at optimum moisture content on top of the stabilised subbase prior to priming and sealing with either asphalt or chip and spray.
- If paving blocks are favoured, place a layer of 25mm bedding sand on top of a stabilised subbase layer followed by the placement of 60/80mm interlocking paving blocks, contained between kerbs or other non-movable structures.
- Adequate sub-surface drainage and surface drainage must be ensured.

### General

All excavations must be inspected by a competent person to verify the founding conditions.



### **13.2.2. Traffic Impact Assessment**

The Traffic Impact Assessment was done by Tsibong Consulting Engineers

#### **a) SUMMARY**

The township is currently accessed from the north and south, with the northern access denoted as (Station 3) and the Southern Access Points denoted as (Station 4). All the access road to and from the development area are gravel.

A number of taxis and buses were observed operating in the study area. In addition, it was noted that there are no public transport facilities in the area, but an informal loading point (taxi rank) exiting on station 3 during the AM peak only. During rainy seasons, transportation becomes a challenge for the residents since a significant number of households rely on public transport for travelling.

#### **b) RECOMMENDATIONS:**

- It is recommended that the township establishment application be approved subject to the required road improvements and construction of the access according Newcastle LM standards.
- If the township and infrastructure upgrades, public transport facilities in forms of lay-byes and a taxi rank must be incorporated in the master plan. The lay-byes should be at m intervals and a taxi rank be accommodated at the central location of the township where it would be easily accessible.
- There must be an upgrading of the main access point (Station 3) to meet the MLM standards.
- Installation of street lighting and walkways along the main road (not an immediate requirement, but is required in future).
- There must be an upgrading of the link between Karbochem Road and Vezubuhle to the tarred road.
- There must be design and construction of the low bridge along the link road to allow two vehicle lanes and pedestrians at the same time.
- The main road must be upgraded to a tarred road, with 3.5m wide lanes on both directions, and the access road is to be upgraded to a 3m width per direction tarred road.

### **13.2.3. Wetland Impact Assessment**

The wetland study for this project was conducted by Zonhla Hydro & Enviro Consulting (Pty) Ltd.

#### **a) METHODOLOGY**

In order to attain background information relating to the study area, a desktop study was undertaken, so as to guide the site assessment which followed. In addition to the database interrogation, the most recent Google Earth and Zoom Earth Imagery of the project site was considered to see if any wetland areas or “anomalies” within the site are visible.

The delineations of the wetland areas were conducted according to the Department of Water Affairs wetland delineation manual ‘*A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas*’ (DWAF, 2005a).

The determination of the present ecological state (PES) of wetlands was conducted by using a tool from the WET-Management Series (issued by the Water Research Commission), the WET-Health (Macfarlane *et al.* 2008).

#### **b) SUMMARY**

The initial wetland identification process was conducted at a desktop level during which the available NFEPA, Ezemvelo KZN Wildlife and SAIIE wetlands dataset were interrogated to determine the presence of any wetland areas that has been determined in the past, within the 500m radius of the project boundary. The SAIIE wetlands database showed no presence of wetlands within a 500m radius of the proposed project boundary, while the NFEPA and Ezemvelo KZN Wildlife wetlands dataset indicated that wetlands systems were present within the 500m radius of the project boundary.

#### **c) RECOMMENDATIONS:**

The following mitigative measure are recommended in order to minimise any potential impact from the project on the wetland system:

- Best practice standards must be followed for the construction and operation of the proposed infrastructure;
- Construction method statements are to be adhered to. These method statements should consider the environmental facets associated with the wetland such as hydrological flow regimes, flora and fauna. These should be approved by the relevant departments (i.e. EDTEA and DWS);

- Existing access routes must be utilised and heavy machinery should not be allowed to enter the demarcated wetland areas;
- The identified wetland area must be demarcated as no-go area during construction. Where works need to be undertaken within a wetland, these should be restricted to the sewer pipeline routes only, with the smallest footprint;
- A site layout plan must be compiled indicating the limits of disturbance associated with the proposed development in relation to the identified sensitive areas (i.e. wetland). No-go areas and any stormwater infrastructure must be indicated on this plan;
- During construction, sediment control measures must be adopted in order to prevent sediments entering the wetland. The construction of the pipelines, if any crosses the wetland system, should be undertaken in a phased approach so as to minimise the disturbances to the wetland. Rehabilitation (if required) should occur in the same manner and not on project completion only;
- The existing and proposed pipelines (sewer and raw water) must be maintained and inspected regularly for any leaks;
- Machinery and equipment must be inspected regularly for faults and possible leaks. If required, servicing of these should occur within the plant site (i.e. outside of the wetland buffer zone);
- No stockpiling of any material should occur in the demarcated wetland area. If this is unavoidable, the ground underneath the stockpile should be lined with a geotextile or similar material. Measures must be put in place to ensure that no silt from any stockpiles placed adjacent to the area of residual hydromorphic soils can enter the area of hydromorphic soils, e.g., soil berms, silt fences, etc.;
- Water required during the construction process must be sourced from an external contractor as and when required. This should be transported to site via a water tanker. If there is a need to source water from the stream (Ngagane River), the DWS must be consulted for permission to abstract;
- Construction must be undertaken during the dry season;
- The activities must be licenced so as to avoid any legal issues (i.e. any activity triggering the NEMA No. 107 of 1998 EIA Regulation of 2014, as amended on 07 April 2017 amended, and Section 21 of the NWA No 36 of 1998, WULA). Where activities have already commenced, the required legislation procedure must be followed ( i.e. Section 24G rectification application under NEMA) in order to ensure compliance. An Environmental expert must be consulted to advice if any of the activities (existing or proposed) may need authorisation from EDTEA or DWS).

Furthermore, the specialist opinion states that the project meets the requirements of the General Authorisation (GA) in terms of Section 39 of the NWA No. 36 of 1998, Water Uses as defined in Section 21(c) and (i)", Notice 509 of 2016. Therefore, a GA in terms of GN 509 must be applied for with the DWS for the proposed project.

#### **13.2.4. Ecological Impact Assessment**

The ecological study for this project was conducted by MONDISE ENVIRONMENTAL SERVICES (PTY) LTD.

##### **a) METHODOLOGY**

The study site was described using a two-phased approach. Firstly, a desktop assessment of the site was conducted in terms of current vegetation classifications and biodiversity programmes and plans.

Further to the above, a site visit was conducted on the 16<sup>th</sup> of June 2020 in order to assess the actual ecological state, current land-use, identify potential sensitive ecosystems and species of conservation concern (SCC). A representative sample of sites, covering the study area, was sampled. It was attempted to cover all natural variation that occurred on site as well as to cover as much of the site as possible. Naming of the plant species follows South African National Biodiversity Institute Database (SANBI, 2015).

##### **b) SUMMARY**

The vegetation of the study area is described as KwaZulu-Natal Highland Thornveld and a small portion falls under Eastern Temperate Freshwater Wetlands (Mucina and Rutherford 2006). The conservation status of both these vegetation types is "Least threatened" as described by Mucina and Rutherford (2006). However, in other literature, the Eastern Temperate Freshwater Wetlands is classified as a Vulnerable Threatened Ecosystem in Need of protection. Based on the KwaZulu-Natal Biodiversity Conservation Plan (KZNBCP) for terrestrial areas, the current study area falls under the Biodiversity Area which is a natural and/or near natural environmental area not identified as a critical biodiversity area.

The impacts of the proposed housing project on ecological processes would be High and Medium Negative without mitigation but with mitigation the impacts could be reduced to Low Negative. The construction is recommended and mitigations outlined in this report need to be adhered to. If the above measures and recommendations are adhered to then it is not

expected that there will be any unacceptable impacts on the vegetation of the receiving environment.

c) **RECOMMENDATIONS:**

- Authorisation must be obtained from DWS prior to any construction taking place within the required buffers of 32 m from all water courses

Planning and design phase

- An Environmental Control Officer (ECO) must be appointed to oversee construction activities.
- A plan to actively rehabilitate the area used for construction post-construction needs to be developed.

Construction phase

- Construction activities need to be restricted to the areas demarcated by the project plans.
- No indigenous vegetation outside the demarcated mine boundaries must be removed.
- Only the approved haul road must be used and vehicles must not traverse virgin land.
- There should be minimal disturbance to areas in the immediate vicinity as successful vegetation recovery will depend on the remaining vegetation.
- Construction boundary must be demarcated and vegetation clearing and top soil removal limited to these areas.
- Construction activities must be limited to the designated development footprint.
- No poaching of any wild animals will be allowed.
- The development area must again be surveyed prior to construction in order to locate and capture any SCC and relocate them.

Operational phase

- All slope areas must be properly stabilized through compaction to ensure proper establishment of a vegetation cover.
- Disturbed areas must be re-vegetated by seeding with plants that are natural to the area.
- An alien removal plan must be implemented and run during operational phase.
- A Rehabilitation Management Plan must be implemented.

### 13.2.5. Heritage Impact Assessment

The Heritage Study for this project was conducted by Tsimba Archaeological Footprints (PTY) LTD.

#### a) METHODOLOGY

The field survey lasted for a day on the 3rd of July 2020. It was conducted by an archaeologist from Tsimba Archaeological Footprint through driving and walking. A ground survey, following standard and accepted archaeological procedures, was conducted. The assessment was rigorous, and detailed enough to present a clear argument to justify the decision in the recommendations section including sufficient information to support the findings contained in the assessment.

#### b) SUMMARY

According to the SAHRIS Paleo Sensitivity map, the proposed development area is rated as a **VERY HIGH** paleo sensitive area warranting a field assessment.

The findings for the site are as follow; No standing structures older than 60 years occur in the study area. The survey did not record any archaeological sites. Ground visibility was very clear during the field survey making it easy to identify any archaeological sites that might occur within the proposed development footprint. Also, no graves or burial grounds were recorded in and along the proposed Prospecting area.

On the report it was concluded that the impacts of the proposed development on the cultural environmental values are not likely to be significant on the entire development site if the EMP includes recommended safeguards and mitigation measures identified in this report.

#### c) RECOMMENDATIONS:

The heritage specialist stated that the proposed development may be allowed to proceed subject to the following recommendations;

- Phase 1 Paleontological Impact Assessment should be carried out by an accredited palaeontologist and submitted to KwaZulu-Natal Amafa and Research Institute.
- The construction teams must be inducted on the possibility of encountering archaeological resources that may be accidentally exposed during clearance and construction at the mining site prior to commencement of work on the site in order to ensure appropriate mitigation measures and that course of action is afforded to any chance finds in accordance with the Chance Find Procedure.

- The Archaeology, Palaeontology and Meteorites Unit of KwaZulu-Natal Amafa and Research Institute should be alerted when site work begins.
- Strict and clear reporting procedures for chance finds must be followed by the client and contractors throughout the construction period.

### 13.2.6. Paleontological Impact Assessment

The paleontological study for this project was conducted by Tsimba Archaeological Footprints (PTY) LTD.

When rock units of moderate to very high palaeontological sensitivity are present within the development footprint, a desk top and or field scoping (survey) study by a professional palaeontologist is usually warranted. The main purpose of a field scoping (survey) study would be to identify any areas within the development footprint where specialist palaeontological mitigation during the construction phase may be required

#### a) METHODOLOGY

The palaeontological impact assessment study was undertaken in August 2020. A Phase 1: Field Survey of the affected portion includes photographs (in 7.1 mega pixels) taken from the site with a digital camera (Canon PowerShot A470). Additionally, Google.maps were accessed on a cellular phone for navigation. A Global Positioning System (GPS) (Garmin eTrex 10) was used to record fossiliferous finds and outcrops (bedrock) when the area is not covered with topsoil, subsoil, overburden, vegetation, grassland, trees or waste. The survey did identify the Karoo Supergroup. A literature survey is included and the study relied heavily on geological maps.

#### b) SUMMARY

The potential impact of the development on fossil heritage is **VERY HIGH** therefore a field survey was necessary for this development (according to SAHRA protocol).

The **Quaternary sediments** may contain a very wide range of possible fossil remains, though these are often sparse, such as: mammalian bones and teeth, tortoise remains, ostrich eggshells, non-marine mollusc shells, ostracods, diatoms, and other micro fossil groups, trace fossils (e.g. calcretised termitaria, rhizoliths, burrows, vertebrate tracks), freshwater stromatolites, plant material such as peats, foliage, wood, pollens, within calc tufa. The rocks of the **Karoo Supergroup** are internationally acclaimed for their richness and diversity of fossils. The rocks of the **Beaufort Group** of South Africa cover approximately one-third of the

land surface and have yielded an abundance of well-preserved therapsids and other tetrapods which have been used to subdivide this Group into eight faunal Assemblage Zones.

The **Volksrust Formation** consists of a monotonous sequence of grey shale and fossils are significant, but very rarely recorded. The Ecca Group, **Vryheid Formation** may contain fossils of diverse non-marine trace, *Glossopteris* flora, mesosaurid reptiles, palaeoniscid fish, marine invertebrates, insects, and crustaceans (Johnson 2009).

The impact is **VERY HIGH** for the Vryheid Formation, **LOW** for the Quaternary sediments. There are significant fossil resources that may be impacted by the development (mudstone, shale) and if destroyed are no longer available for scientific research or other public good (Almond, *et al.* 2009).

#### **c)RECOMMENDATIONS:**

- Mitigation will still be needed if fossils are found during the construction.
- No consultation with parties was necessary. The Environmental Control Officer must familiarise him- or herself with the formations present and its fossils.
- The development may go ahead with caution.
- The ECO must visit site after clearing, blasting, excavating and drilling and survey for fossils.
- The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction activities. For a chance find, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation.
- The specialist will require a Phase 2 mitigation permit from the relevant Heritage Resources Authority before a Phase 2 may be implemented.



## 14. IMPACT ASSESSMENT AND RECOMMENDED MITIGATION MEASURES

Each impact identified is assessed in terms of probability (Likelihood of occurring), scale (spatial scale), magnitude (severity) and duration (temporal scale). To effectively implement the adopted scientific approach in determining the significance of the environmental impact, a numerical value was linked to each rating scale (see table 15).

The following criteria will be applied to the impact assessment for the proposed development:

### Occurrence

- ✚ Probability - The probability of the impact describes the likelihood of the impact actually occurring.
- ✚ Impact Duration - the Duration of the impact describes the period of time during which an environmental system or component is changed by the impact.

### Severity

- ✚ Magnitude - refers to the 'Degree of Disturbance' to biophysical systems and components expresses the change in the health, functioning and/or role of the system or component as a result of an activity
- ✚ Scale/extent - The Extent of the impact generally expresses the spatial influence of the effects produced by a disturbance to an environmental system or component

The following ranking scales were used:

<i>+ Probability: =P</i>	<i>Duration: =D</i>
5 – Definite (More than 80 % chance of occurrence)	5 – Permanent- The only class of impact that will be non-transitory (Indefinite)
4 – Probable (Between 60-80% chance of occurrence)	4 - Long-term-: The impact and its effects will continue or last for the entire operational life of the development (15- 50years)
3 – Possible (Between 40-60% chance of occurrence)	3 - Medium-term-: The impact and its effects will continue or last for some time after the construction phase (5-15 years)
2 – Fairly Unlikely (Between 20-40% chance of occurrence)	2 – Medium-short- The impact and its effects will continue or last for the period of a relatively
1 – Unlikely (Less than 20% chance of occurrence)	

	long construction period and/or limited recovery time after this construction period (2-5 years)  1 – Short Term- Likely to disappear with mitigation measures or through natural processes span shorter than construction phase (0-2 years)
<i>Scale: =S</i>  5 – International (beyond 200km)  4 – Regional (50-200km radius)  3 – Local (2-50km radius)  2 – Surrounding Area (within 2km)  1 – Site (within100m)	<i>Magnitude: =M</i>  5 - High  4– Medium High  3 – Medium  2 – Medium Low  1 – Low

*Status of Impact*

+ Positive / -Negative or 0-Neutral

The overall impact significance score/points (**SP**) for each identified impact is calculated by multiplying magnitude, duration, and scale by the probability of all this happening.

The range of possible significance scores is classified into seven rating classes as shown in Table 15 below.

$$\mathbf{SP = (Magnitude +Duration +Scale) \times Probability}$$

The impacts status can either be positive, negative or neutral as depicted in table 15

**Table 12: Impact significance Ratings**

Significance	Environmental Significance Points	Colour Code
Negligible	0-10	N
Very low	11-20	VL
Low	21-30	L
Medium	31-40	M
Medium-high	41-50	MH
High	51-60	H
Very high	61-75	VH

### 14.1. ALTERNATIVE A (SITE EXTENSION TO THE NORTH EAST)

**Table 13: IMPACT SIGNIFICANCE EVALUATION AND SCORING – ALT A  
CONSTRUCTION PHASE**

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
<p><b>Loss of indigenous vegetation</b> The development will result in the obliteration of vegetation on site for the purpose of construction and the installing of service infrastructure.</p>	<p><b>SP= M+D+SxP</b> <b>SP = 4+4+2x5</b> <b>SP= 50</b>  <b>Medium-High</b></p>	<ul style="list-style-type: none"> <li>➤ Vegetation must only be removed on the site demarcated and authorized for construction.</li> <li>➤ Where possible, construction activities must be performed in previously disturbed areas.</li> <li>➤ The development area must again be surveyed prior to construction, so to locate and capture any SCC.</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 4+3+1x3</b> <b>SP= 24</b>  <b>Low</b></p>
<p><b>Loss of plant species of conservational concern:</b> It is possible that there might be plant species of conservational concern that might be found during the construction phase, especially during the rainy season.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 4+5+2x5</b> <b>SP= 55</b>  <b>High</b></p>	<ul style="list-style-type: none"> <li>➤ All plant species identified as of conservational concern must not be removed, or disturbed.</li> <li>➤ If needed, approval must be obtained from the ECO, before any disturbance or removal of plant SCC.</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 3+2+1x3</b> <b>SP= 18</b>  <b>Very Low</b></p>
<p><b>Loss and Fragmentation of Habitats;</b> Animals with limited mobility are often the first to be affected by habitat fragmentation due to its effects on population viability. Reptiles and small mammals may be separated into distinct populations.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 5+5+2x5</b> <b>SP= 60</b>  <b>High</b></p>	<ul style="list-style-type: none"> <li>➤ All construction activities must take place within an area demarcated for the development.</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 3+5+2x4</b> <b>SP= 40</b>  <b>Medium</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
<p><b>Loss of fauna</b></p> <p>The proposed construction activities might result in a loss of animal species that could be found on site.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 5+4+2x4</b>  <b>SP= 44</b></p> <p><b>Medium-high</b></p>	<ul style="list-style-type: none"> <li>➤ All workers must be trained to recognize threatened species on site.</li> <li>➤ During site preparation, special care must be taken during the clearing of the works area in order to minimize damage or disturbance of roosting and nesting sites.</li> <li>➤ No faunal species are to be trapped, hunted or killed during the construction phase.</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 3+2+2x3</b>  <b>SP= 21</b></p> <p><b>Low</b></p>
<p><b>Encroachment of Alien Invasive Species:</b></p> <p>Disturbed areas are most likely to be infested by alien vegetation.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 4+5+2x5</b>  <b>SP= 55</b></p> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>➤ An on-going proper alien invasive management plan must be implemented.</li> <li>➤ All sites disturbed by construction activities should be monitored for colonization by invasive plants and should be controlled as they emerge throughout the project life cycle.</li> </ul>	<p><b>SP= M+D+SxP</b>  <b>SP= 2+1+1x2</b>  <b>SP= 8</b></p> <p><b>Negligible</b></p>
<p><b>Potential loss of wetland habitat:</b></p> <p>The proposed extension site to the North eastern section of the existing settlement contain NFEPA wetland units. Also, most parts of the borders of the extension site falls within the 1:100-Year floodline.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 5+5+3x5</b>  <b>SP= 65</b></p> <p><b>Very High</b></p>	<ul style="list-style-type: none"> <li>➤ A 32m buffer around the the identified wetlands must be maintained.</li> <li>➤ No construction activities must be carried out within these buffers.</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 4+5+3x4</b>  <b>SP= 48</b></p> <p><b>Medium-High</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
<p><b>Deterioration in water quality as a result of:</b> The spilling of hydrocarbons and other hazardous substances from machinery and equipment used during the construction and operational phase;</p> <p>Hazardous substances and sediment entering the wetland system as a result of construction activities</p>	<p><b>SP= M+D+SxP</b> <b>SP= 5+4+3x5</b> <b>SP= 60</b></p> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>➤ Machinery must be parked on the designated bunded areas and dip trays must be placed under the machinery, when not used to capture any possible oil leaks;</li> <li>➤ All petrochemical storage tanks must be enclosed in a bunded area that makes provision for 110% of the total volume of tanks. All these bunded areas must be supplied with a closable valve through which any spillage can be safely removed;</li> </ul>	<p><b>SP=M+D+SxP</b> <b>SP= 2+3+2x2</b> <b>SP= 21</b></p> <p><b>Low</b></p>
<p><b>Alterations to the flow regimes:</b> Impacts on the water resources may be from an increase of hardened surfaces within the contributing catchment of the floodplain wetland.</p>	<p><b>SP=M+D+SxP</b> <b>SP= 4+5+2x5</b> <b>SP= 55</b></p> <p><b>High</b></p>	<ul style="list-style-type: none"> <li>➤ The construction of the pipelines, should be undertaken in a phased approach so as to minimise the disturbances to the wetland</li> </ul>	<p><b>SP=M+D+SxP</b> <b>SP= 3+5+1x3</b> <b>SP= 27</b></p> <p><b>Low</b></p>
<p><b>Ground water Contamination as a result of:</b> Potential leaks from the pipelines and other hazardous substances leaking from equipment.</p> <p>Hazardous substances entering the soil and wetland systems during construction and the operational phase.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 5+4+3x4</b> <b>SP= 48</b></p> <p><b>Medium-high</b></p>	<ul style="list-style-type: none"> <li>➤ Suitable storage facilities for handling and storage of oils, paints, grease, fuels, chemicals, and any hazardous materials to be used, must be provided to prevent the migration of spillage into the ground and possible ingress into the groundwater regime.</li> </ul>	<p><b>SP=M+D+SxP</b> <b>SP= 3+3+2x2</b> <b>SP= 16</b></p> <p><b>Very low</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
		<ul style="list-style-type: none"> <li>➤ Machinery used on site should be placed on an impermeable layer to avoid groundwater contamination.</li> <li>➤ All remains of excess concrete must be physically removed on completion. Washing the remains into the ground is not acceptable.</li> </ul>	
<p><b>Soil erosion and degradation of soil quality</b></p> <p>The most significant impact will be the changes in the soil structure and degradation of soil quality as a result of erosion and compaction. Additionally, spills and leaks may also occur from vehicles and heavy equipment used during the construction operations, which may result in soil contamination</p>	<p><b>SP=M+D+SxP</b>  <b>SP= 4+4+2x5</b>  <b>SP= 50</b></p> <p><b>Medium-high</b></p>	<ul style="list-style-type: none"> <li>➤ Vegetation clearance should commence on the upgradient sections and gradually progress downgradient, such that the undeveloped portion can serve as a natural erosion control, sediment retention, and stormwater attenuation mechanism.</li> <li>➤ Heavy machinery operating onsite must be routinely checked for fuel leaks or malfunctions to minimize the risk of oil spills.</li> <li>➤ Sediment barriers such as berms, contour ridges or contour grass strips must be installed across all slopes.</li> <li>➤ All sediment barriers must be installed or setup outside recommended wetland buffers.</li> <li>➤ Concrete/Cement mixing must be done on hard surfaces or mixing mats to avoid soil contamination</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 3+3+1x4</b>  <b>SP= 28</b></p> <p><b>Low</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
<p><b>Air pollution: Dust</b></p> <p>Dust generated during construction will result from clearing and earthworks. The major dust sources will be from the movement of vehicles over the cleared working area and from vehicles transporting material and equipment to the working areas. The occurrence and significance.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 4+2+2x4</b>  <b>SP= 32</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ Remove the vegetation cover as it becomes necessary for work to proceed.</li> <li>➤ Limit on-site vehicle speed to 15-20 km/ph.</li> <li>➤ Apply dust suppressant to unpaved or cleared areas.</li> <li>➤ Water exposed areas before high winds</li> <li>➤ Prohibit activities during windy conditions</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 2+1+1x2</b>  <b>SP= 8</b></p> <p><b>Negligible</b></p>
<p><b>Aesthetic Impact;</b></p> <p>During the construction phase, residents who live in close proximity to or overlook the proposed project site will experience a change in their existing views as residents will have a view of a construction site characterized by exposed earth, and machinery</p>	<p><b>SP=M+D+SxP</b>  <b>SP= 4+5+2x4</b>  <b>SP= 44</b></p> <p><b>Medium-high</b></p>	<ul style="list-style-type: none"> <li>➤ The contractor should maintain good housekeeping on-site to avoid litter and minimize waste</li> <li>➤ Dust suppression is important as dust will raise the visibility of the development.</li> <li>➤ Clearance of vegetation should be done all at once at the site</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 3+5+2x3</b>  <b>SP= 30</b></p> <p><b>Low</b></p>
<p><b>Noise pollution;</b></p> <p>The main sources of noise associated with the proposed construction activities include the following; Construction activities and equipment delivery. Construction activities are likely to be confined to daytime and the noise levels will only affect the adjacent areas for a relatively short period of time.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 5+2+3x4</b>  <b>SP= 40</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ Ensure that operating hours as determined by the EA are adhered to. Where not defined, development must be limited to daylight hours.</li> <li>➤ All vehicles must be maintained in accordance with manufactures specifications to avoid excessive noise.</li> <li>➤ All vehicles not in use must be turned off.</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 3+1+2x2</b>  <b>SP= 12</b></p> <p><b>Very low</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
<p><b>Traffic Impact</b></p> <p>The transportation of the required materials and machinery will necessitate the use of heavy-duty vehicles. In addition, there will also be an increase in construction vehicles in and around the proposed site. The most significant impacts will be felt on Karbochem Road. This impact will, however, be of temporary duration as it will only last for the construction phase.</p>	<p><b>SP=M+D+SxP</b>  <b>SP= 4+2+3x5</b>  <b>SP= 45</b></p> <p><b>Medium-high</b></p>	<ul style="list-style-type: none"> <li>➤ Prior to construction, engage with the relevant road authorities (KZN Dept of Transport, and other relevant road authority) to jointly monitor road conditions during the construction period.</li> <li>➤ Construction activities must comply with the recommendations of the Traffic Impact Assessment (TIA) report.</li> <li>➤ Establish a set route that will be used by heavy-duty vehicles so as to limit potential damages.</li> <li>➤ Signs must be installed to guide all movement of vehicles around the construction site</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 2+1+2x3</b>  <b>SP= 15</b></p> <p><b>Very low</b></p>
<p><b>Generation of waste</b></p> <p>Waste will be created during the construction phase of the project. This may range from general to hazardous waste, that may pollute surface and groundwater sources.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 5+1+2x5</b>  <b>SP= 40</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ Construction waste, for instance unused concrete must be disposed of at a licensed Waste disposal facility/Landfill site.</li> <li>➤ No construction waste to be stockpiled on site.</li> <li>➤ Litter bins must be provided at the site for waste generated by construction personnel</li> </ul>	<p><b>SP= M+D+SxP</b>  <b>SP= 3+1+1x3</b>  <b>SP= 15</b></p> <p><b>Very low</b></p>
<p><b>Loss of Archaeological resources;</b></p> <p>According to the SAHRIS Paleo Sensitivity map, the proposed development area is rated as a VERY HIGH paleo sensitive area warranting a field assessment. The survey also did not record any archaeological sites.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 5+5+1x4</b>  <b>SP= 44</b></p> <p><b>Medium-high</b></p>	<ul style="list-style-type: none"> <li>➤ Regular Archaeological Watching Briefs should be carried out during construction in case any chance findings are made.</li> <li>➤ Should there be a chance find, then a phase 2 paleontological study is required.</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 2+5+1x3</b>  <b>SP= 24</b></p> <p><b>Low</b></p>



Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction Phase (Negative)</b>			
<p><b>Destruction of Heritage Resources:</b></p> <p>There are no standing structures older than 60 years in the study area. There are also no graves that were identified within the proposed study area, and the nearest burial site is located at another portion of the farm, outside of the study area.</p>	<p><b>SP=M+D+SxP</b>  <b>SP= 4+5+1x4</b>  <b>SP= 40</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ Should any artifact or heritage resource be encountered, the contractor is advised to stop the operation immediately and report the matter to the municipality. The discovered fossils must be protected and the appointed EO must report the matter to SAHRA.</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 2+5+1x3</b>  <b>SP= 24</b></p> <p><b>Low</b></p>
<p><b>Destruction of Burial Grounds and Graves continued:</b></p> <p>There are no graves or burial grounds were recorded in and along the proposed Prospecting area.</p>	<p><b>SP=M+D+SxP</b>  <b>SP= 3+5+1x3</b>  <b>SP= 27</b></p> <p><b>Low</b></p>	<ul style="list-style-type: none"> <li>➤ If any human remains, graves, archaeological and historical residues are discovered, the KwaZulu-Natal Heritage Act requires that operations should cease immediately pending an evaluation by the heritage authorities.</li> <li>➤ This finding must be reported to the heritage specialist or KwaZulu-Natal Amafa and Research Institute as a precaution measure</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 2+5+1x2</b>  <b>SP= 16</b></p> <p><b>Very Low</b></p>

## POST CONSTRUCTION

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Post-Construction Phase (Negative)</b>			
<p><b>Loss of indigenous vegetation</b> The development will result in the obliteration of vegetation on site for the purpose of construction and the installing of service infrastructure.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 5+5+2x5</b> <b>SP= 60</b> <b>High</b> <b>(60)</b></p>	<ul style="list-style-type: none"> <li>➤ All slope areas must be properly stabilized through compaction to ensure proper establishment of a vegetation cover.</li> <li>➤ A Rehabilitation Management Plan must be implemented. Disturbed areas must be re-vegetated by seeding with plants that are indigenous to the area.</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 3+2+2x3</b> <b>SP= 21</b>  <b>High</b> <b>(55)</b></p>
<p><b>Loss of fauna</b> Post construction activities animals species might not come back to the area.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 5+4+3x5</b> <b>SP=60 High</b></p>	<ul style="list-style-type: none"> <li>➤ All disturbed areas must be revegetated to attract faunal species back to the site after the construction phase.</li> </ul>	<p><b>SP=M+D+SxP</b> <b>SP=3+2+2x3</b> <b>SP=21 Medium-High</b></p>
<p><b>Loss and Fragmentation of Habitats;</b> Animals separated into distinct populations may not be able to come together again, leading a disruption in gene pool and speciation</p>	<p><b>SP= M+D+SxP</b> <b>SP= 4+5+2x5</b> <b>SP= 55 High</b></p>	<ul style="list-style-type: none"> <li>➤ Rehabilitate all affected areas to attract animals back to the disturbed area.</li> <li>➤ Use indigenous plants during the revegetation of all disturbed areas.</li> </ul>	<p><b>SP=M+D+SxP</b> <b>SP=3+3+2x3</b> <b>SP= 24</b></p>
<p><b>Encroachment of Alien Invasive Species:</b> Disturbed areas are most likely to be infested by alien vegetation after the construction phase.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 4+5+3x5</b> <b>SP= 60 Very high</b></p>	<ul style="list-style-type: none"> <li>➤ An on-going proper alien invasive management plan must be developed and implemented during operational phase.</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 2+1+1x2</b> <b>SP= 8</b></p>
<p><b>Potential loss of wetland habitat:</b> The proposed extension site to the North eastern section of the existing settlement contain NFEPA</p>	<p><b>SP= M+D+SxP</b> <b>SP= 5+5+2x5</b> <b>SP= 60 Very High</b></p>	<ul style="list-style-type: none"> <li>➤ A rehabilitation plan should be developed and implemented in order to rehabilitate impacted areas, especially near wetlands.</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 4+5+2x4</b> <b>SP= 44 Medium-High</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Post-Construction Phase (Negative)</b>			
wetland units. Also, most parts of the borders of the extension site falls within the 1:100-Year floodline.			
<b>Increased demand on bulk services</b> Associated operation activities i.e. additional bulk services (water, sewer and electricity) are required to cater for the proposed development	<b>SP= M+D+SxP</b> <b>SP= 4+5+3x4</b> <b>SP= 48</b> <b>Very high70</b>	<ul style="list-style-type: none"> <li>➤ Energy-saving alternatives such as use of solar energy should be installed in the proposed residential units – provided that the budget for such is allocated.</li> <li>➤ The proposed scope of works as per the MIB infrastructure development bulk services</li> </ul>	<b>SP= M+D+SxP</b> <b>SP=3+5+2x3</b> <b>SP= 30</b> <b>Medium 39</b>
<b>Increase in general waste</b> The amount of waste generated in the settlement will increase during the operational phase of the project.	<b>SP= M+D+SxP</b> <b>SP= 4+5+3x4</b> <b>SP= 48</b> <b>High 60</b>	<ul style="list-style-type: none"> <li>➤ The applicant should ensure that the collection of waste general waste is carried out within the proposed development.</li> <li>➤ New waste collection routes for collection services must be done in order to accommodate the proposed development.</li> </ul>	<b>SP= M+D+SxP</b> <b>SP= 3+5+2x3</b> <b>SP= 30</b> <b>Medium-High50</b>
<b>Increased Traffic</b> The establishment of the settlement will increase traffic flow.	<b>SP= M+D+SxP</b> <b>SP= 3+5+2x4</b> <b>SP= 40</b> <b>Medium</b>	<ul style="list-style-type: none"> <li>➤ All the recommendations of the Traffic Impact Assessment study must be implemented.</li> </ul>	<b>SP= M+D+SxP</b> <b>SP= 2+5+2x2</b> <b>SP= 18</b> <b>Very low18</b>
<b>Aesthetic Impact;</b> After the construction phase, residents who live in close proximity to or overlook the proposed project site will experience a change in their existing views as residents.	<b>SP= M+D+SxP</b> <b>SP= 5+5+2x5</b> <b>SP= 60</b> <b>Medium(40)</b>	<ul style="list-style-type: none"> <li>➤ All remaining construction infrastructure, rubble and waste must be removed from the site</li> </ul>	<b>SP= M+D+SxP</b> <b>SP= 3+5+1x4</b> <b>SP= 36</b> <b>Low(30)</b>

## 14.2. ALTERNATIVE C (UPGRADING EXISTING SETTLEMENT) – MOST PREFERED

**Table 14: IMPACT SIGNIFICANCE EVALUATION AND SCORING – ALT C**

### CONSTRUCTION PHASE

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction (Negative)</b>			
<p><b>Loss of indigenous vegetation</b> The development will result in the obliteration of vegetation on site for the purpose of construction and the installing of service infrastructure.</p>	<p><b>SP = M+D+SxP</b> <b>SP = 4+5+2x4</b> <b>SP = 44</b>  <b>Medium-High</b></p>	<ul style="list-style-type: none"> <li>➤ Vegetation must only be removed on the site demarcated and authorized for construction.</li> <li>➤ Where possible, construction activities must be performed in previously disturbed areas.</li> <li>➤ The development area must again be surveyed prior to construction, so to locate and capture any SCC.</li> </ul>	<p><b>SP = M+D+SxP</b> <b>SP = 3+5+2x3</b> <b>SP = 30</b>  <b>Low</b></p>
<p><b>Loss of plant species of conservational concern:</b> It is possible that plant species of conservational concern might be found during the construction phase, especially during the rainy season. Also, a portion of the study area falls under a catchment area, earmarked for conservation by the KZNBCP freshwater plan</p>	<p><b>SP= M+D+SxP</b> <b>SP= 5+5+3x3</b> <b>SP= 39</b> <b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ All plant species identified as of conservational concern must not be removed, or disturbed.</li> <li>➤ If needed, approval must be obtained from the ECO, before any disturbance or removal of plant SCC.</li> </ul>	<p><b>SP = M+D+SxP</b> <b>SP = 3+4+3x2</b> <b>SP = 20</b> <b>Very Low</b></p>
<p><b>Loss and Fragmentation of Habitats;</b> Animals with limited mobility are often the first to be affected by habitat fragmentation due to its effects on</p>	<p><b>SP= M+D+SxP</b> <b>SP= 4+5+2x3</b> <b>SP= 33</b></p>	<ul style="list-style-type: none"> <li>➤ All construction activities must take place within an area demarcated for the development.</li> </ul>	<p><b>SP = M+D+SxP</b> <b>SP = 3+4+1x3</b> <b>SP = 24</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction (Negative)</b>			
population viability. Reptiles and small mammals may be separated into distinct populations.	<b>Medium</b>		<b>Low</b>
<b>Loss of fauna</b> The proposed construction activities might result in a loss of animal species that could be found on site.	<b>SP= M+D+SxP</b> <b>SP= 3+4+3x4</b> <b>SP= 40</b>  <b>Medium</b>	<ul style="list-style-type: none"> <li>➤ All workers must be trained to recognize threatened species on site.</li> <li>➤ During site preparation, special care must be taken during the clearing of the works area in order to minimize damage or disturbance of roosting and nesting sites.</li> <li>➤ No faunal species are to be trapped, hunted or killed during the construction phase.</li> </ul>	<b>SP= M+D+SxP</b> <b>SP= 3+3+2x3</b> <b>SP= 24</b>  <b>Low</b>
<b>Encroachment of Alien Invasive Species:</b> Disturbed areas are most likely to be infested by alien vegetation.	<b>SP= M+D+SxP</b> <b>SP= 3+5+2x4</b> <b>SP= 40</b>  <b>Medium</b>	<ul style="list-style-type: none"> <li>➤ An on-going proper alien invasive management plan must be developed.</li> <li>➤ All areas disturbed by construction activities should be monitored for colonization by invasive plants and should be controlled as they emerge throughout the project life cycle.</li> </ul>	<b>SP= M+D+SxP</b> <b>SP= 2+1+1x2</b> <b>SP= 8</b>  <b>Negligible</b>
<b>Potential loss of wetland habitat:</b> The proposed extension site to the North eastern section of the existing settlement contain NFEPA wetland units. Also, most parts of the borders of the extension site falls within the 1:100-Year floodline.	<b>SP= M+D+SxP</b> <b>SP= 4+5+2x3</b> <b>SP= 33</b>  <b>Medium</b>	<ul style="list-style-type: none"> <li>➤ A 32m buffer around the the identified wetlands must be applied and maintained.</li> <li>➤ No construction activities must be carried out within these buffers.</li> </ul>	<b>SP= M+D+SxP</b> <b>SP=3+2+2x2</b> <b>SP= 14</b>  <b>Very low</b>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction (Negative)</b>			
<p><b>Deterioration in water quality as a result of:</b> The spilling of hydrocarbons and other hazardous substances from machinery and equipment used during the construction and operational phase;</p> <p>Hazardous substances and sediment entering the wetland system as a result of construction activities</p>	<p><b>SP= M+D+SxP</b> <b>SP= 4+4+4x4</b> <b>SP= 48</b></p> <p><b>Medium-high</b></p>	<ul style="list-style-type: none"> <li>➤ Machinery must be parked on the designated bunded areas and dip trays must be placed under the machinery, when not used to capture any possible oil leaks;</li> <li>➤ All petrochemical storage tanks must be enclosed in a bunded area that makes provision for 110% of the total volume of tanks. All these bunded areas must be supplied with a closable valve through which any spillage can be safely removed;</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP=3+2+3x2</b> <b>SP= 16</b></p> <p><b>Very low</b></p>
<p><b>Alterations to the flow regimes:</b> Impacts on the water resources may be from an increase of hardened surfaces within the contributing catchment of the floodplain wetland.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 3+5+2x4</b> <b>SP= 40</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ The construction of the pipelines, should be undertaken in a phased approach so as to minimise the disturbances to the wetland</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 2+4+2x3</b> <b>SP= 24</b></p> <p><b>Low</b></p>
<p><b>Ground water Contamination as a result of:</b> Surface and ground water pollution associated with construction activities i.e. contamination from fuels, cement, oils and paints through run-off or as a result of leaks.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 4+3+3x4</b> <b>SP= 40</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ Suitable storage facilities for handling and storage of oils, paints, grease, fuels, chemicals, and any hazardous materials to be used, must be provided to prevent the migration of spillage into the ground and possible ingress into the groundwater regime.</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 2+2+2x2</b> <b>SP= 12</b></p> <p><b>Very Low</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction (Negative)</b>			
		<ul style="list-style-type: none"> <li>➤ Machinery used on site should be placed on an impermeable layer to avoid groundwater contamination.</li> <li>➤ All remains of excess concrete must be physically removed on completion. Washing the remains into the ground is not acceptable.</li> </ul>	
<p><b>Soil erosion and degradation of soil quality</b></p> <p>The most significant impact will be the changes in the soil structure and degradation of soil quality as a result of erosion and compaction. Additionally, spills and leaks may also occur from vehicles and heavy equipment used during the construction operations, which may result in soil contamination</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 3+4+1x4</b>  <b>SP= 32</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ Vegetation clearance should commence on the upgradient sections and gradually progress downgradient, such that the undeveloped portion can serve as a natural erosion control, sediment retention, and stormwater attenuation mechanism.</li> <li>➤ Heavy machinery operating onsite must be routinely checked for fuel leaks or malfunctions to minimize the risk of oil spills.</li> <li>➤ Sediment barriers such as berms, contour ridges or contour grass strips must be installed across all slopes.</li> <li>➤ All sediment barriers must be installed or setup outside recommended wetland buffers.</li> <li>➤ Concrete/Cement mixing must be done on hard surfaces or mixing mats to avoid soil contamination</li> </ul>	<p><b>SP= M+D+SxP</b>  <b>SP= 2+3+1x2</b>  <b>SP= 12</b></p> <p><b>Low</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction (Negative)</b>			
<p><b>Air pollution: Dust</b></p> <p>Dust generated during construction will result from clearing and earthworks. The major dust sources will be from the movement of vehicles over the cleared working area and from vehicles transporting material and equipment to the working areas. The occurrence and significance.</p>	<p><b>SP= M+D+SxP</b></p> <p><b>SP= 4+1+2x4</b></p> <p><b>SP= 28</b></p> <p><b>Low</b></p>	<ul style="list-style-type: none"> <li>➤ Remove the vegetation cover as it becomes necessary for work to proceed.</li> <li>➤ Limit on-site vehicle speed to 15-20 km/ph.</li> <li>➤ Apply dust suppressant to unpaved or cleared areas.</li> <li>➤ Water exposed areas before high winds</li> <li>➤ Prohibit activities during windy conditions</li> </ul>	<p><b>SP= M+D+SxP</b></p> <p><b>SP= 3+1+1x3</b></p> <p><b>SP= 15</b></p> <p><b>Very low</b></p>
<p><b>Aesthetic Impact;</b></p> <p>During the construction phase, residents who live in close proximity to or overlook the proposed project site will experience a change in their existing views as residents will have a view of a construction site characterized by exposed earth, and machinery</p>	<p><b>SP= M+D+SxP</b></p> <p><b>SP= 4+3+2x4</b></p> <p><b>SP= 36</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ The contractor should maintain good housekeeping on-site to avoid litter and minimize waste</li> <li>➤ Dust suppression is important as dust will raise the visibility of the development.</li> </ul>	<p><b>SP= M+D+SxP</b></p> <p><b>SP= 3+2+1x3</b></p> <p><b>SP= 18</b></p> <p><b>Very low</b></p>
<p><b>Noise pollution;</b></p> <p>The main sources of noise associated with the proposed construction activities include the following; Construction activities and equipment delivery. Construction activities are likely to be confined to daytime and the noise levels will only affect the adjacent areas for a relatively short period of time.</p>	<p><b>SP= M+D+SxP</b></p> <p><b>SP= 5+1+2x5</b></p> <p><b>SP= 40</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ Ensure that operating hours as determined by the EA are adhered to. Where not defined, development must be limited to working hours.</li> <li>➤ All vehicles must be maintained in accordance with manufactures specifications to avoid excessive noise.</li> <li>➤ All vehicles not in use must be turned off.</li> </ul>	<p><b>SP= M+D+SxP</b></p> <p><b>SP= 3+1+2x3</b></p> <p><b>SP= 18</b></p> <p><b>Very low</b></p>



Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction (Negative)</b>			
<p><b>Traffic Impact</b></p> <p>The transportation of the required materials and machinery will necessitate the use of heavy-duty vehicles. In addition, there will also be an increase in construction vehicles in and around the proposed site. The most significant impacts will be felt on Karbochem Road. This impact will, however, be of temporary duration as it will only last for the construction duration of the project.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 5+2+3x5</b>  <b>SP= 50</b></p> <p><b>Medium-high</b></p>	<ul style="list-style-type: none"> <li>➤ Construction activities must comply with the recommendations of the Traffic Impact Assessment (TIA) report.</li> <li>➤ Prior to construction, engage with the relevant road authorities (KZN Dept of Transport, and other relevant road authority) to jointly monitor road conditions during the construction period.</li> <li>➤ Establish a set route that will be used by heavy-duty vehicles so as to limit potential damages.</li> <li>➤ Road signs must be installed to guide all movement of vehicles in the construction site.</li> </ul>	<p><b>SP= M+D+SxP</b>  <b>SP= 3+1+2x3</b>  <b>SP= 18</b></p> <p><b>Very Low</b></p>
<p><b>Generation of waste</b></p> <p>Waste will be created during the construction phase of the project. This may range from general to hazardous waste, that may pollute surface and groundwater sources.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 5+1+2x5</b>  <b>SP= 40</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ Construction waste, for instance unused concrete must be disposed of at a licensed Waste disposal facility/Landfill site.</li> <li>➤ No construction waste to be stockpiled on site.</li> <li>➤ Litter bins must be provided at the site for waste generated by construction personnel</li> </ul>	<p><b>SP= M+D+SxP</b>  <b>SP= 3+1+1x3</b>  <b>SP= 15</b></p> <p><b>Very low</b></p>
<p><b>Loss of Archaeological resources;</b></p> <p>According to the SAHRIS Paleo Sensitivity map, the proposed development area is rated as a VERY HIGH paleo sensitive area warranting a field assessment. The survey also did not record any archaeological sites.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 3+5+1x3</b>  <b>SP= 27</b></p> <p><b>Low</b></p>	<ul style="list-style-type: none"> <li>➤ Regular Archaeological Watching Briefs should be carried out during construction in case any chance findings are made.</li> <li>➤ Should there be a chance find, then a phase 2 paleontological study is required.</li> </ul>	<p><b>SP= M+D+SxP</b>  <b>SP= 2+3+1x2</b>  <b>SP= 12</b></p> <p><b>Very low</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Construction (Negative)</b>			
<p><b>Destruction of Heritage Resources:</b></p> <p>There are no standing structures older than 60 years in the study area. There are also no graves that were identified within the proposed study area, and the nearest burial site is located at another portion of the farm, outside of the study area.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 5+5+1x3</b>  <b>SP= 33</b></p> <p><b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ Should any artifact or heritage resource be encountered, the contractor is advised to stop the operation immediately and report the matter to the municipality. The discovered fossils must be protected and the appointed EO must report the matter to SAHRA.</li> </ul>	<p><b>SP= M+D+SxP</b>  <b>SP= 3+5+1x2</b>  <b>SP= 18</b></p> <p><b>Very low</b></p>
<p><b>Destruction of Burial Grounds and Graves continued:</b></p> <p>There are no graves or burial grounds were recorded in and along the proposed Prospecting area.</p>	<p><b>SP= M+D+SxP</b>  <b>SP= 3+5+1x3</b>  <b>SP= 27</b></p> <p><b>Low</b></p>	<ul style="list-style-type: none"> <li>➤ If any human remains, graves, archaeological and historical residues are discovered, the KwaZulu-Natal Heritage Act requires that operations should cease immediately pending an evaluation by the heritage authorities.</li> <li>➤ This finding must be reported to the heritage specialist or KwaZulu-Natal Amafa and Research Institute as a precaution measure</li> </ul>	<p><b>SP=M+D+SxP</b>  <b>SP= 2+5+1x2</b>  <b>SP= 16</b></p> <p><b>Very low</b></p>

## POST CONSTRUCTION

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Post-Construction Phase (Negative)</b>			
<p><b>Loss of indigenous vegetation</b> Indigenous vegetation may not be able to naturally grow back after the construction phase.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 4+4+2x4</b> <b>SP= 40</b>  <b>Medium</b></p>	<ul style="list-style-type: none"> <li>➤ All slope areas must be properly stabilized through compaction to ensure proper establishment of a vegetation cover.</li> <li>➤ A Rehabilitation Management Plan must be implemented. Disturbed areas must be re-vegetated by seeding with plants that are indigenous to the area.</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 1+1+1x2</b> <b>SP= 6</b>  <b>Negligible</b></p>
<p><b>Loss of fauna</b> Post construction activities animals species might not come back to the area.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 5+5+3x4</b> <b>SP= 52</b> <b>High</b></p>	<ul style="list-style-type: none"> <li>➤ All disturbed areas must be revegetated to attract faunal species back to the site after the construction phase.</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 3+2+2x3</b> <b>SP= 21</b> <b>Low</b></p>
<p><b>Loss and Fragmentation of Habitats;</b> Animals separated into distinct populations may not be able to come together again, leading a disruption in gene pool and natural speciation.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 5+5+2x5</b> <b>SP= 60</b> <b>High</b></p>	<ul style="list-style-type: none"> <li>➤ An on-going proper alien invasive management plan must be developed and implemented during operational phase.</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 3+3+1x3</b> <b>SP= 21</b> <b>Low</b></p>
<p><b>Encroachment of Alien Invasive Species:</b> Disturbed areas are most likely to be infested by alien vegetation after the construction phase.</p>	<p><b>SP= M+D+SxP</b> <b>SP= 5+5+3x4</b> <b>SP= 52</b> <b>High</b></p>	<ul style="list-style-type: none"> <li>➤ An on-going proper alien invasive management plan must be developed and implemented during operational phase</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 2+1+1x2</b> <b>SP= 8</b> <b>Negligible</b></p>
<p><b>Increased demand on bulk services</b></p>	<p><b>SP= M+D+SxP</b> <b>SP= 4+5+3x4</b></p>	<ul style="list-style-type: none"> <li>➤ Energy-saving alternatives such as use of solar energy should be installed in the</li> </ul>	<p><b>SP= M+D+SxP</b> <b>SP= 3+5+2x3</b></p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
<b>Post-Construction Phase (Negative)</b>			
Associated operation activities i.e. additional bulk services (water, sewer and electricity) are required to cater for the proposed development	<b>SP= 48</b>  <b>Medium-high</b>	proposed residential units – provided that the budget for such is allocated.	<b>SP= 30</b>  <b>Low</b>
<b>Increase in general waste</b> The amount of waste generated in the settlement will increase during the operational phase of the project.	<b>SP= M+D+SxP</b> <b>SP= 4+5+3x4</b> <b>SP= 48</b>  <b>Medium-high</b>	<ul style="list-style-type: none"> <li>➤ The applicant should ensure that the collection of waste general waste is carried out within the proposed development.</li> <li>➤ New waste collection routes for collection services must be done in order to accommodate the proposed development.</li> </ul>	<b>SP= M+D+SxP</b> <b>SP= 3+5+2x3</b> <b>SP= 30</b>  <b>Low</b>
<b>Increased Traffic</b> The establishment of the settlement will increase traffic flow.	<b>SP= M+D+SxP</b> <b>SP= 3+5+2x4</b> <b>SP= 40</b> <b>Medium</b>	<ul style="list-style-type: none"> <li>➤ All the recommendations of the Traffic Impact Assessment study must be implemented.</li> </ul>	<b>SP= M+D+SxP</b> <b>SP= 2+5+2x2</b> <b>SP= 18</b> <b>Very low</b>
<b>Aesthetic Impact;</b> After the construction phase, residents who live in close proximity to or overlook the proposed project site will experience a change in their existing views as residents.	<b>SP= M+D+SxP</b> <b>SP= 5+5+2x5</b> <b>SP= 60</b> <b>High</b>	<ul style="list-style-type: none"> <li>➤ All remaining construction infrastructure, rubble and waste must be removed from the site</li> </ul>	<b>SP= M+D+SxP</b> <b>SP= 3+5+1x4</b> <b>SP= 36</b> <b>Medium</b>

## 15. SUMMARY OF POTENTIAL POSITIVE AND NEGATIVE IMPACTS IDENTIFIED

The proposed housing development may result in both positive and negative impacts on the environment and the surrounding community. This EIR and the attached EMPr aims to ensure that the positive impacts of the proposed development are enhanced, while the negative impacts are avoided or minimized. In instances where the negative impacts cannot be avoided nor minimized, with robust consultations with the various specialists, measures are put in place that further assist in ensuring that the best practicable methods are applied.

The potential positive impacts of the proposed development are as follows:

- Temporary/short term employment opportunities, which turns to skills development within the surrounding community.
- Provision of housing to curb the housing backlog within the Newcastle Local Municipality.
- Provision of services infrastructure

The potential negative impacts of the proposed development are as follows:

- The activities associated with the construction phase of the development may result in loss of both Flora and Fauna.
- The activities to be undertaken during the construction phase have potential to impact surface and groundwater resources.
- Construction activities are more likely to cause changes in air quality within the surrounding immediate environment.
- Increased traffic and noise due to construction activities.
- For the whole duration of the construction phase, there will be visual impacts as a result of the construction activities.
- There is Health safety risks associated with the construction phase.
- Increase in the generation of waste as a result of construction activities.

It is important to emphasize that the negative impacts can be avoided or minimized through implementation of the EMPr during the project life cycle of the proposed development.

## **16. CUMULATIVE IMPACTS**

In terms of the EIA regulations the cumulative impact, is considered from the holistic view. It means that the impacts of an activity are considered from the past, present and foreseeable future together with the impact of activities associated with that activity, that in itself may not be significant, but when combined, may result in a significant change, which is larger than the sum of all activities. "Cumulative impacts can be: Additive, synergistic, time crowding, neutralizing and space crowding" (DEA, 2017;14).

The following cumulative impact(s) were identified for the proposed activity;

### **16.1. Synergistic: Fragmentation of Habitat**

The development of housing units and installation of infrastructure in the local area will have a significant cumulative impact on populations of different flora and fauna species. The transformation of natural sites which are identified to meet biodiversity patterns and process thresholds will disintegrate the network of these habitats. Also, poor rehabilitation of high and moderately sensitive areas may lead to the permanent degradation of these ecosystems as well as allow invading alien vegetation species to expand.

### **16.2. Synergistic: Social transformation**

The construction of more housing units within the community will transform the settlement into a compact settlement with a high population density. This will have an exhaustive effect on the local environment and resources, including the increasing demand for the provision of basic services.

### **16.3. Regional Economic Development**

The creation of employment opportunities would subsequently improve the economic development within the region.

## **17. COMMENTS AND RESPONSES REPORT**

A Comments and Responses Report has been compiled and attached as appendix D9 it records the date that issues were raised, a summary of each issue, and the response of the team to address the issue.

In addition, all comments from the Scoping Phase and Draft EIR or where the status of the previous responses has changed have also been addressed in the Comments and Responses Report of this final EIA report.

## **18. RECOMMENDATIONS FROM THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)**

The EAP recommends the authorization of this application: However, the following conditions and mitigation measures are recommended and should be considered in any authorization that may be granted by the competent authority in respect of the application.

- Appointment of an Environmental Control Officer (ECO) to monitor, oversee and advise on site-specific environmental management requirements where and when needed.
- The Environmental Management Programme (EMPr) must be enforced throughout the lifecycle of the project.
- All construction activities must be undertaken within the approved site footprint
- The clearance of vegetation must be minimized and only done in areas that are to be developed.
- Any work in and around natural water bodies, especially the identified wetland units and river, must be considered potentially negative and precautionary practices must be adopted.
- All vehicle and equipment maintenance must take place in the workshop area;
- Storage areas must be managed properly by applying the suggested mitigation measures in this document.
- Local labour must be sourced to maximise the economic benefits for the local community, with preference being on previously disadvantaged individuals.
- All reasonable precautions such as maintenance of Delivery trucks and vehicles must be taken to minimize noise generated on-site.
- All employees must be trained about the Spill Management, Waste management, Emergency Procedures and Evacuation Procedures in place.

## 19. CONCLUSION

The decision to grant or refuse authorisation in terms of Section 24 of NEMA must be made in the light of the provisions of NEMA. Section 24 provides that, in order to give effect to the general objectives of integrated environmental management laid down in NEMA, the potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority charged by the Act with deciding applications for environmental authorisation. An environmental impact assessment report (an "EIA Report") concerning the impact of the proposed activity and alternative activity options on the environment, has been compiled and submitted as prescribed and authorisation may only be issued after consideration of such report.

We submit that the environmental process undertaken thus far complies with these requirements and that that this report covers the full suite of potential environmental issues related to the proposed development. All potential impacts have been evaluated and responded to by either complete avoidance where possible, or by recommendation of the most appropriate and feasible mitigation measures. The preferred / mitigated development proposal presented in this report is responsive to the integrated results of the assessment of potential impacts made by the various specialists on the project team.

Based on comparative evaluation of the various alternatives, including the No-Go option, it is evident that the current status quo is not necessarily the best environmental option and that the preferred Alternative (alternative C, preferred by EAP) can meet the required objections to offset the No-Go option (subject to the implementation of recommended development mitigation measures). This final EIR therefore concludes that the proposed development has been considered via a balanced approach, mindful of cumulative impacts, need and desirability of the project and that the overall negative environmental impacts will be of very low significance. As such, the project can be considered for environmental authorisation subject to implementation of the recommended phased approach and specialist mitigation measures as specified in the EMPr.

*Written submissions must be addressed to:*

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