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DRAFT BASIC ASSESSMENT REPORT

Ref: 14/12/16/3/3/1/2422

THE PROPOSED DEVELOPMENT OF THE NDUMO SHOPPING COMPLEX WITH A FUEL FILLING STATION, A TAXI RANK AND MARKET STALLS IN NDUMO TOWN, WITHIN WARD 16 OF THE JOZINI LOCAL MUNICIPALITY OF UMKHANYAKUDE DISTRICT, KWAZULU-NATAL PROVINCE.

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ON BEHALF OF:



**iThala Development Finance Corporation
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Table of Contents

List of acronyms	1
Glossary of items	2
EXECUTIVE SUMMARY	5
1. INTRODUCTION	7
2. PROJECT TITTLE.....	7
3. PROJECT DESCRIPTION	7
4. PROJECT LOCALITY	8
5. SITE ACCESS.....	10
6. ENGINEERING SERVICES.....	10
6.1 Bulk Water Infrastructure	11
6.1.1 Status Quo: Bulk Water Supply.....	11
6.1.2 Water Demand: Ndumo Retail Centre Development.....	12
6.1.3Water Supply Considerations: Ndumo Retail Centre Development	12
6.2 Bulk Sewerage Infrastructure.....	13
6.2.1 Status Quo: Bulk Sewerage Infrastructure	13
6.2.2 Sewerage: Ndumo Retail Centre Development	14
7. ROADS INFRASTRUCTURE	14
7.1 Status Quo: Access Roads.....	14
7.1.1 Road Considerations: Ndumo Retail Centre Development	14
7.1.2Stormwater Infrastructure & Management	15
7.1.2.1 Status Quo: Ndumo Village Storm Water Management.....	15
8. ACTIVITY MOTIVATION	15
8.1 The need	16
8.2 Desirability.....	17
9. SITE ALTERNATIVE.....	17
9.1 Alternative A (Location & Infrastructural Technology Alternatives)	18
9.2 Alternative B (Infrastructural Technology Alternative).....	19
9.3 Alternative C (Design Alternatives).....	20
9.3.1 Underground Fuel Storage Tanks.....	20
9.3.2 Above Ground Fuel Tanks.....	20
9.4 Alternative D (No-Go Alternative)	21

9.5 Preferred Alternatives.....	21
10 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES.....	22
11. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED BY THE ACTIVITY.....	25
11.1 Climate.....	25
11.1.1 Potential impact.....	26
11.2 Topography.....	26
11.2.1 Potential impacts.....	28
11.3 Geology and Soil.....	29
11.3.1 Potential impacts.....	30
11.4 Hydrological Features.....	30
11.4.2 Rivers and dams.....	32
11.4.3 Wetlands.....	33
11.4.4 Potential impacts.....	34
11.5 Biomes.....	35
11.5.1 Potential Impacts.....	36
11.6 Flora.....	36
11.6.1 Potential Impacts.....	37
11.7 Biodiversity Status.....	38
11.7.2.1 Potential impacts.....	40
11.8 Threatened Ecosystems and Protected Areas.....	40
11.8.2 Protected Areas.....	41
11.8.2.1 Potential Impacts.....	42
11.9 Fauna.....	42
11.9.1 Potential Impacts.....	43
11.10 Visual environment and land use character.....	43
11.10.1 Potential Impacts.....	44
11.11 Heritage and cultural aspects.....	45
11.11.1 Potential Impacts.....	45
11.12 Social and economic aspects.....	45
11.12.1 Population Density.....	45
11.12.2 Human Settlement.....	46
11.12.4 Ndumo Area.....	46

11.12.5 Potential Impacts	46
12. WASTE, EFFLUENT, AIR POLLUTION AND ATMOSPHERIC EMISSIONS	47
12.1 General waste management: construction phase	47
12.2 Effluent	47
12.3 Ambient air pollution and atmospheric emissions	47
12.4 Noise management	48
13 WATER USE	48
14 THE PUBLIC PARTICIPATION PROCESS.....	48
14.1 Background	49
14.2 Objectives of public participation.....	49
14.3 Notification of the Interested and Affected Parties (I&APs).....	49
14.4 Comments from the registered Interested and Affected Parties (I&APs).....	50
15 IMPACT ASSESSMENT AND MITIGATION MEASURES	51
15.1 Impact significance evaluation for alternative A.....	54
16 CUMULATIVE IMPACT ASSESSMENT AND MITIGATION MEASURES.....	73
Synergistic: Fragmentation of indigenous Habitat	73
17. RECOMMENDATIONS BY SPECIALISTS	74
17.1 Engineering Geotechnical Investigation	75
17.2 Heritage Impact Assessment	76
17.3 Ecological Impact Assessment.....	77
18. RECOMMENDATIONS FROM THE ENVIRONMENTAL ASSESSMENT PRACTITIONER.....	79
18.1 Recommendations during construction.....	79
19. CONCLUSION.....	80
20. REFERENCES	81
APPENDICES	83
Appendix A. DECLARATION OF INFORMATION.....	84
Appendix B. ENVIRONMENTAL MANAGEMENT Programme (EMPr).....	85
Appendix C. SITE PHOTOGRAPHS AND LOCALITY MAPS	86
C-1: SITE PHOTOGRAPHS	87
C-2: LOCALITY MAP	88
Appendix D. SITE LAYOUT.....	89

Appendix E. PUBLIC PARTICIPATION PROCESS.....	90
E-1: PUBLIC PARTICIPATION PLAN.....	91
E-2: PRE-APPLICATION MEETING MINUTES.....	92
E-3: ONSITE NOTICES	93
E-4: NEWSPAPER ADVERT.....	94
E-5: Register of i&aP.....	95
e-6: BACKGROUND INFORMATION DOCUMENT	96
Appendix F: EAP’S CV(S).....	97
APPENDIX G: SPECIALIST STUDIES.....	98
G-1: GEOTECHNICAL INVESTIGATION REPORT	99
G-2: HERITAGE IMPACT ASSESSMENT REPORT	100
G-3: TERRESTRIAL ECOLOGICAL STUDY REPORT	101
APPENDIX H: WEB-BASED ENVIRONMENTAL SCREENING REPORT.....	102

List of Figures

- Figure 1: Geographic context of the proposed Site
- Figure 2: Locality map of the project area
- Figure 3: Alternative A Map indicating the location of the site in relation to the central business site
- Figure 4: Ndumo Rural Area climate graph [Source: Climate-Data.Org]
- Figure 5: Map showing the topography within the project area
- Figure 6: Map showing a dominance geological formation within the project site
- Figure 7: Drainage Region and Quaternary Catchment Area Map
- Figure 8: Map showing rivers and dams around the project area
- Figure 9: Map showing the wetland features around the project area
- Figure 10: Map Showing the biomes surrounding and within the project area
- Figure 11: Map showing the vegetation types of the farm

Figure 12: Map showing the Biodiversity Status of the area

Figure 13: Map showing Protected Areas around the Ndumo Area

Figure 14: Picture showing the Land Use of the area

List of Tables

Table 1: Co-ordinates	9
Table 2: 21-digits Surveyor General Code	9
Table 3: Environmental Statutory Framework	22
Table 4: Public Participation Processes	50
Table 5: Cumulative Impacts	73

LIST OF ACRONYMS

BAR	Basic Assessment Report
BSP	Biodiversity Sector Plan
CEMP	Construction Environmental Management Plan
CFP	Chance Finds Procedure
DFFE	The Department of Forestry, Fisheries, and the Environment
DWS	Department of Water and Sanitation
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
DOT	Department of Transport
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
EMP	Environmental Management Plan
EMPr.	Environmental Management Programme
GA	General Authorisation
GIS	Geographic Information System
I&AP	Interested and Affected Parties
JLM	Jozini Local Municipality
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act 107 (Act 107 of 1998)
NEMPAA	National Environmental Management: Protected Areas (Act 57 of 2003)
PPP	Public Participation Plan/Process
SCADA	Supervisory Control and Data Acquisition
SCC	Species of Conservation Concern

GLOSSARY OF ITEMS

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 artifacts, 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, 1994 (Act 15 of 1994), 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 artifacts associated with military history which are older than 75 years and the site on which they are found.

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, in terms of Listing Notice 1 (GNR 327 and 324 of 2017) of NEMA (as amended).

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

DEVELOPMENT FOOTPRINT: any evidence of physical alteration because of the undertaking of an activity.

ENVIRONMENT: in terms of the NEMA (as amended), the “environment” means the surroundings within which humans exist and that are made up of:

- the land, water, and atmosphere of the earth;
- micro-organisms, plant 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 CONTROL OFFICER (ECO): 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.

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

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr): 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 lifecycle of the project. This EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

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.

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

HYDROLOGICAL SYSTEM: water bodies and their connectivity to the welfare of an ecosystem.

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.

INTERESTED AND AFFECTED PARTY (I&AP): 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.

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

POLLUTION: NEMA defines pollution to mean any change in the environment caused by the substances; radioactive or other waves; or noise, odours, 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.

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.

WATER POLLUTION: the National Water Act, 1998 (Act 36 of 1998) defines 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.

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.

EXECUTIVE SUMMARY

The iThala Development Finance Corporation (PTY) Ltd proposes to develop the Ndumo Shopping Complex with a fuel filling station, a taxi rank and market stalls in Ndumo town, ward 16 of the Jozini Local Municipality of uMkhanyakude District, KwaZulu-Natal Province. This will require the clearance of 2.7ha of indigenous vegetation. The total size of the farm is 6.4 ha, with the development footprint being 2.7 ha. This site is registered under the ERF 16638, Ndumu B, which is an area that has not been designated for any specific zone at the stage of the assessment.

The development will use the existing roads that are around the site. Proper intersections on the access roads to the new development will be developed, and this will include the application of traffic calming measures on the access approaches, so to avoid back locks on the mall entrances.

The septic tank and french drain system will be used for the proposed Development, seeing that there are no sewer connection options around the area and all the properties around are using septic tanks.

Water to support the proposed development will be supplied by the uMkhanyakude District Municipality, through a connection point that has been identified onsite (a water service level agreement has been obtained and attached). Electricity to support the developments operations will be supplied by Eskom, and a service level agreement has been obtained and attached.

The project has been proposed as part of the Ndumo Yenkululeko Regeneration Programme established by the KwaZulu Natal Provincial government, which aims to develop facilities, services and infrastructure that will contribute to improving the socio-economic conditions and living standards in the Ndumo area. The proposed location of the development is important in terms of major infrastructure and economic development projects and programmes, as it is close to the most strategic borders between South African, southern Swaziland and Mozambique.

The vegetation of the study area is described as the Western Maputaland Clay Bushveld (SVI 20) and its national conservation status is vulnerable (Munika and Rutherford 2006). The study area is an open savannah with *Vachellia spp.*, a short grassland dominated by *Bothriochloa insculpta* (Pinhole grass) and *Eragrostis spp* and patches of bare ground. The area is partially underlain by red sand and red calcarenite of the Uloa Formation of the Tertiary System and marine glauconitic siltstone of the Mzinene Formation which belongs to the Zululand Group. There were however no

archaeological or historical resources that were identified within the project footprint. The village has elements of evolving cultural environment and features. These mostly include modern development with some rural elements. It also boasts of the Ndumo Game Reserve which is located at approximately 1.7km North.

The NEMA, and the Environmental Impact Assessment (EIA) Regulations (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 & EIA, depending on the scope of the activity. The EIA regulations specify that: Activities identified in Listing Notice 1 and 3 (GNR 327 and 324 of 2017) requires a Basic Assessment while activities identified in Listing Notice 2 (GNR 325 of 2017) are subject to a Scoping and EIA. The listed activity associated with the proposed development is Listing Notice 1, Activity 27 and Listing Notice 3, Activity 10. This application will therefore follow a Basic Assessment process.

Emvelo Quality and Environmental Consultant has been appointed by Exilite Consulting Engineers on behalf of iThala Development Finance Corporation (PTY) Ltd (the applicant), as the independent Environmental Assessment Practitioner (EAP), to facilitate the Basic Assessment Processes required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) for this application.

The Public Participation Process (PPP) has, to date, included: displaying onsite notices, placing an advertisement in the Ilanga Newspaper (local isiZulu newspaper), distribution of Background Information Documents (BIDs), facilitation of a public meeting, as well as the circulation of the draft Basic Assessment Report (BAR) to the relevant Interested and Affected Parties (I&APs).

1. INTRODUCTION

Envelo Quality and Environmental Consultant has been appointed by Exilite Consulting Engineers on behalf of iThala Development Finance Corporation (PTY) Ltd, to undertake an Environmental Impact Assessment (EIA) for the proposed development of the Ndumo Shopping Complex with a fuel filling station, a taxi rank and market stalls in Ndumo town, ward 16, Within the Jozini Local Municipality of uMkhanyakude District, KwaZulu-Natal Province.

This will include the facilitation of the Basic Assessment Processes as required in terms of the NEMA.

2. PROJECT TITTLE

The proposed development of the Ndumo Shopping Complex with a fuel filling station, a taxi rank and market stalls in Ndumo town, within ward 16 of the Jozini Local Municipality of uMkhanyakude District, KwaZulu-Natal Province.

3. PROJECT DESCRIPTION

The iThala Development Finance Corporation (PTY) Ltd proposes to develop the Ndumo Shopping Complex, with a fuel filling station, a taxi rank and market stalls in Ndumo town, Within ward 16 of the Jozini Local Municipality of uMkhanyakude District, KwaZulu-Natal Province.

The proposed development entails the clearance of 2.7 ha of indigenous vegetation for the construction of the following:

- A shopping centre of 3 levels and supporting services (6000 sqm),
- A fuel station of 60 000 litres storage tanks tanks (820 sqm). The 60 000 litres consist of 20 000 litres petrol, 20 000 litres diesel and 20 000 litres petrol.
- A taxi rank (540 sqm); and
- Market stalls (3600 sqm).

The development will use the existing roads that are around the site. Proper intersections on the access roads to the new development will be developed, and this will include the application of traffic calming measures on the access approaches, so to avoid back locks on the mall entrances.

The septic tank and french drain system will be used for the proposed Development, seeing there are sewer connection options around the area and all the properties around are using septic tanks.

Water to support the proposed development will be supplied by the uMkhanyakude District Municipality, through a connection point that has been identified onsite (a water service level agreement has been obtained and attached). Electricity to support the developments operations will be supplied by Eskom, and a service level agreement has been obtained and attached.

The total size of the proposed property is 6.4 ha, and the proposed Development Footprint is approximately 2.7 ha.

4. PROJECT LOCALITY

The development is ward 16, Ndumo rural town, located at ERF: 16638, Ndumu B, within the Jozini Local Municipality of uMkhanyakude District, KwaZulu-Natal Province. The site is approximately 70km Northeast of the Jozini Town.

Figure 1 provides the geographical context of the proposed development site, in relation to major towns or cities within the municipality.

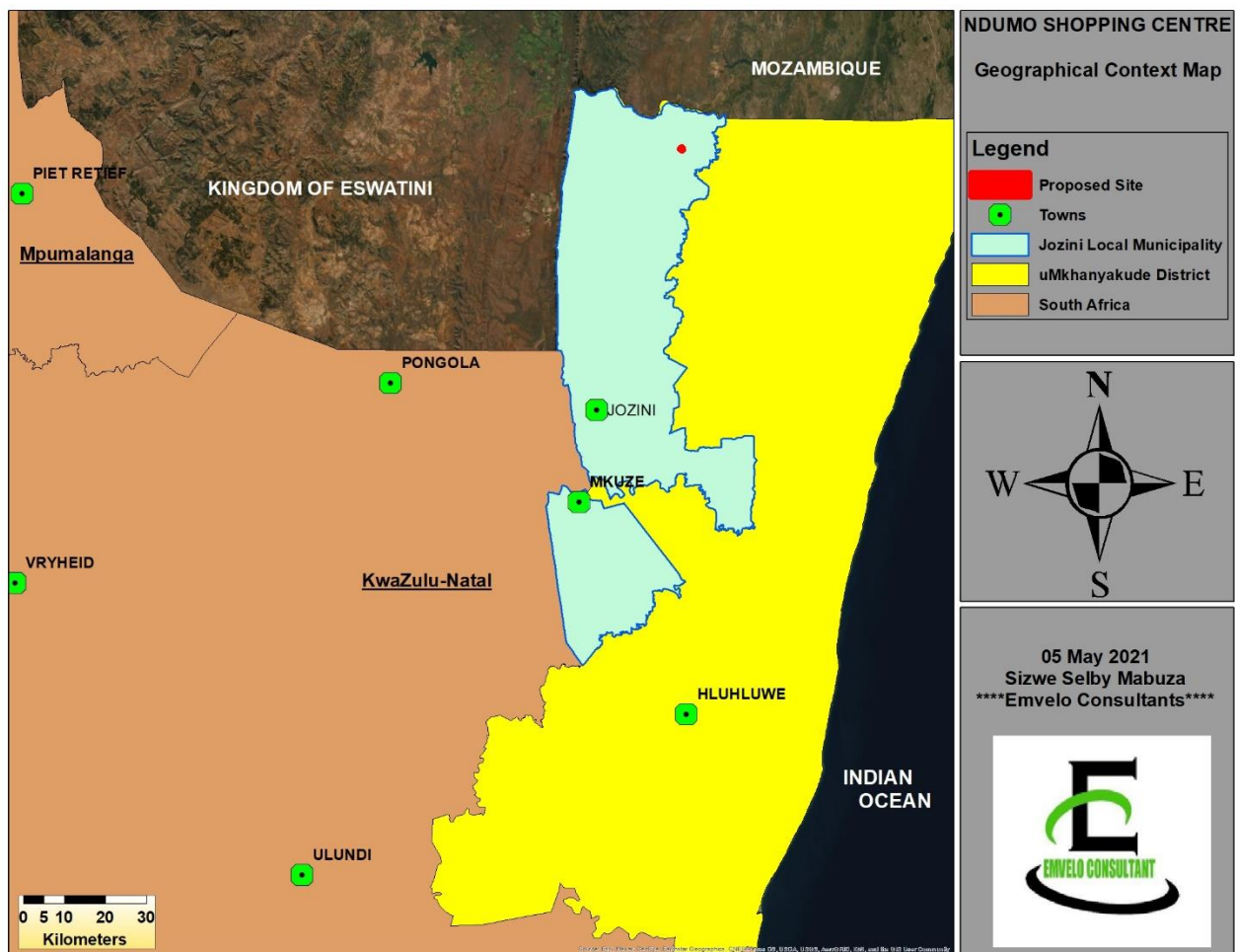


Figure 1: Geographic context of the proposed Site

Table 1 provides the geographical co-ordinates for the proposed development site.

Table 1: Co-ordinates

NDUMO SHOPPING COMPLEX			
Latitude & Longitude	Degrees	Minute	Seconds
South	26°	55'	23.48"
East	32°	14'	58.78"

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

Table 2: 21-digits Surveyor General Code

N	O	G	S	0	0	0	0	0	0	0	0	8	2	8	1	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

The Figure 2 below is the locality map for development, indicating the proposed site boundary, and a 500m buffer of the site, the Ndumo Game Reserve, local roads, NFEPA wetlands, the Qotho Dam, as well as the nearby business centre of the area.

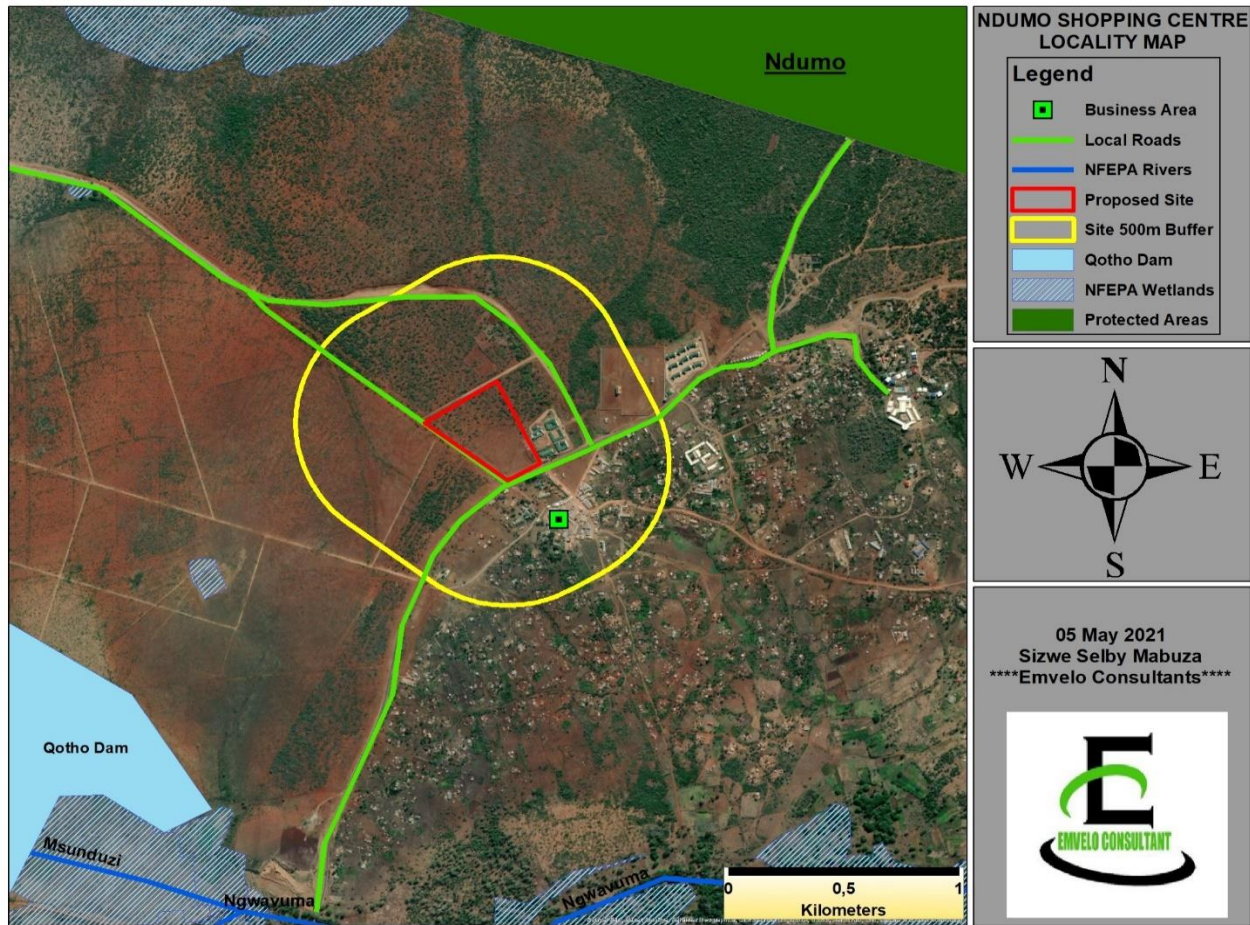


Figure 2: Locality map of the project area

5. SITE ACCESS

From Jozini, you take the road P522 going North East for 50.1km, then join the P435, and continue for 19km until you arrive at the site.

The site can be accessed via the provincial road P435 from Jozini Town to the Ndumo Game Reserve.

6. ENGINEERING SERVICES

6.1 Bulk Water Infrastructure

6.1.1 Status Quo: Bulk Water Supply

Ndumo village consists of informal/registered residential properties and streets. The Jozini Local Municipality is the water service provider for Ndumo village.

The existing bulk water supply infrastructure servicing the Ndumo village and surrounding settlements consist of the following:

- **Qotho dam:** located towards the west of Ndumo village.
- **Raw water pump station at qotho dam:** pumping water via a 400mm dia steel rising main to the water treatment works.
- **Shemula Water Treatment Works:** The water treatment works is located 12km southwest of Ndumo village. Water is treated at this facility at a rate of 7Mℓ per day. This facility serves a number of areas with Ndumo being one of them.

Treated water is stored in 2 x 2Mℓ + 1 x 1 Mℓ bulk storage reservoirs: Located at the water treatment works site. The 1 Mℓ bulk storage reservoir is from the old system that was made redundant, yet the reservoir is still used to support the two new reservoirs.

- **There is further water storage facilities offsite:** The offsite bulk water reservoir is a 4Mℓ Storage reservoir and it is located 2.4km northwest of site. This reservoir is used as a pre-distribution reservoir and it is fed from the onsite storage facilities, it then distributes the water to the different areas that are serviced by the Shemula water scheme. This storage reservoir was previously upgraded from 0.7Mℓ (see photo7) to an extra 4Mℓ (see photo6) and there is a current plan to further upgrade the facility with a new 5Mℓ storage reservoir.
- **Ndumo village has it's own 5Mℓ storage reservoir:** which is fed from the above mentioned reservoir hence the need to upgrade the above mentioned reservoir, this reservoir is located in Ndumo and it serves the greater Ndumo area.
- **Bulk gravity network:** The bulk water supply network was upgraded during 2015 – 2016. The upgrading of the bulk and reticulation network involved the placement of a new 400mm dia. bulk ductile iron pipe rising main from the pre-distribution reservoir to the Ndumo supply reservoir. The neighbouring communities surrounding Ndumo have drawn-offs from this 400mm rising main, these draw off points have bulk meters and Umkhanyakude district municipality bill Jozini local municipality for bulk consumption. Another new 350mm bulk

ductile iron pipe was also placed as the gravity pipe from the Ndumo supply reservoir to supply the greater Ndumo area.

- Yard meter connection system was not implemented, and consumers are not billed for water consumption at present. Large water consumers like commercial developments, schools, clinic's etc are metered and billed.
- **Ndumo retail center connection point:** An anticipated connection point was located on site; this connection point is from the 350mm supply line and it consists of a 350mm valve where a draw-off can be created for the new development and the retail center supply line will be reduced to a 150mm steel pipe.
- The quality of potable water being produced by Shemula water treatment works is of good quality and does comply with all the requirements of the Department of Water and Sanitation.

6.1.2 Water Demand: Ndumo Retail Centre Development

The current water demand of Ndumo is higher than what it should be due to minor system losses in the reticulation network. Regular maintenance of the supply network is required.

The water demand for the new development is reflected below. The total demand is 88.6 kl/day.

ESTIMATED WATER DEMAND FOR NDUMO RETAIL CENTER					
PLANNED INFRASTRUCTURE					
<i>Type of Development</i>	<i>Demand(ℓ/day)</i>	<i>Gross Floor Area(ha)</i>	<i>Gross Floor Area(km²)</i>	<i>Total demand(ℓ/day)</i>	<i>Total demand(kℓ/day)</i>
Business	400ℓ/d/100m ²	2,21	22141,84	88 567	88,57
TOTAL		88567,4		88,6	

The "Guidelines for: Human settlement planning and design volume2." were used as design criteria.

6.1.3 Water Supply Considerations: Ndumo Retail Centre Development

It is therefore confirmed that the retail centre development will not have a significant impact on the water demand of Ndumo village. The existing bulk water infrastructure can accommodate the demand. The municipality needs to address the minor system losses to reduce water consumption.

The developer and the municipality will have to consider the following:

- Water is generally available on day-to-day basis; however, break downs still occur from time to time.
- The storage capacity provided should comply with the requirements of the authority. A storage capacity of 48 hours of annual average daily demand is suggested. The nominal capacity of the duty pump should be equivalent to the sum of the instantaneous peak demand and the fire demand (obtained from chapter9 of the guidelines for human settlement planning and design), or the instantaneous peak demand plus an allowance of 20%, whichever is the greater. All pumps should be rated for similar duties so that they are interchangeable. The standby power source should operate automatically in the event of an electricity supply failure.
- A storage tank of about 220 *kℓ* is required for 48hour storage capacity. The purpose of storing water is to meet balancing requirements and cater for emergencies (e.g. firefighting) or planned shut-downs.
- Alternative water source, like a borehole is also suggested as a back-up water supply source for the development, pending a favorable report is received from a geo-hydrologist.

6.2 Bulk Sewerage Infrastructure

6.2.1 Status Quo: Bulk Sewerage Infrastructure

There is no existing municipal sewerage collection system in Ndumo village. All erfs use their own method of sewer collection, most households have their own pit toilets where else Municipal buildings, shops, halls, and other community facilities have their own septic tank systems.

All the erfs with septic tanks dispose their own sewerage by means of hiring a truck to honeycomb and dispose for them, there is no municipal truck that comes for cleaning of septic tanks and disposal of sewerage. The nearest sewerage disposal plant is in Jozini town which is approximately 70km from Ndumo village.

6.2.2 Sewerage: Ndumo Retail Centre Development

The septic tank and french drain system will be used for the proposed Development, seeing there are sewer connection options around the area and all the properties around are using septic tanks.

From the water demand calculation, the sewage design flows are assumed at 85%. The sewage that will be produced from the shopping Centre is estimated to be 75.31kl/day.

ESTIMATED SEWERAGE GENERATION FOR NDUMO RETAIL CENTER			
PLANNED INFRASTRUCTURE			
<i>Type of Development</i>	<i>Demand(kl/day)</i>	<i>%water to sewerage</i>	<i>Total sewerage(kl/day)</i>
Business	88,6	85%	75,31

7. ROADS INFRASTRUCTURE

7.1 Status Quo: Access Roads

The internal streets in Ndumo village are all gravel roads branching to different areas of the village, no formal road systems are in place yet. The only formal tared road is the main access road D1851 coming from Makhane to Ndumo, the tared road runs passed Ndumo village to the entrance of the game reserve. This is currently the only provincial road that comes to Ndumo and the only tared road in this area, this is also same main road that passes the proposed Ndumo retail centre development.

There are certain planned road infrastructure developments that are yet to be implemented in the Ndumo village. These are the Ndumo village main ring road and the connecting road passing between the library and the stadium (see figure4 below).

7.1.1 Road Considerations: Ndumo Retail Centre Development

The proposed Ndumo village retail centre development is located along the main DOT road entering Ndumo from Makhane (D1851 Rd). The site will be accessed using the existing gravel roads, there won't be construction of the additional roads during this phase.

Intersections will to be created according to DOT standards and the mitigation measures will be stipulated in the EMPr.

7.1.2 Stormwater Infrastructure & Management

7.1.2.1 Status Quo: Ndumo Village Storm Water Management

There is generally no storm water management system all around the village. The gravel roads direct storm water naturally, channels are formed along the storm water flow paths which are mainly formed on the side of the gravel roads.

There are only a few road crossing pipes seen around our site which collect water from the inner streets on the higher side south of the new development site and runs across the road to dispose the water on the lower side behind the new development site. These formed channels will be properly built and used to manage the storm water collected from the retail centre development and also accommodate all the water that will come from the planned road infrastructure development mentioned above. There will be an introduction of v-drains in the main road along the front of the development which will also direct water to these existing channels.

The channel on the east of site has a headwall built to discharge water on the planned retail development site. This headwall and its channel will be broken down and discontinued as there will be a newly introduced 900mm collecting pipe on that side to carry all the water to a discharge point on the north of the new development. The general slope of the site also falls to the north on a 1:30 slope.

The final planned discharge point is on the north of site, new headwalls will be built in that area of discharge and the water will cross the road in the north of the new development site thru four existing 450mm concrete pipes to an open field where all the storm water is currently disposed.

8. ACTIVITY MOTIVATION

The Provincial Growth and Development Strategy (2011) was developed in order to establish the development vision for KwaZulu-Natal province in line with the overarching framework provided by the National Development Plan 2030.

The uMkhanyakude District Growth and Development Plan (DGDP) 2014 was developed in order to provide integration and alignment between the KwaZulu-Natal Provincial Growth and

Development Strategy (PGDS) at the provincial level on the one hand and the strategies and plans of district and local government (which impact directly on constituent communities) on the other. The DGDP outlines the comprehensive and strategic vision and direction for growth in the District until the year 2030. The long-term vision for uMkhanyakude District as outlined in the DGDP is simple: “uMkhanyakude Metro by 2030”, subsequently refined to read: “A renowned District Municipality through excellence in service delivery by 2035”.

The Jozini Local Municipality IDP confirms Ndumo as a secondary investment point in the municipality, along with Ingwavuma, uBombo and Bhambanana. These are existing and future growth points and centres of population concentration within the municipality which will form the basis for the allocation of funding and resources as well as service delivery. They also serve as a basis for the clustering of activities and services such as schools, shops, community halls.

8.1 The need

The project has been proposed as part of the Ndumo Yenkululeko Regeneration Programme established by the KwaZulu Natal Provincial government, which aims to develop facilities, services and infrastructure that will contribute to improving the socio-economic conditions and living standards in the Ndumo area. The Ndumo Retail Centre was identified as a viable investment which could ignite socio-economic growth and development in the region.

The proposed project is expected to spur social, economic, and infrastructural development in Ndumo Town and act as a catalyst for economic growth by unlocking potential across several sectors, such as trade and agriculture in the country. By creating retail commercial space, it will provide an opportunity to boost local retail spending and reduce leakages to other retail centres.

The project will provide the local people with services such as access to shops and many other provided services, as the local people currently have to travel to the Jozini town (70km away) to access a number of basic services. This development will also serve tourists passing through this area as it is located in the road that accesses the Ndumo game reserve.

The location of the shopping complex is important in terms of major infrastructure and economic development projects and programmes, as it is close to the most strategic borders between South African, southern Swaziland and Mozambique. It is through these borders that millions of tonnes of cargo move between the three countries, linking UKDM with South Africa, Swaziland, and

Mozambique's key infrastructure together (ports, terminals, airports etc). This therefore plays a vital role in the importation and exportation of goods between these countries, hence boosting the economy of the country.

The operation of the centre will also contribute to the local and regional economy, as the shops will employ staff primarily from the local Ndumo area and also will purchase most of their supplies from firms within the local economy. This will also reduce the limited access to vehicles or public transport together with the remoteness of the site, which forces people to walk/travel great distances to access services and social amenities.

The area is therefore in need of a one-stop retail offering for convenience purposes, and this development is expected to serve those needs, and other economic, social, and cultural benefits.

8.2 Desirability

The development of the proposed new proposed retail centre in Ndumo will have potential social and economic impacts that will accrue to the region as a result of the implementation of the project.

The impact on job creation in the area through the infrastructure spending occasioned by construction is significant. An estimated 379 jobs will be created during the construction over the two-year construction period. These include 72 direct jobs, 233 jobs created indirectly (through suppliers, etc.) and a further induced 74 jobs created through the spending injection into the rest of the economy. Most of these are in the unskilled or semi-skilled worker categories.

Also, the P435 is the main corridor into the Town and Game Reserve, hence the proposed site is strategically positioned along a tourism route. This is significant as cultural and heritage tourism opportunities also spur the need for increased commercial support activity.

9. SITE ALTERNATIVE

The Department of Environmental Affairs provides guidelines on the assessment of alternatives, to which the impact assessment be considered DEAT (2004a) and DEAT (2006). These alternatives are; location (site), activity (project), site layout, design, scale, routing, scheduling, process, demand, input as well as the no-go alternative.

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 the appointed Environmental Assessment Practitioner (EAP), which in some instances culminates in a single preferred project proposal.

The following alternatives have been identified for this project.

9.1 Alternative A (Location & Infrastructural Technology Alternatives)

iThala Development Finance Corporation (PTY) Ltd did an analysis in and around the Ndumo area in KZN and the results showed that there is a need to develop a retail centre in Ndumo which will be serving people living in Ndumo and the surrounding areas. This development will also serve tourists passing through this area as it is located next to the road that accesses the Ndumo game reserve.

Therefore, the proposed location alternative has been chosen for the following reasons: firstly, the proposed site is located adjacent to the business centre of the rural town, at a portion of the town that has not yet been designated for any development. This was found to be spatially the best site location for the proposed project. Also, as mentioned on the previous section, the site is located next to the P435, which is the main corridor into the Town and the Game Reserve, hence making the proposed site to be strategically positioned along a tourism route.

This alternative also involves a sewerage collection that will follow the onsite sewerage system, using a septic tank and French drain. The proposed facility will be located at the lowest point (between 60 and 61 meter above sea level) of the proposed site. The positioning of the proposed plant is in the lowest section within the development site so to allow for the natural gravitation of sewer.

The figure below indicates the location of the proposed septic tank within the site, which is adjacent to the local Central Business Area, and along the P435 road.

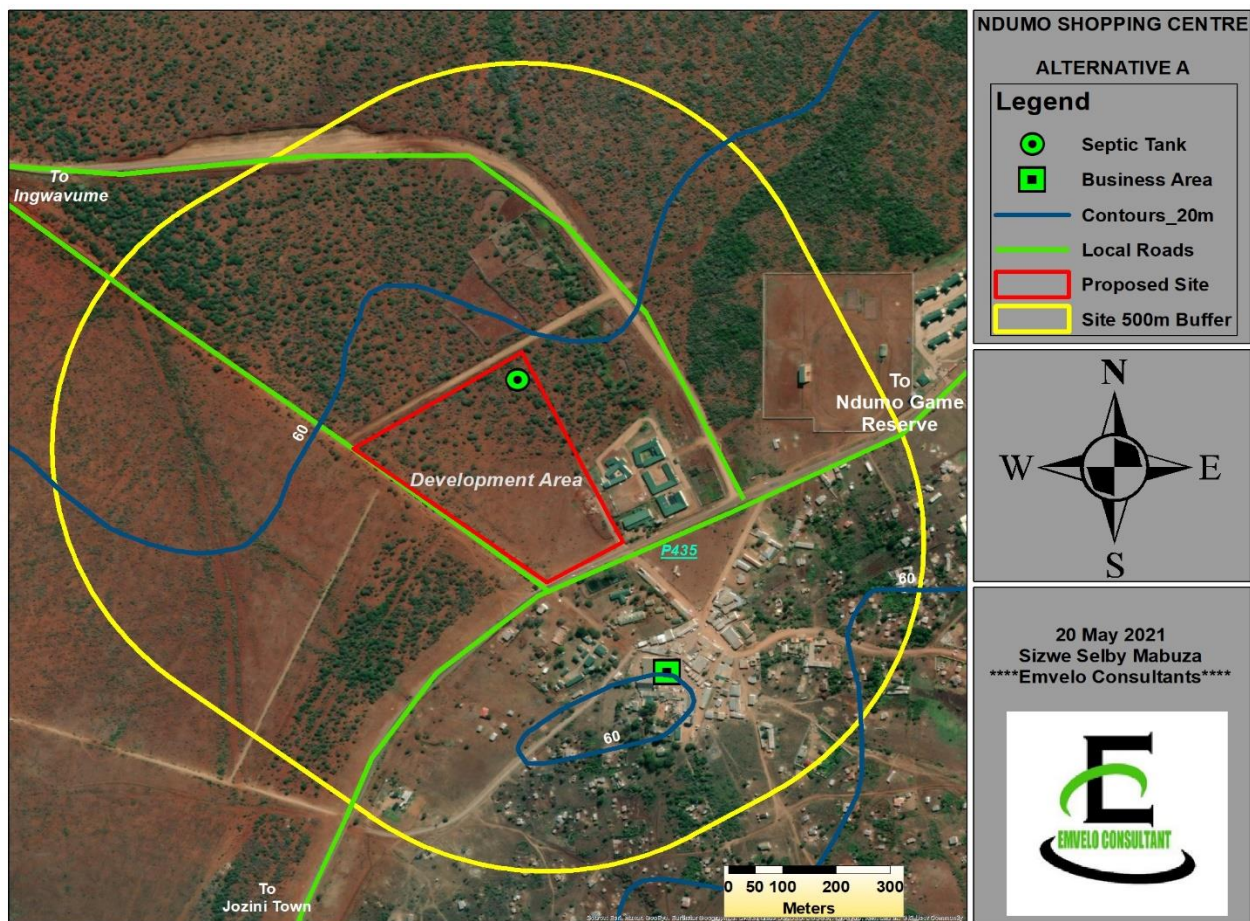


Figure 3: Alternative A Map indicating the location of the site in relation to the central business site

This is therefore most preferred alternative, from an environmental and economical perspective.

9.2 Alternative B (Infrastructural Technology Alternative)

This alternative proposes for the construction of the shopping complex at the currently proposed site, but with an offsite sewerage connection, that will have to be constructed to join the nearest sewer pumpstation.

There is no existing sewerage connection within and around the area, and the nearest sewerage treatment plant is in Jozini town which is approximately 70km from Ndumo village. It was however discovered that, the development of the offsite infrastructure, or rather the transportation of the sewerage waste to the nearest pumpstation may be expected to have high environmental and economic costs.

9.3 Alternative C (Design Alternatives)

The proposed design alternatives for the fuel filling station propose the Underground Fuel Storage Tanks and Above Ground Fuel Storage Tanks, with a capacity of 60 000 litres (820 sqm), as detailed below.

9.3.1 Underground Fuel Storage Tanks

This Alternative proposes that the three (3) Underground Fuel Tanks (UFTs) of 20 000 litres each will be design in such a manner that unions within piping sumps allow easy disconnection of pipes. A pipe chase that has extra slack also allows for easy disconnection and replacement if required.

Although, the UFTs have social benefits, such as: less safety hazards, no visual and aesthetic aspects to residents, less corrosion as it is not exposed to external environments. But its environmental impacts outweigh these benefits. The leaking UFTs are a grave threat to groundwater quality. Petroleum fuel is a complex blend of several hundred compounds. Once tanks leak, many of these contaminants can move rapidly through surrounding soil, quickly contaminate large quantities of groundwater and seep into surface water, such as lakes and rivers.

9.3.2 Above Ground Fuel Tanks

This Alternative proposes that the three (3) Above Ground Fuel Tanks of 20 000 litres each will be placed on the impermeable concrete bounded facility, which can contain approximately 110% of the fuel capacity.

The Above Ground Fuel Tanks (ASTs) is the safest option, as they pose far less risk than Underground Storage Tanks (USTs), thus why they are recommended worldwide. Having an AST extends beyond safety, however, there are advantages of having an AST which are listed below:

- ✚ Early detection of leaks – The biggest advantage of an AST is that visual inspections are possible. This means that the ASTs will mitigate the ground water pollution as a result of fuel leakages;
- ✚ Easy access for inspections and replacement – Since AST are installed in locations that are easy to access. Also, the ease of replacement is especially valuable for commercial purposes, as fuel demands for a business can increase as the business expands;
- ✚ Geological stability- does not require deep excavation and backfilling;

- ✚ Longer lifespan- The process of corrosion is sped up by moisture in the soil and other factors such as certain types of backfill and the soil's pH acidity. The ASTs are not affected by these factors which allows them to have a longer lifespan.

9.4 Alternative D (No-Go Alternative)

This alternative considers the option of 'doing nothing' and maintaining the status quo. There will be no clearance of indigenous vegetation, and no construction of the shopping complex and all the associated infrastructures, therefore there will be no negative impacts associated with the proposed activity. The ecological functioning and integrity of the area would be preserved. However, there will also be no positive impacts associated with the project, for instance, local and regional economic growth, provision of job opportunities and skills development.

The EAP is therefore of the view that the alternative B, and the NO-GO option are both undesirable, and therefore mostly prefer alternative A, in the face of social, environmental, and economic needs of the local people, the districts DGDP and local municipality's' plans, as well as the South African National Development Plan 2030 objectives.

9.5 Preferred Alternatives

The role of alternatives is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts (DEAT, 2004).

The Alternative A: 'Location and Infrastructural Technology Alternative' will be more preferred for this development, due to the strategic location of the site, and land availability. Also, the use of septic tank and French drain, will be ideal, as there are no bulk sewer services with the project area (**Refer to Section 8.1**). There are no wetlands and other sensitive ecosystem within the reach of the proposed site (**Refer to Section 10.4 & 10.7**).

Moreover, Alternative D (Option 2): 'Design Alternative' provide for the use of Above Ground Fuel Tanks, this is another preferred design alternative it will have minimal environmental degradation that might be expected, as there will no ground water contamination from the fuel storage. Therefore, after consideration of bio-physical and social environmental aspects, the most

preferable alternative, is the “Alternative D: Design Alternative”. With this alternative, it is safer to say that the choice of the Above Ground Fuel Tanks will yield desirable outcome for the operation of fuel filling station, while avoiding the potential bio-physical aspects.

10 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

In terms of the Environmental Regulations promulgated under the NEMA, an EIA must be conducted for any development or activity that requires an Environmental Authorisation. The listed activities in the NEMA, relevant to this project, that triggers the need for an Environmental Authorisation are listed below:

Table 3: Environmental Statutory Framework

Legislation	Relevance
Constitution of the Republic of South Africa, (No. 108 of 1996)	<ul style="list-style-type: none"> ➤ Chapter 2 – Bill of Rights. ➤ Section 24 – Environmental Rights.
National Environmental Management Act (NEMA) (No. 107 of 1998)	<ul style="list-style-type: none"> ➤ Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment). ➤ Section 28 – Duty of care and remediation of environmental damage. ➤ Environmental management principles. ➤ Authorities – Department of Environmental Affairs (DEA) (national) and Department of Economic Development Tourism and Environmental Affairs (provincial).
GN No. 326 (7 April 2017)	<ul style="list-style-type: none"> ➤ 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 authorisations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.

- Purpose – to 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.
- The investigation, assessment, and communication of the potential impact of activities must follow the procedure as prescribed in regulations 19 and 20 of the EIA Regulations published in terms of section 24(5) of the Act. However, according to Regulation 15(3) of GN No. 327, Scoping and an Environmental Impact Report (S&EIR) must be applied to an application, if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities.
- Activities under Listing Notice 1 and Listing Notice 3 that are relevant to this project.

<p>GNR No. 327 (7 April 2017) Listing Notice 1.</p>	<p>Listing Notice 1 activities that are relevant to this project are as follows;</p> <p>Listed activity 27: The clearance of an area of 1 Hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for -</p> <ul style="list-style-type: none"> (i) The undertaking of linear activity; or (ii) Maintenance purposes undertaken in accordance with a maintenance management plan. 	<p>Approximately 2.7 ha of indigenous vegetation will be cleared prior to the construction of the centre.</p>
<p>GNR No. 327 (7 April 2017) Listing Notice 3.</p>	<p>Listing Notice 3 activities that are relevant to this project are as follows;</p> <p>Listed Activity 10: The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. xiii. Outside urban areas: (aa) Areas within 10 kilometres from</p>	<p>The proposed project includes the construction and operation of fuel tanks with a combined capacity of 60000 litres (60 cubic meters)</p>

	national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve;	
National Water Act (Act No. 36 of 1998)	<ul style="list-style-type: none"> ➤ Chapter 3 – Protection of water resources. ➤ Section 19 – Prevention and remedying effects of pollution. ➤ Section 20 – Control of emergency incidents. ➤ Chapter 4 – Water use. ➤ Authority – Department of Water and Sanitation (DWS). 	
National Environmental Management Air Quality Act (Act No. 39 of 2004)	<ul style="list-style-type: none"> ➤ Air quality management ➤ Section 32 – Dust control. ➤ Section 34 – Noise control. ➤ Authority – EDTEA. 	
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	<ul style="list-style-type: none"> ➤ Management and conservation of the country's biodiversity. ➤ Protection of species and ecosystems. ➤ Authority – EDTEA. 	
Occupational Health & Safety Act (Act No. 85 of 1993)	<ul style="list-style-type: none"> ➤ Provisions for Occupational Health & Safety ➤ Authority – Department of Labour. 	
National Heritage Resources Act (Act No. 25 of 1999)	<ul style="list-style-type: none"> ➤ Section 34 – protection of structure older than 60 years. ➤ Section 35 – protection of heritage resources. ➤ Section 36 – protection of graves and burial grounds. ➤ Authority – KwaZulu-Natal Amafa and Research Institute 	

National Road Traffic Act 1996 (Act No. 96 of 1996)	➤ Authority – KwaZulu-Natal Department of Public Works, Roads, and Infrastructure.
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11. 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 Basic Assessment 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.

11.1 Climate

The uMkhanyakude District is characterized by a temperate climate with warm to hot summers and mild winters. The mild winter temperatures are due to the oceanic climate (warm Agulhas current), with the lowest temperatures, which are experienced between March and July.

Jozini area is characterized by seasonal dry winters and wet summers with periodic flooding. The summer temperature ranges from 23° to 40°, while winter temps range from 16° to 26°. Mean annual rainfall is 600mm and 800mm along the Lebombo Mountains which fall within a moist belt. The annual average evaporation is approximately 1660mm with evaporation highest during the winter and early spring months. IDP

Ndumo Area is located in the summer rainfall region of South Africa, with an annual rainfall range of approximately 850 to 1050mm. The area is influenced by the local steppe climate, and during the year there is little rainfall. This climate is considered to be BSh according to the Köppen-Geiger climate classification. The temperature here averages 22.5 °C / 72.4 °F. Precipitation here is about 696 mm per year.

The figure 4 below presents the climatic graph of the Ndumo Area.

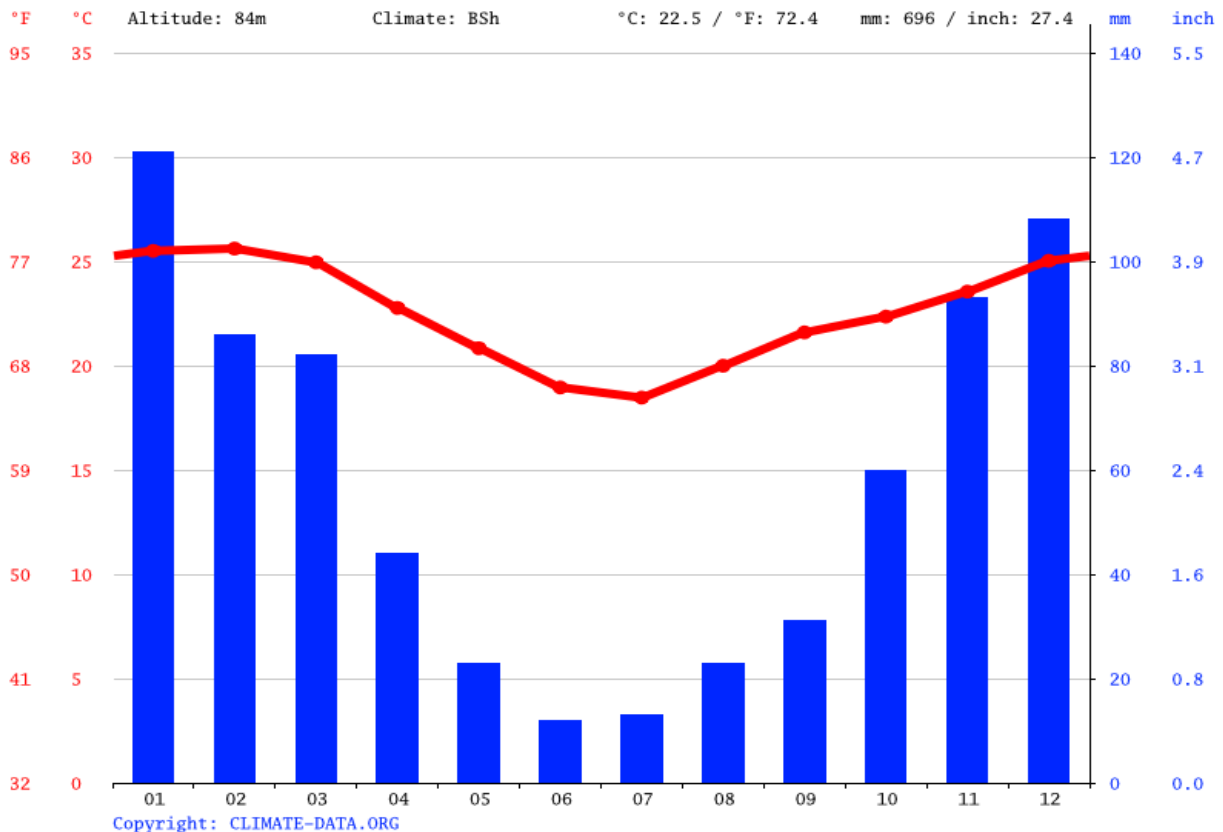


Figure 4: Ndumo Rural Area climate graph [Source: Climate-Data.Org]

The driest month is June, with 12 mm of rainfall. Most of the precipitation here falls in January, averaging 121 mm, see figure 4 above.

11.1.1 Potential impact

There are no direct adverse impacts foreseen in terms of the project to the climate. It is however expected that construction of the shopping centre, will change the ground cover to hardened surfaces on this portion of the area, hence increasing rainfall runoff, and high rates of evaporation, which will impact on the climate of the area. Also, the operation of the Shopping centre may increase carbon emissions within the region, the area. The measures to reduce the project's carbon footprint will be considered further in the EMP.

11.2 Topography

The uMkhanyakude District Municipality is characterised by a diverse terrain consisting of coastal dunes and plains, mountain ranges and low-lying foothills, high hills and incised river valleys. The

altitude ranges from 10- 70 metres above sea level around Mtubatuba and St Lucia Town to 670 metres at the Lebombo Mountain range, and with the highest point being on average just above 744 metres above sea level at Ingwavuma within the Lebombo Mountain range. (EKZNW Biodiversity sector plan)

Within the Jozini municipality there are two distinct differ topographic features, namely the Lebombo Mountain range on the western boundary with the highest point being on average just above 744 metres above sea level at Ingwavuma and the low lying Makhatini flats. In the north are the eastern foothills of the Lebombo Mountain range, extending from Ndumo south to Mkuze and the low-lying western plains.

The municipality is situated in an area with relatively steep slopes that makes a large area of the municipality not suitable for development and settlement. This situation also makes the municipal area highly susceptible to erosion of topsoil and silting in dams.

The topography of the proposed development site is shown on figure 5 below.

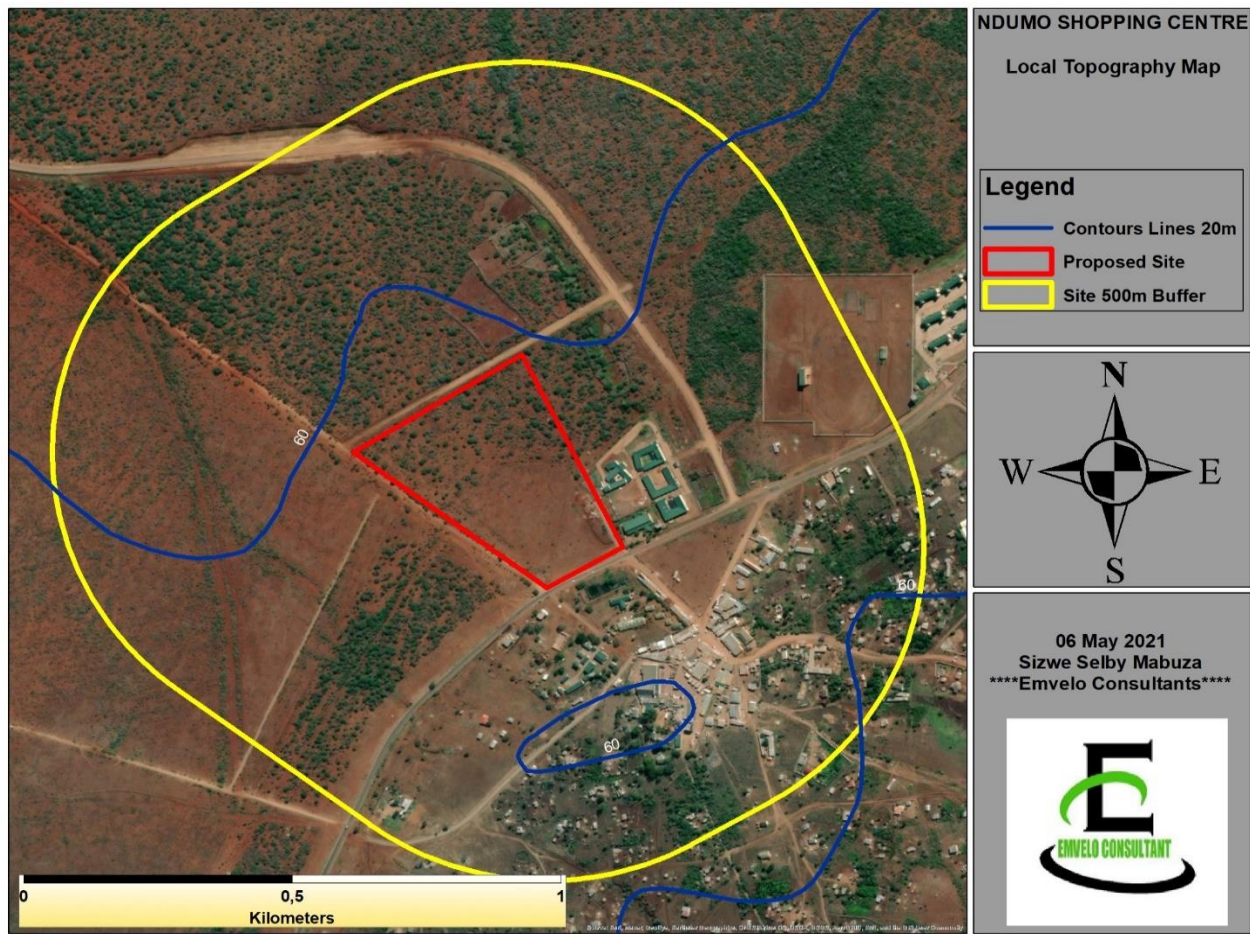


Figure 5: Map showing the topography within the project area

The development site is located between 60 and 80 meters above sea level on the northern section of the local municipality, which is characterized by gentle slope surfaces.

The area is slightly flat sloping towards north and is drained by means of surface run off, with storm water collecting towards the north and depositing on the unnamed non-perennial river channel.

11.2.1 Potential impacts

The protection of steep areas should be high on the municipality's list and the identification of sensitive areas where development should not take place need to be considered as part of the Wilderness area.

The Geotechnical Investigations did not reflect any risk for the formation of sinkholes or subsidence caused by the presence of carbonic rocks which are water soluble rocks. There are also no evidence of seismic active region and mining activity beneath the study area has been revealed.

Therefore, the proposed development is expected to have minimal impacts on the overall topography of the area, provided that soil erosion is prevented. This can be achieved by the mitigation of activities that might exacerbate surface run-off, through carefully implementation of recommendations given by EAP, Specialists, and as well as on the EMPr.

11.3 Geology and Soil

The geology of the uMkhanyakude District has been developed over billion of years through successive phases of continental assembly and mountain building events followed by long periods of deep erosion.

The study area is partially underlain by red sand and red calcarenite of the Uloa Formation of the Tertiary System and marine glauconitic siltstone of the Mzinene Formation which belongs to the Zululand Group.

The geological makeup of the proposed site is presented on the map below.

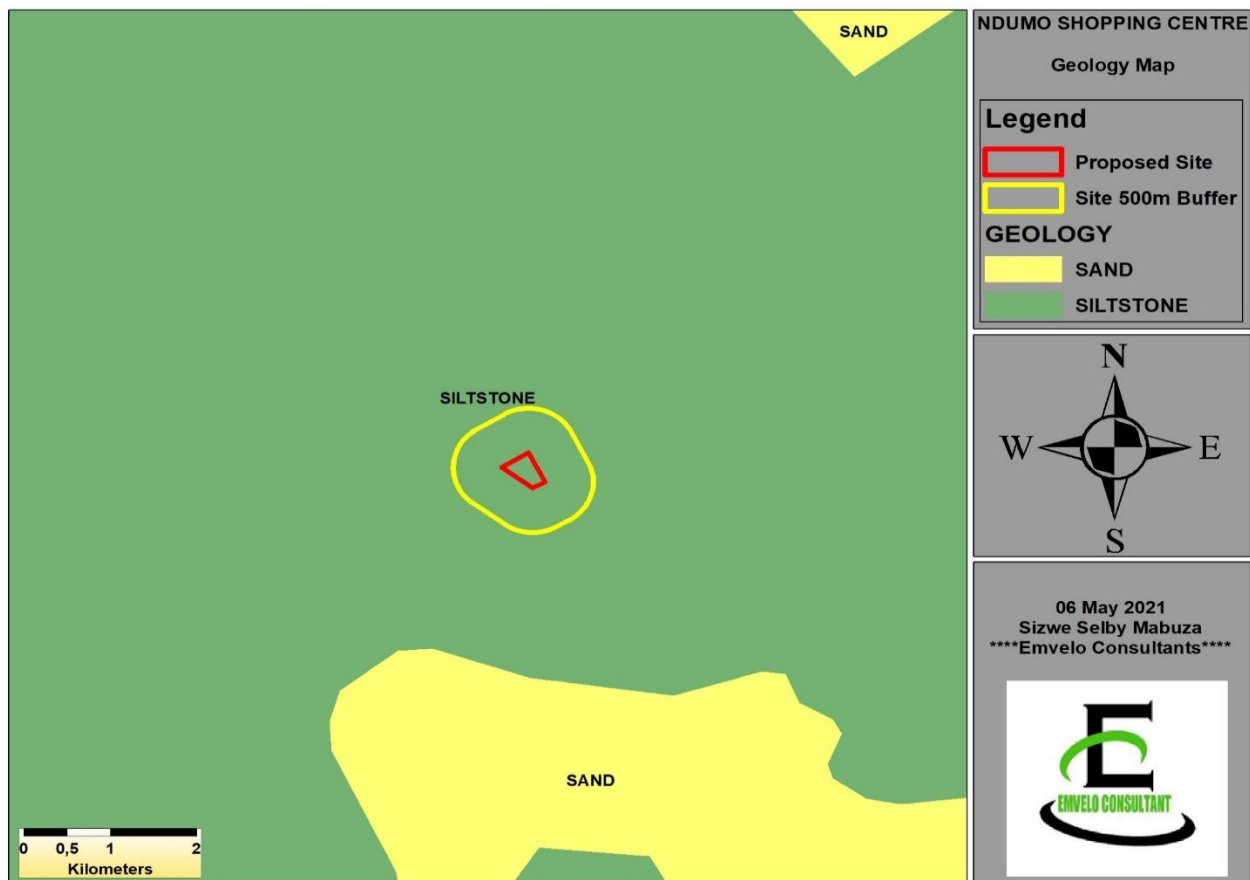


Figure 6: Map showing a dominance geological formation within the project site

The geological composition of the study area is largely dominated by Siltstone (**Figure 6**).

11.3.1 Potential impacts

The geological formation or makeup of the area may be impacted on due to potential erosion, degradation, and loss of topsoil due to vegetation clearance activities as well as stormwater runoff. Also, the inappropriate handling and storage of hazardous substances, spillages from equipment and plant and poor waste management, wastewater and cement mixing could cause soil contamination.

11.4 Hydrological Features

The hydrology of the uMkhanyakude District is strongly influenced by the high lying land to the west with its associated network of non-perennial rivers, the large areas of low-lying plains which

tend to form extensive wetland and pan areas and the major watercourses originating to the west of the District.

The UKDM is rich in surface water resources that support a wide biodiversity and is the backbone of a thriving tourist industry. The district incorporates many areas relevant to the freshwater ecosystem conservation and conservation priorities, which include wetland clusters, refuge or critically endangered and endangered, as well as otherwise threatened, fish species within the Mkuze River, Pongola River and the freshwater coastal lakes. These features are largely dependent on the quality of the resource that originates outside of conserved areas, which is difficult to manage.

East of the mountain range the topography flattens substantially and develops into lowland undulating watercourses and the formation of floodplains and off-channel pan-type wetlands which are typical characteristic feature of the Pongola and Mkuze Rivers within this area.

Jozini has an abundance of natural water resources. Major rivers include the Pongola River, the Ingwavuma River, the Mkuze River, and the Usuthu River, of these areas only the Usuthu and Pongola Rivers are perennial. The Pongola is the most important river in Jozini as it traverses the full length of the area. The flooding of the Ingwavuma and the Usuthu dam up the waters of the Pongola, resulting in an area of deep flooding during peak floods and the infilling of plains.

The quaternary catchment, rivers, dams and wetlands around the project area are discussed in the following sub-sections.

11.4.1 Quaternary Catchment Areas

The figure below represents the Drainage Region as well as the Quaternary Catchment Area in which the proposed site is located on.

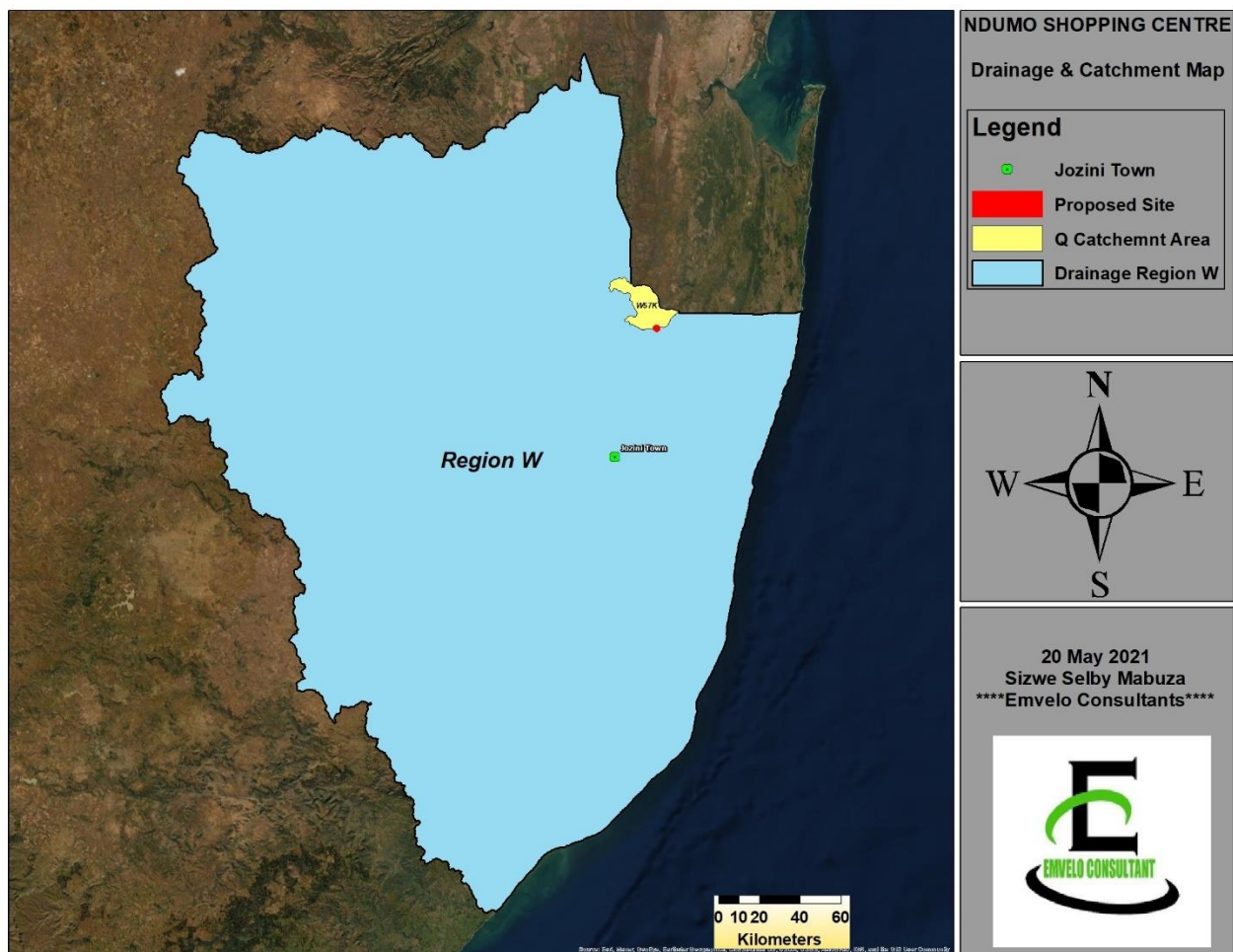


Figure 7: Drainage Region and Quaternary Catchment Area Map

As per the figure above, the study area is located in the Quaternary Catchment W57K, within the Drainage Region W.

11.4.2 Rivers and dams

Watercourses within the district include the Pongola River, which drains the north-western area northwards toward the Great Usutu River and Mozambique, the Msunduzi River and Mkuze River which drain the central areas in a southerly direction toward the iSimangaliso Wetland Park system, and the Hluhluwe, Nyalazi River and Mfolozi Rivers which drain the southern areas towards the iSimangaliso Wetland Park system. Three of these major watercourses, the Nyalazi, Mkuze and Black Mfolozi are classified as being free flowing rivers, meaning that these rivers have no barriers that obstruct movement and migration of aquatic species (EKZNW BDSP).

The figure below indicates the rivers and dams that are within and around the proposed site.

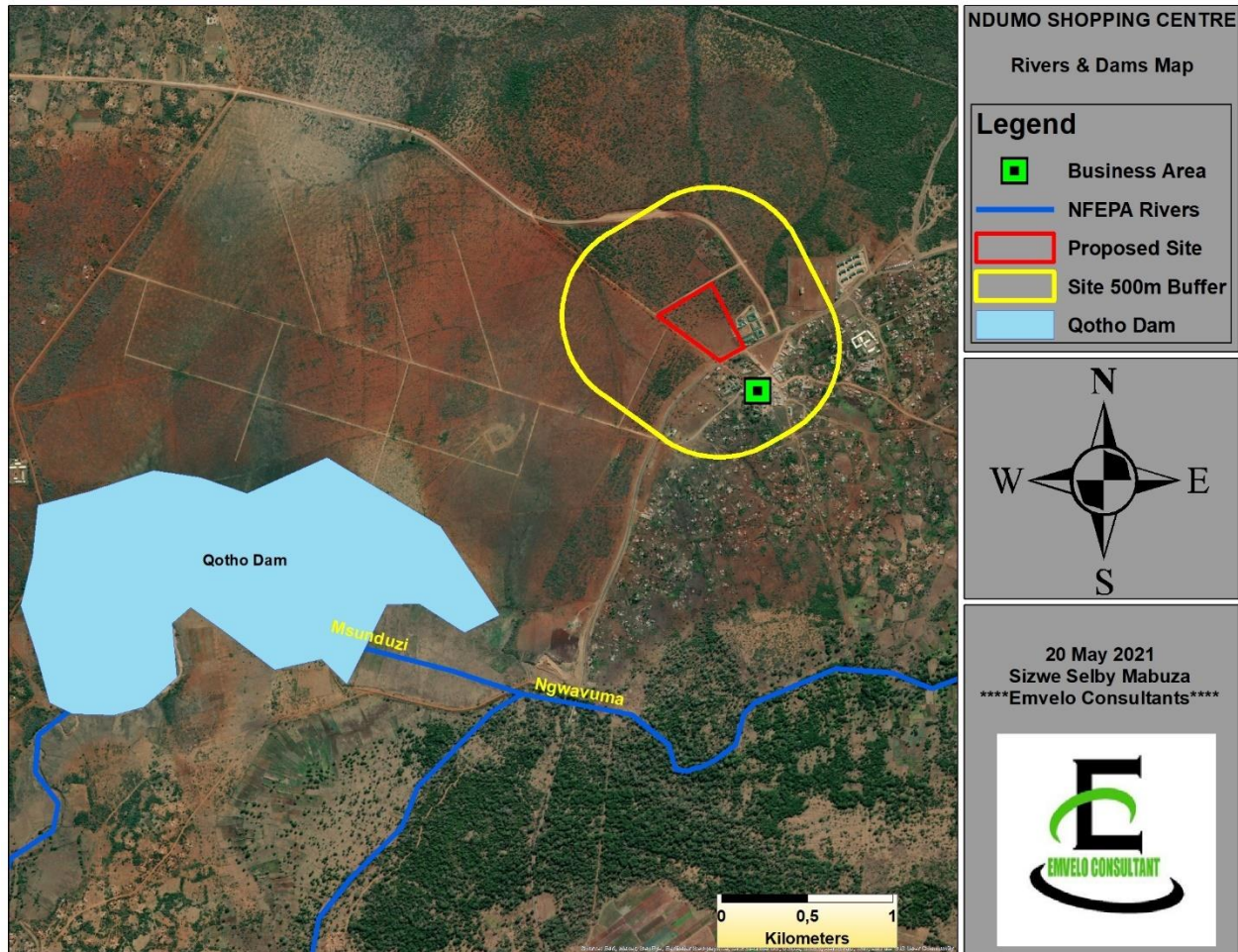


Figure 8: Map showing rivers and dams around the project area

The figure above indicates that the Ngwavuma NFEPA River is approximately 1.9km south of the proposed site. Also, on the western section we find the Msunduzi River, which joins to the Ngwavuma River.

The Msunduzi River borders the Qotho Dam located at the South West of the proposed site.

11.4.3 Wetlands

The Mkuze and Msunduzi Rivers, which also originated to the west of the District, drain the southern areas of the municipality into the iSimangaliso Wetland Park and ultimately southwards toward the Indian Ocean.

The south eastern portion of the district is also rich in floodplain wetland areas which are drained by the Mfolozi, Msunduzi and Nyalazi Rivers.

The figure below indicates the wetlands that are around the proposed site.

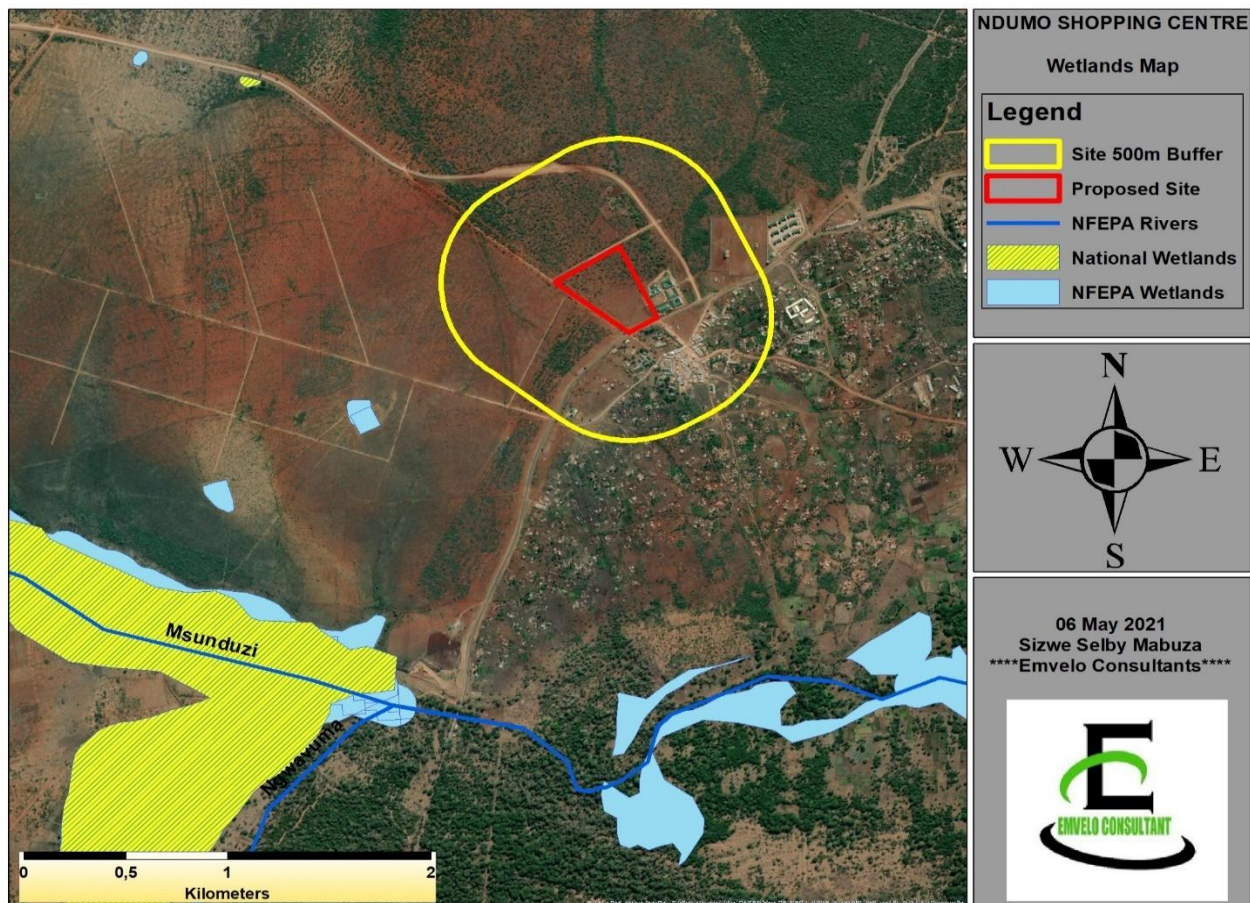


Figure 9: Map showing the wetland features around the project area

The figure above indicates that there are no wetland units within the proposed site, and none within the site 500m buffer. The nearest wetland unit is an NFEPA wetland, located at approximately 1.2km south west of the proposed site.

11.4.4 Potential impacts

Anticipated impacts include.

- Alteration of the natural flow regime.
- Possible pollution of groundwater caused by contaminated run-off and infiltration.
- Potential for increased sediments to enter the system through surface water dispersion.

The project would therefore have minimum impact. The recommendations on the EMPr must be adhered to minimise any impacts that may arise.

11.5 Biomes

The uMkhanyakude District traverses six biomes; the Azonal Forest, Forest, Indian Coastal Belt, Savanna, Grassland and Wetlands biomes and contains 45 vegetation types.

The figure below indicates the biome types that are around the project location.

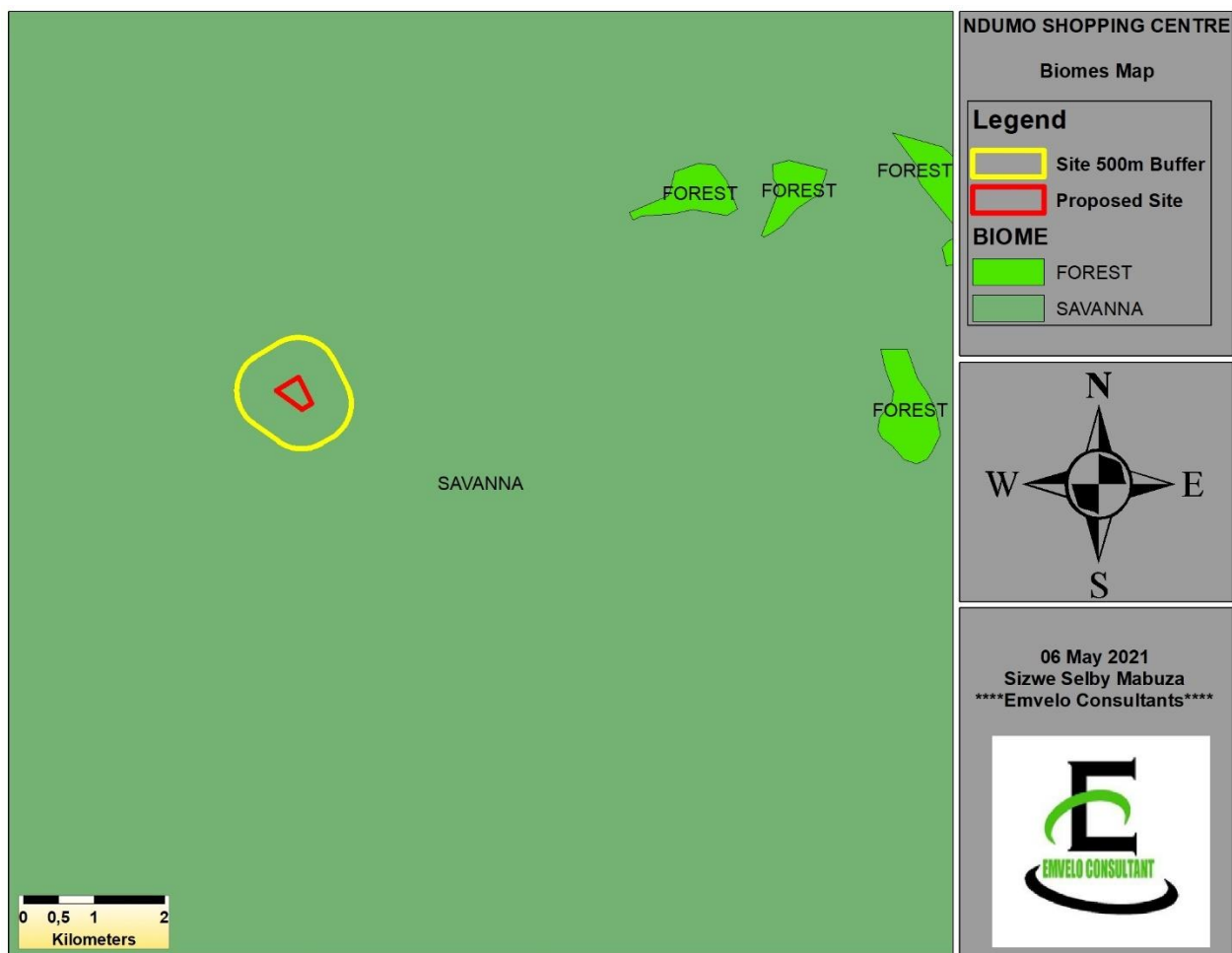


Figure 10: Map Showing the biomes surrounding and within the project area

The proposed site is on the Savanna Biome, which is characterized by the following Vegetation types and Conservation statuses; Eastern Valley Bushveld (*Least Threatened*), KwaZulu-Natal Coastal Belt Thornveld (*Vulnerable*), KwaZulu-Natal Highland Thornveld (*Least Threatened*),

KwaZulu-Natal Hinterland Thornveld (*Least Threatened*), Northern Zululand Sourveld (*Least Threatened*), Thukela Thornveld (*Least Threatened*), Thukela Valley Bushveld (*Least Threatened*), Zululand Coastal Thornveld (*Critically Endangered*), as well as the Zululand Lowveld (vulnerable).

11.5.1 Potential Impacts

Potential impacts are associated with the clearance of vegetation for the purpose of construction. This may destroy a number of important species found within the vegetation type of the biome where the site is located.

The recommendations on the EMPr must be adhered to minimise any impacts that may arise.

11.6 Flora

The study area is an open savannah with *Vachellia spp.*, and had a short grassland dominated by *Bothriochloa insculpta* (Pinhole grass) and *Eragrostis spp.* and patches of bare ground. The alien invasive species such as bugweed and paperthorn were common. The study site was not very diverse in terms of plant species that were encountered there. A total of 17 plant species comprised of trees, grasses and forbs were identified. There were no species of conservation concern (SCC) encountered during the field visit. The vegetation condition of the study site was relatively poor based on the current observation of the dominance by *Bothriochloa insculpta*, some alien invasive plants that included a very abundant *Alternanthera caracasana* (Paperthorn) and patches of bare ground.

The project area is in close proximity (about 1,7 km) to a protected area, Ndumo Game Reserve. 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 map below indicates the vegetation types that are found within and around the proposed study area.

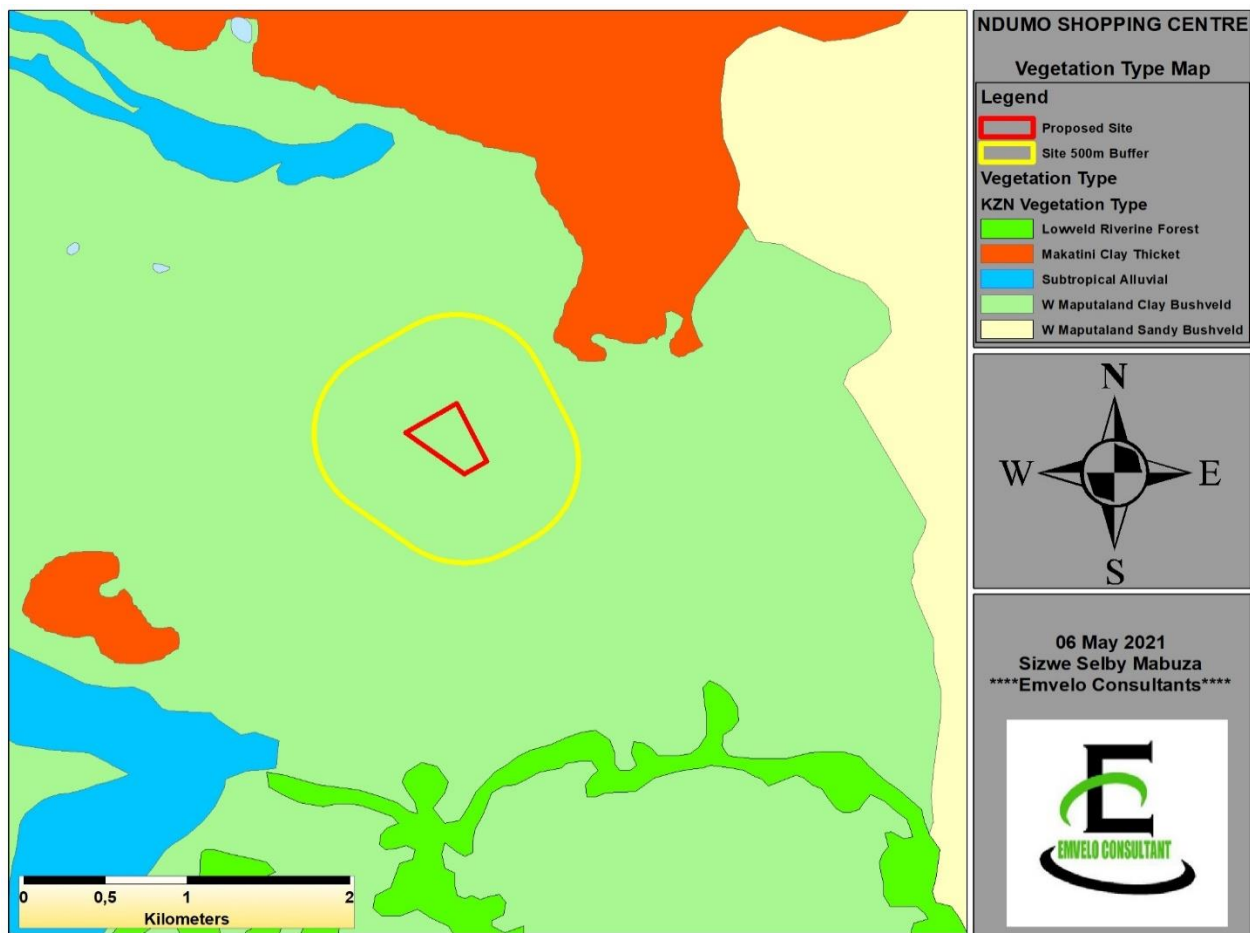


Figure 11: Map showing the vegetation types of the farm

The vegetation of the study area is described as the Western Maputaland Clay Bushveld (SVI 20) and its national conservation status is vulnerable (Munica and Rutherford 2006) (see **Figure 11**).

There were no species of conservational concern that were encountered on site.

11.6.1 Potential Impacts

Potential impacts to vegetation could result from the clearance of vegetation for construction purposes. This may also result in the possible spreading of alien invasive species on disturbed areas. Therefore, the control of alien vegetation and soil erosion is highly recommended.

11.7 Biodiversity Status

The region, specifically the Maputaland region, is of great conservation and biodiversity importance and falls within the Maputaland Centre of Plant Endemism (Van Wyk & Smith, 2001), a globally recognized biodiversity hotspot. The uMkhanyakude District covers the bulk of the Maputaland Centre of Plant Endemism (Van Wyk & Smith, 2001), which extends from the Hluhluwe town area up to Maputo in Mozambique. This centre is typified by lush riverine and estuarine habitats, diverse savannah and foothill grasslands, and highly specialized and threatened dune forests. High levels of endemism are spread across virtually the whole taxonomic spectrum within this centre, involving both plants and animals. Of the plant species, most endemics are associated with three of the major plant communities, namely Sand forest, Tembe Sandy bushveld and the Maputaland Wooded grassland. This region thus warrants a high level of conservation protection.

The highly variable topography characteristic of KwaZulu-Natal and the District creates biophysical habitat and micro climatic conditions which support a range of biodiversity. North facing slopes are generally warmer and drier, supporting habitat types such as grasslands. South facing slopes, escarpments and sheltered kloofs on the other hand tends to be cooler and wetter, commonly providing conditions favourable for supporting indigenous forest. This mosaic of habitat provides opportunity for a diversity of biota with different habitat requirements to exist within relatively smaller areas, in comparison to regions with flat topography.

Critical Biodiversity Areas are natural or near natural landscapes that are considered critical for meeting biodiversity targets and thresholds, and which safeguard areas required for the persistence of viable populations of species and the functionality of ecosystems.

The CBA areas are described below in terms of terrestrial and aquatic (which includes freshwater and marine) environs of the uMkhanyakude District.

11.7.1 Terrestrial Critical Biodiversity Areas

The catchment area of this region was selected in the prioritization process as being an important catchment area for biodiversity. The study area falls under the **Biodiversity Area** which is a natural and/or near natural environmental area not identified as a critical biodiversity area.

Figure 12 below shows location of the proposed site in relation to terrestrial CBAs.

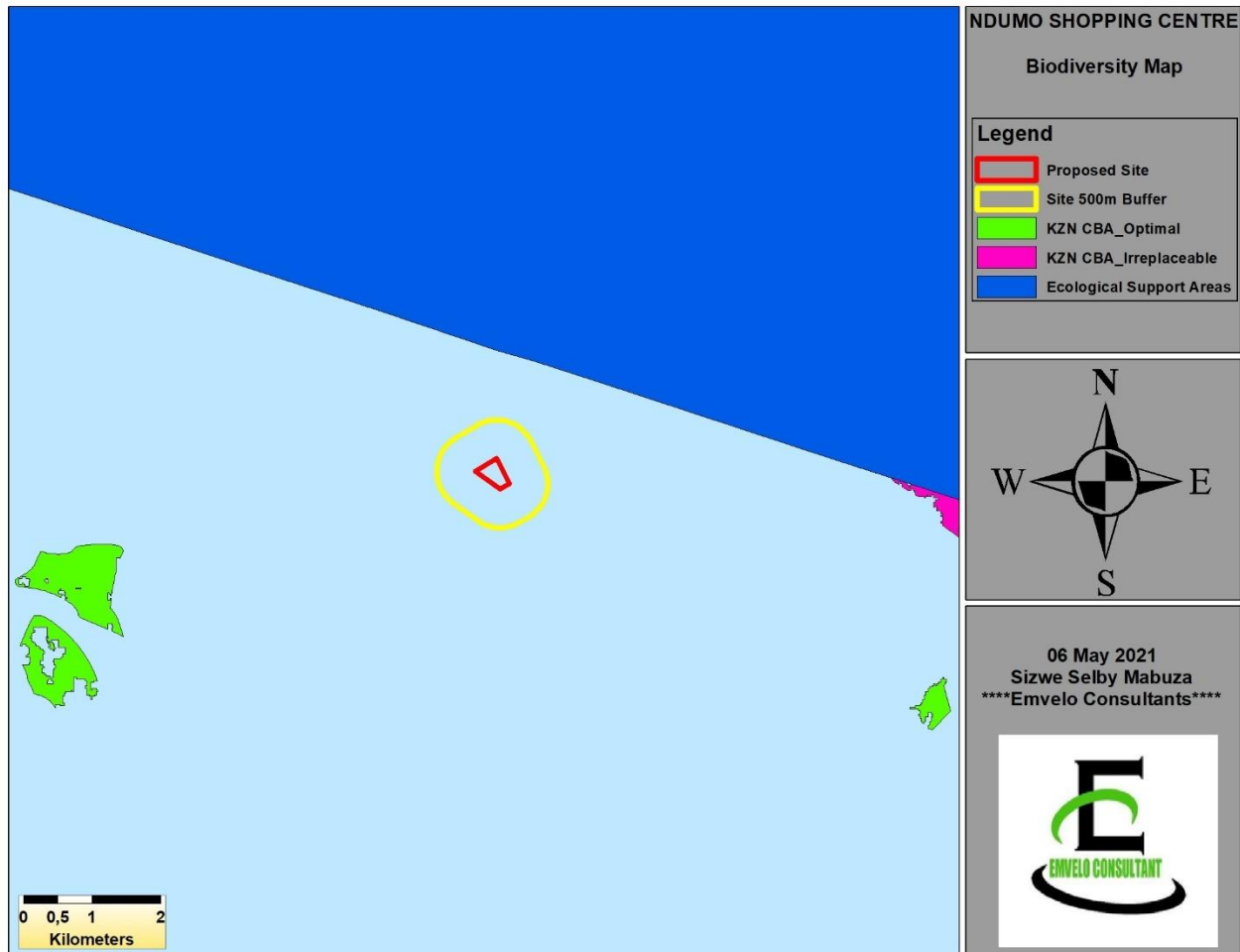


Figure 12: Map showing the Biodiversity Status of the area

There are no terrestrial CBAs within or in close proximity of the proposed site. The nearest terrestrial CBA is 5.6km south west. Also, approximately 1.1km north from the proposed site there is an Ecological Support Area.

11.7.2 Aquatic Critical Biodiversity Areas

Within the uKDM, there are a number of areas that have been identified as Aquatic CBAs, and they include: The floodplain and wetland complex of the Phongolo River from Jozini Dam to Ndumo Nature Reserve, the Mkuze River floodplains leading into Lake St. Lucia, and the Mfolozi River around Mtubatuba, which were identified as priority wetlands and of biodiversity importance in the provincial assessment. (2) The Czewane Pan (north of Mkuzi Nature Reserve along Mkuze River) and Muzi Pan were identified as part of the provincial assessment. This was confirmed during the local input, which identified these pans as being of high bird biodiversity and proposed

Czewane as a Ramsar wetland site (3) The Central Maputuland Complex (south of Sileza Nature Reserve) identified during the local input included the Gontembe and Manzimhlope Pans. These pans were noted as being water table driven, and although significantly reduced in size due to the lowering of the regional Maputuland Sand Aquifer, largely as a result of the modification of land through forestry and woodlots, are of biodiversity importance and would be of significance biodiversity importance if the water table levels were improved through implementation of land use change practises. (4) The Muzi Swamp portion to the south of Tembe Nature Reserve, are coastal lowland sedge wetlands which have been identified as priority wetlands in the provincial assessment. (5) Marine Areas, which include the inshore and near shore (5km), has been designated as a Marine Protected Area and is part of the iSimangaliso Wetland Park.

Within the proposed site, there are no aquatic CBAs that have been identified.

11.7.2.1 Potential impacts

International population growth and development expansion, leading to habitat *destruction*, *degradation*, and *fragmentation*, are the major factors behind biodiversity loss, with South Africa being no exception.

The proposed activity may result in the permanent loss of unidentified plant SCC. Also, the clearing of the area for construction purposes, as well as other already disturbed areas in the project area are most likely to be infested by the alien vegetation as a result of the project.

The impacts of the Ndumo shopping complex project in Ndumo town on ecological processes would be High and Medium Negative without mitigation but with mitigation the impacts could be reduced to Medium and Low Negative. Measures to prevent the loss of Critical Biodiversity Areas have been analyzed and presented on this report, as well as the EMPr.

11.8 Threatened Ecosystems and Protected Areas

In partnership with the Department of Environmental Affairs, the South African National Biodiversity Instituted published a draft report titled “Threatened Ecosystems in South Africa: Descriptions and Maps”, to provide baseline information on the List of Threatened Ecosystems (SANBI, 2009). The aim was to provide a description and a status of ecosystems using practical and credible set of criteria of ecosystems.

Protected Areas are terrestrial, aquatic, or marine areas that are formally protected by law and managed mainly for the purpose of biodiversity conservation. Formal Protected Areas are gazetted in terms of the National Environmental Management: Protected Areas Act (NEMPAA).

11.8.1 Threatened Ecosystems

The Maputaland-Pondoland-Albany area is an important centre of plant endemism, and the second richest floristic region. In total there are over 2500 species that occur within the Mapuland Centre of which at least 230 species are endemic or near endemic to the region.

11.8.2 Protected Areas

The uMkhanyakude District contains a number of formally protected and other conservation areas. The Provincial Reserves are managed by EKZNW, who is the primary Conservation Agency responsibility for the management of biodiversity in KZN. These areas include,

The below figure indicates the protected areas around the proposed project site.

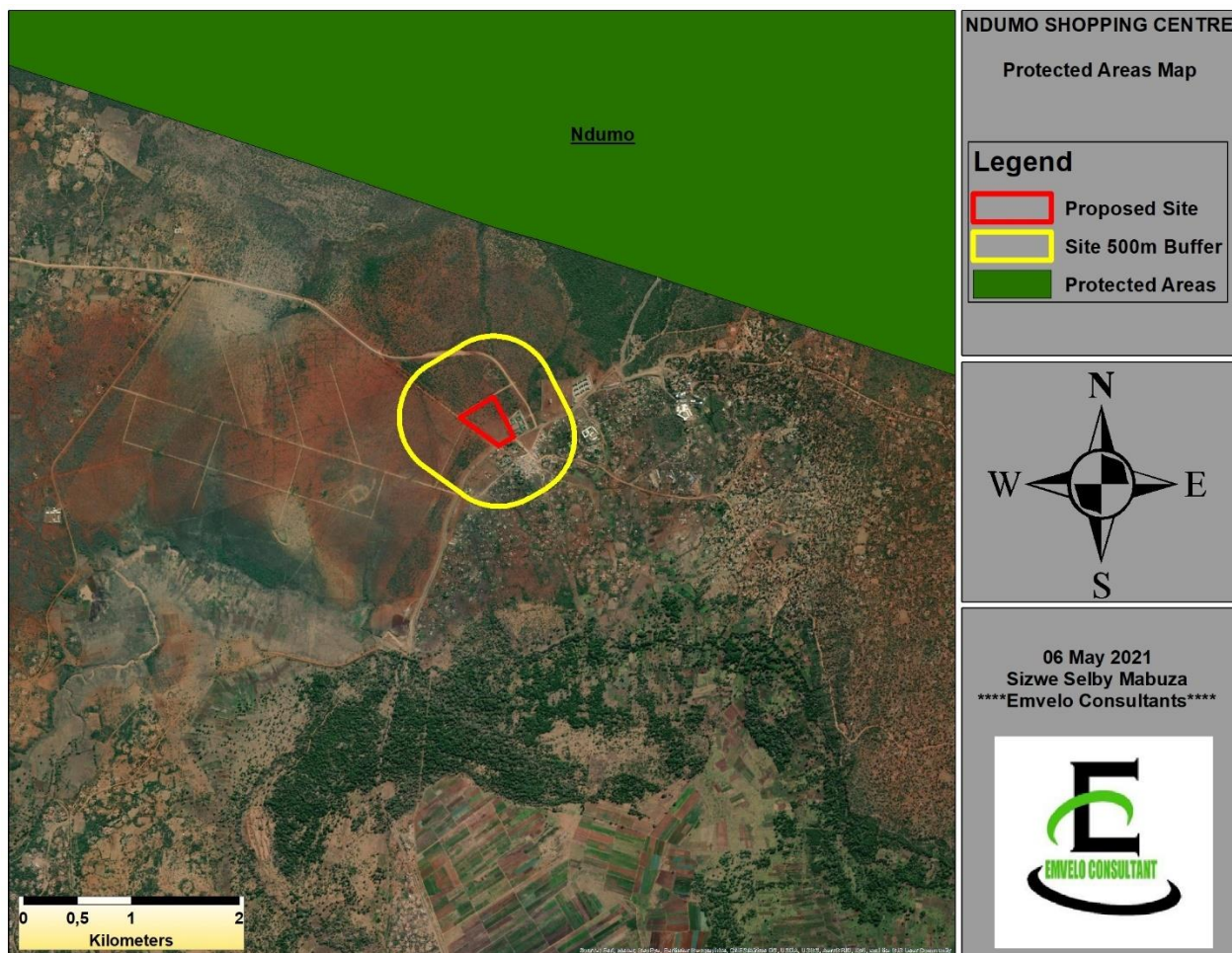


Figure 13: Map showing Protected Areas around the Ndumo Area

The proposed site is located at approximately 1.5km south of the Ndumo Game Reserve, which is the 4th largest provincial nature reserve area within the district (10117 ha), as per the NEMPAA.

11.8.2.1 Potential Impacts

Vegetation clearance can lead to fragmentation, reduction, and loss of habitat as well as the migration of animals away from the area. Therefore, an Environmental Management Programme (EMPr) has been designed to ensure mitigation and management of identified impacts.

11.9 Fauna

The Maputaland-Pondoland Albany hotspot records high levels of species and endemism for fauna, although this is lower than that recorded for plant diversity.

The recorded faunal data for the uMkhanyakude District indicates a number of Red List species, including 1 Critically Endangered species (*Cloeotis percivali australis*, the Short-eared trident bat), 12 Endangered, 40 Vulnerable, 23 Near Threatened and 20 rare and/or endemics.

11.9.1 Potential Impacts

Vegetation clearance can lead to fragmentation, reduction, and loss of habitat as well as the migration of animals away from the area. Another threat to the fauna around the site can be the poaching and wilful harming of animals by the construction workers. Although, there were no fauna species encountered during the Environmental Study, the site is suitable for development, provided that the recommendations given by the Ecological Assessment and EMP are adhered to.

11.10 Visual environment and land use character

Subject to the direct visual influence of the proposed project, the zone of visual influence can be experienced at different scales by receptors located at various distances from the site. The viewshed area and zone of visual influence for new developments is classified as follows:

- High visibility - Visible from a large area (several square kilometres, >5km radius)
- Moderate visibility - Visible from an intermediate area (several hectares, 2.5 – 5 km radius).
- Low visibility - Visible from a small area around the project site (<1km radius).

Ndumo is characterised by a dispersed settlement pattern consisting of low-density residential units and the clustering of business activities. Some of the houses serve a dual purpose of having a spaza shop in a section of the house. Small business uses and community facilities are located adjacent to the D1851 road (Ndumo Master Plan).

The business core area adjacent to the proposed site consists of a SPAR, Post Office, filling station and small businesses ranging from liquor stores to cell phone shops. There is a large concentration of informal traders in the area, mostly centred around the SPAR entrance.

Community and social facilities located in and around the node include a clinic, unutilised airstrip, primary and secondary schools, and a community hall.



Figure 14: Picture showing the Land Use of the area

The project area has indigenous vegetation within it and is bordered by a number of built-up areas, making this proposed development to be streamlined with the local environment, and categorized as of hard modification.

11.10.1 Potential Impacts

The proposed development will blend in with existing land uses which is mostly dominated by a number of other built-up areas. Therefore, this project is not anticipated to be highly visible from great distances and will be perceived by receptors in close proximity in the category of “***medium/moderate visibility***”.

11.11 Heritage and cultural aspects

The village has elements of evolving cultural environment and features. These mostly include modern development with some rural elements. It also boasts of the Ndumo Game Reserve. However, no archaeological or historical resources were identified within the project footprint.

11.11.1 Potential Impacts

Although the possibility of archaeological or historical sites associated with the general project area is high, however, from a contextual studies perspective, no medium to high significance archaeological, heritage landmark or monument was recorded on the direct footprint of the proposed development site.

During the clearing of vegetation and excavation activities, heritage resources/places that might be buried underground may be affected. Moreover, soil preparation may expose objects of heritage significance. However, these potential impacts can be mitigated provided that the recommendation of this report and EMPr are adhered to.

11.12 Social and economic aspects

11.12.1 Population Density

The municipality has a fairly low average population density with the expected high-density areas of the primary node and the traditional authority areas. This pattern has a positive effect on service delivery as the higher the density the more economical can service delivery be done.

POPULATION GROWTH	POPULATION 2011	POPULATION 2016
Male	86,116	93,282
Female	100,386	104,933
Total	186,502	198,215

11.12.2 Human Settlement

The municipality has a largely rural character with low density scattered households and the nodal points.

The Jozini settlement pattern is dominated by expansive rural and informal settlements. Approximately 98% of Jozini is rural in nature and this is made evident by the housing typology. These settlements are scattered unevenly in areas under traditional authority with poor road infrastructure that interlinks them. Their location in space is highly influenced by a variety of livelihood strategies such as access to water, land, public facilities, public transport routes and bulk services.

11.12.3 Financial/Economic Environment

Jozini LM can be described as a middle to low income area with growth potential. This is justified given the fact that there are pockets of wealth and a growing middle class. This is juxtaposed with areas of low income and poverty. Given that Jozini LM's GVA and production is growing at a rate faster than that of the Province of KwaZulu-Natal, it indicates that there is potential in the area for greater growth and that there is untapped potential for future developments. There are a number of future developments and PDA applications lodged with Jozini LM and this implies potential for the area to experience more fruitful growth. It also means that skills development and training programmes need to be developed in order to meet the demand for skills associated with these developments.

11.12.4 Ndumo Area

Ndumo is located approximately 60km north of Jozini. The area of Ndumo is 15.4 km², population is 4,354 with Male population being 1,920 (44.1%) and Female population 2,434 (55.9%). Population changes from 1975 to 2015, +46.5%.

11.12.5 Potential Impacts

It is expected that the Ndumo community and other communities within the municipality will benefit through jobs during the construction, operation, and maintenance phase, which will enable the

transfer of skills and boost the local economy. This will contribute to alleviating poverty and decrease the dependency ratio.

12. WASTE, EFFLUENT, AIR POLLUTION AND ATMOSPHERIC EMISSIONS

Construction activities, like other operations, also leads to pollution of air, land, and water bodies.

12.1 General waste management: construction phase

The general waste during the projects cycle will be sorted into recyclable and non-recyclable waste, in skip bins to be collected by certified service provider, who will be appointed prior to the construction phase of the development.

Suitable portable chemical toilet facilities will be provided and serviced by certified service provider during the duration of construction this service provider will be appointed during the prior to the construction phase, and they will detail on where there will dispose the waste. Proper measures will be put in prevent to spillages as a result of toppled portable toilet, as prescribed by EMPr. The provision ratio for portable toilets per workers will be 1:20 and be provided for both males and females workers onsite.

12.2 Effluent

No effluent will be generated during the construction phase of the project. Proper measures will be put in place to contain any spillages (oil spills) occurring during construction, as prescribed by EMPr.

12.3 Ambient air pollution and atmospheric emissions

The proposed development itself will not have direct impact on air pollution and atmospheric emission. However, certain activities during the construction phase could have a minor impact on the ambient air because of emissions from the onsite equipment, machinery, and vehicles. These include dust emanating from soil preparation activities and fumes (carbon monoxide) released by farm vehicles and machinery. These minor impacts can be mitigated through adherence to the EMPr.

The activity will, therefore, have an indirect but minor effect on the release of emissions. The release of significant emissions from any source will be controlled under the National Environment Management: Air Quality Act 39 of 2004.

12.4 Noise management

The project sites will emit different levels of noise due to the various construction activities, movement of heavy construction vehicles, use of machinery as well as from large number of workers on site. However, noise impacts are expected to be of short duration and only during certain times, especially during construction, and on delivery days or periods, which is likely to only have impacts to the immediate environment. The potential noise pollution impacts will be mitigated provided that the EMPr is adhered to.

13 WATER USE

The total demand of the proposed project in terms of water is expected to be 88.6 kl/day. The water demands for the development will be provided through metered connection from the Jozini Local Municipality. An anticipated connection point was located on site, this connection point is from the 350mm supply line and it consists of a 350mm valve where a draw-off can be created for the new development and the retail centre supply line will be reduced to a 150mm steel pipe.

The retail centre development will not have a significant impact on the water demand of Ndumo village, as the existing bulk water infrastructure can accommodate the demand.

14 THE PUBLIC PARTICIPATION PROCESS

Section 24 (4) (a) (v) of NEMA, provides that the procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment, must ensure, with respect to every application for an Environmental Authorisation, the public information and participation procedures which provide all interested and affected parties, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures.

14.1 Background

Public participation (PP) is part of the EIA process which is governed under the principles of NEMA as well as the EIA regulations. It is defined as the process by which an organization consults with all interested or affected parties (I&APs) which include organizations, government entities, affected communities, non-governmental organisations (NGOs), etc. It is a two-way communication process and collaborative problem solving with the goal of achieving better and more acceptable decisions.

The PP process also provides all the stakeholders including the community with a platform to raise their environmental concerns before the Competent Authority can make a final decision regarding the issuing of the Environmental Authorization. This prevents and minimizes disputes before they become unsolvable. Chapter 6 of the EIA regulations emphasize that the information related to the proposed project must be made available to I&APs, prior to a final decision. Therefore, this process will allow I&APs to have access to the information relating to this project. The application was conducted according to Chapter 6 of the EIA Regulations 2017.

14.2 Objectives of public participation

The objectives are as follows:

- To inform and involve the community and the stakeholders about the proposed project.
- To identify and address the community and stakeholder's environmental concerns regarding this activity.
- To provide opportunities for the community, relevant government departments, surrounding businesses, the residents, and other stakeholders to raise their environmental concerns, suggest solutions and identify priorities or issues.
- To protect the environmental rights of the local community.
- To optimise on local and indigenous knowledge of the area.

14.3 Notification of the Interested and Affected Parties (I&APs)

Section 41 of Chapter 6 of the EIA regulations have listed the different options, to be used when notifying the I&APs. The PP process for this project was conducted, as detailed in Table 5 and indicated by the green blocks.

Table 4: Public Participation Processes

<i>All the Interested and Affected parties were notified of the application by-</i>		
Fixing a notice board at the place conspicuous to and accessible by the public at the boundary, on the fence, or along the corridor of any alternative sites.	YES	NO
Any alternative site also mentioned in the application	YES	NO
<i>Has a written notice been given to-</i>		
Landowner or person in control if the applicant is not in control of the land	YES	NO
The municipal councillor of the Ward in which the site and alternative site of the proposed activity.	YES	NO
The municipality which has jurisdiction in the area and other organs of state	YES	NO
<i>Placing an advertisement in-</i>		
Local newspaper	YES	NO
Any official Gazette that is published specifically for providing public notice of applications	YES	NO
One provincial newspaper, any official Gazette that is published with the purpose of providing public notice of applications.	YES	NO

14.4 Comments from the registered Interested and Affected Parties (I&APs).

Section 43 of Chapter 6 of NEMA (EIA Regulations 2017) indicates that all I&APs are entitled to comment in writing on all reports produced by the applicant during the EIA process. This will bring the concerns raised to the attention of the applicant.

The I&APs were provided with the opportunity to raise their concerns and comments regarding the proposed development project. Firstly, a Background Information Document (BID) was sent to all relevant I&APs. The onsite notices in isiZulu were displayed onsite on 04th of May 2021. Notices were displayed in strategic positions in the project area in order to enhance accessibility from the public. A newspaper advert in isiZulu newspaper was published on the Ilanga Newspaper. A public meeting was facilitated at the Eziphosheni Hall in Ndumo on the 28th of May 2021. Currently the

PP process is at the stage of the circulation of the Draft Basic Assessment Report, of which all I&APs have 30 days to comment and/or provide their inputs. All comments and concerns raised are recorded on the I&APs Commenting Report attached in Appendix E of the final BAR.

15 IMPACT ASSESSMENT AND MITIGATION MEASURES

The Environmental Impact Assessment (EIA) conducted for the preconstruction, the construction and as well as the operational and decommissioning phases of the development, are discussed in (**section 14.1**) below.

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.

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 which 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) 3 – Possible (Between 40-60% chance of occurrence) 2 – Fairly Unlikely (Between 20-40% chance of occurrence) 1 – Unlikely (Less than 20% 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 - Medium-term - The impact and its effects will continue or last for some time after the construction phase (5 - 15 years) 2 – Medium-short - The impact and its effects will continue or last for the period of a relatively 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 which span shorter than the 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 (**refer to section 15.1**).

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

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

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

15.1 Impact significance evaluation for alternative A

PRE-CONSTRUCTION

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Pre-Construction Phase (Negative)			
<p>Loss of indigenous vegetation</p> <p>The proposed project will result in the clearance of 2.7 ha of indigenous vegetation for the purpose of construction.</p> <p>The Western Maputaland Clay Bushveld (SVI 20) in which the site is on is vulnerable, with a 19% target to be conserved.</p>	<p>SP = M+D+SxP SP = 5+5+2x5 SP = 60</p> <p style="text-align: center;">High</p>	<ul style="list-style-type: none"> ➤ An Environmental Control Officer (ECO) must be appointed to oversee construction activities. ➤ Vegetation must only be removed on the site demarcated and authorized for construction, and other related activities. ➤ A plan to actively rehabilitate the construction area post-construction needs to be developed 	<p>SP = M+D+SxP SP = 3+5+1x5 SP = 45</p> <p style="text-align: center;">Medium-High</p>
<p>Loss of plant and faunal species of conservational concern (SCC)</p> <p>A precautionary measure was adopted in assessing this impact due to a lack of supporting evidence from the ecological specialist. The ecological specialist found no plant species of conservation concern.</p> <p>Although no species of conservational concern were found on site, it is possible that they might be found during the pre- and the construction phases of the project, especially during the rainy season.</p>	<p>SP = M+D+SxP SP = 5+5+2x3 SP = 36</p> <p style="text-align: center;">Medium</p>	<ul style="list-style-type: none"> ➤ All species identified as of conservational concern must not be removed, or disturbed. ➤ If needed, approval must be obtained from the ECO, before any disturbance or removal of plant SCC. ➤ The site area must again be surveyed prior to construction, so to locate and capture any SCC. 	<p>SP = M+D+SxP SP = 2+5+1x1 SP = 8</p> <p style="text-align: center;">Negligible</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Pre-Construction Phase (Negative)			
<p>Loss and disturbance to fauna</p> <p>The clearance of vegetation might result in a loss of animal species that could be found on site.</p> <p>Disturbance to fauna may be from noise, light, and other disturbances.</p>	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65</p> <p>Very High</p>	<ul style="list-style-type: none"> ➤ All workers must be trained to recognize threatened species on site. ➤ During site clearance and preparation, special care must be taken in order to minimize damage or disturbance of roosting and nesting sites. ➤ No faunal species are to be trapped, hunted, or killed during the construction phase. ➤ No fires should be allowed at the site. ➤ No dogs or other pets must be allowed on site. 	<p>SP = M+D+SxP SP = 2+3+2x3 SP = 21</p> <p>Low</p>
<p>Loss and Fragmentation of Habitats</p> <p>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>SP = M+D+SxP SP = 5+5+3x5 SP = 65</p> <p>Very high</p>	<ul style="list-style-type: none"> ➤ All project activities must take place within the area demarcated for the development. 	<p>SP = M+D+SxP SP = 3+5+2x4 SP = 40</p> <p>Medium</p>
<p>Encroachment of Alien Invasive Species</p> <p>Disturbed areas are most likely to be infested by alien vegetation.</p> <p>Within the site there are some alien invasive plants that included a very abundant <i>Alternanthera caracasana</i> (Paperthorn)</p>	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65</p> <p>Very High</p>	<ul style="list-style-type: none"> ➤ An on-going alien invasive management plan must be developed and implemented during the clearance of vegetation. ➤ All areas disturbed areas must be monitored for colonization by invasive plants and must be controlled as they emerge. 	<p>SP = M+D+SxP SP = 2+1+1x2 SP = 8</p> <p>Negligible</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Pre-Construction Phase (Negative)			
		<ul style="list-style-type: none"> ➤ The clearing/eradication of alien species must be undertaken in all phases of development. 	
<p>Soil erosion and degradation of soil quality</p> <p>The clearance of vegetation will increase the rate of surface water runoff and therefore resulting in soil erosion and loss of quality.</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>SP = M+D+SxP SP = 4+5+3x5 SP = 60</p> <p>High</p>	<ul style="list-style-type: none"> ➤ 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. ➤ Construction machinery operating onsite must be routinely checked for fuel leaks or malfunctions to minimize the risk of oil spills. ➤ Sediment barriers such as berms, contour ridges or contour grass strips must be installed across all slopes. ➤ All sediment barriers must be installed or setup outside recommended wetland buffers. ➤ After every rainfall event, the farmer must check the site for erosion damage and immediately repair any damage recorded. 	<p>SP = M+D+SxP SP = 2+5+2x1 SP = 9</p> <p>Negligible</p>
Deterioration in water quality	<p>SP = M+D+SxP SP = 3+5+2x3 SP = 30</p>	<ul style="list-style-type: none"> ➤ Machinery must be parked on the designated banded areas and dip trays must be placed 	<p>SP = M+D+SxP SP = 1+5+1x1 SP = 7</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Pre-Construction Phase (Negative)			
This may be from the spilling of hydrocarbons and other hazardous substances from machinery and equipment used during the construction and operational phase;	Low	under the machinery, when not used to capture any possible oil leaks;	Negligible
<p>Air pollution; Dust and Emissions</p> <p>Dust and emissions from construction and delivery vehicles and generation of dust because of land or vegetation clearing.</p> <p>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.</p>	<p>SP = M+D+SxP SP = 5+1+3x5 SP = 45</p> <p style="text-align: center;">Medium</p>	<ul style="list-style-type: none"> ➤ Prohibit the clearance of vegetation during windy conditions. ➤ Bare (unvegetated) soils can be regularly dampened with water to suppress dust, especially when strong winds prevail. ➤ Limit on-site vehicle speed to 15-20 km/ph. 	<p>SP = M+D+SxP SP = 2+1+1x2 SP = 8</p> <p style="text-align: center;">Negligible</p>
<p>Noise Pollution</p> <p>The main sources of noise associated with the proposed activities include the following: construction workers, activities, and machinery.</p>	<p>SP = M+D+SxP SP = 5+1+3x5 SP = 45</p> <p style="text-align: center;">High</p>	<ul style="list-style-type: none"> ➤ All construction vehicles must be maintained in accordance with manufactures specifications to avoid excessive noise. ➤ All construction vehicles not in use must be turned off. 	<p>SP = M+D+SxP SP = 2+1+1x3 SP = 12</p> <p style="text-align: center;">Very Low</p>
<p>Loss of Heritage and Archaeological resources</p> <p>The removal of vegetation may require for excavation activities to be conducted, which may expose and damage objects of heritage and / or archaeological significance.</p>	<p>SP = M+D+SxP SP = 4+5+2x3 SP = 33</p> <p style="text-align: center;">Medium</p>	<ul style="list-style-type: none"> ➤ Monitoring during site clearance for possible human remains or burials and implement chance find procedure if any finds are uncovered. 	<p>SP = M+D+SxP SP = 1+5+1x1 SP = 7</p> <p style="text-align: center;">Negligible</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Pre-Construction Phase (Negative)			
Also, the activities on site may require for the excavation of soil material, which may expose and damage potential heritage and archaeological resources.		<ul style="list-style-type: none"> ➤ A Chance Finds Procedures (CFP) should be implemented where possible heritage finds are uncovered/ discovered. ➤ 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. 	
<p>Visual Impact</p> <p>During the pre-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 the site characterized by exposed earth, and farm machinery.</p> <p>Also, within a close proximity of the proposed site, there is the Ndumo Game Reserve, which is a protected area. Visitors, animals and residents will therefore experience a change in their visual.</p>	<p>SP = M+D+SxP SP = 5+3+3x5 SP = 55</p> <p style="text-align: center;">High</p>	<ul style="list-style-type: none"> ➤ The contractor must maintain good housekeeping on-site to avoid litter and minimize waste. ➤ Dust suppression is important as dust will raise the visibility of the development. 	<p>SP = M+D+SxP SP = 3+2+2x3 SP = 21</p> <p style="text-align: center;">Low</p>
Increased Traffic	<p>SP = M+D+SxP SP = 4+1+3x4</p>	<ul style="list-style-type: none"> ➤ All construction vehicles must use the existing access road to the site. 	<p>SP = M+D+SxP SP = 2+1+2x2</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Pre-Construction Phase (Negative)			
Temporal movement in and out of the construction site may lead to increased traffic on the access roads used	SP = 32 Medium	➤ Road temporary signing, traffic control signals, delineators, message boards, must be used for traffic accommodation in the work zone, and must be visible to motorists and pedestrians.	SP = 10 Negligible

CONSTRUCTION PHASE

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Construction (Negative)			
<p>Loss of indigenous vegetation</p> <p>The construction activities of this development will result in the obliteration of vegetation on site.</p> <p>The Western Maputaland Clay Bushveld (SVI 20) in which the site is on is vulnerable, with a 19% target to be conserved.</p>	<p>SP = M+D+SxP SP = 5+5+2x5 SP = 60</p> <p style="text-align: center;">High</p>	<ul style="list-style-type: none"> ➤ Vegetation must only be removed on the site demarcated and authorized for construction. ➤ Where possible, all construction activities must be performed on previously disturbed areas. ➤ Where vegetation has been cleared, site rehabilitation in terms of soil stabilization and re-vegetation must be undertaken. 	<p>SP = M+D+SxP SP = 2+5+1x2 SP = 16</p> <p style="text-align: center;">Very low</p>
<p>Loss of plant and faunal species of conservational concern</p> <p>A precautionary measure was adopted in assessing this impact due to a lack of supporting evidence from the ecological specialist. The ecological specialist found no plant species of conservation concern.</p> <p>Although no species of conservational concern were found on site, it is possible that they might be found during the vegetation clearance, soil cultivation and preparation phase, especially during the rainy season.</p>	<p>SP = M+D+SxP SP = 3+5+2x3 SP = 30</p> <p style="text-align: center;">Low</p>	<ul style="list-style-type: none"> ➤ The development area must again be surveyed prior to construction, so to locate and capture any SCC. ➤ All species identified as of conservational concern must not be removed, or disturbed. ➤ If needed, approval must be obtained from the ECO, before any disturbance or removal of SCC. 	<p>SP = M+D+SxP SP = 2+5+1x2 SP = 16</p> <p style="text-align: center;">Very Low</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Construction (Negative)			
<p>Loss and Fragmentation of Habitats. 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>SP = M+D+SxP SP = 5+5+3x5 SP = 65 Very High</p>	<ul style="list-style-type: none"> ➤ All construction activities must take place within an area demarcated for the development. 	<p>SP = M+D+SxP SP = 3+3+1x3 SP = 21 Low</p>
<p>Loss of fauna Uncontrolled construction activities might result in a loss of animal species that could be found on site.</p>	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65 Very High</p>	<ul style="list-style-type: none"> ➤ All workers must be trained to recognize threatened species on site. ➤ During site preparation, special care must be taken during the clearing of the works area to minimize damage or disturbance of roosting and nesting sites. ➤ No faunal species are to be trapped, hunted, or killed during the construction phase. 	<p>SP = M+D+SxP SP = 2+5+1x2 SP = 16 Very Low</p>
<p>Encroachment of Alien Invasive Species: Disturbed areas are most likely to be infested by alien vegetation. Within the site there are some alien invasive plants that included a very abundant <i>Alternanthera caracasana</i> (Paperthorn).</p>	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65 Very High</p>	<ul style="list-style-type: none"> ➤ An on-going proper alien invasive management plan must be developed. ➤ 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. 	<p>SP = M+D+SxP SP = 1+1+1x1 SP = 3 Negligible</p>
<p>Deterioration in water quality</p>	<p>SP = M+D+SxP SP = 3+5+3x3</p>	<ul style="list-style-type: none"> ➤ Machinery must be parked on the designated banded areas and dip trays must be placed 	<p>SP = M+D+SxP SP = 1+5+1x1</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Construction (Negative)			
<p>Increased sediment entering the aquatic systems through surface water dispersion.</p> <p>Hydrocarbons spills and leaks from the machinery used.</p>	<p>SP = 33</p> <p>Medium</p>	<p>under the machinery, when not used to capture any possible oil leaks.</p> <ul style="list-style-type: none"> ➤ Stormwater measures must be put in place that will limit the run-off from the site. ➤ Erosion control measures must be implemented at the stormwater outlets that drain from the site, these should make provision for energy dissipaters, etc. ➤ The drainage lines must be safeguarded ➤ The potential longterm downstream pollution from waste, hydrocarbons, petrochemicals and other chemicals and solvents associated with the proposed development must be avoided. 	<p>SP = 7</p> <p>Negligible</p>
<p>Alteration of the natural flow regime</p> <p>Impacts on watercourses due to construction activities within, and/or at the banks of these watercourses.</p>	<p>SP = M+D+SxP</p> <p>SP = 3+5+2x2</p> <p>SP = 20</p> <p>Very Low</p>	<ul style="list-style-type: none"> ➤ Construction activities within and around watercourses and within their buffer zones must be prohibited. ➤ Unauthorized abstraction of water from water features must be prohibited. 	<p>SP = M+D+SxP</p> <p>SP = 1+5+1x1</p> <p>SP = 7</p> <p>Negligible</p>
<p>Ground water Contamination</p> <p>Surface and ground water pollution associated with construction activities i.e., contamination from fuels,</p>	<p>SP = M+D+SxP</p> <p>SP = 4+5+3x5</p> <p>SP = 60</p>	<ul style="list-style-type: none"> ➤ Machinery used on site should be placed on an impermeable layer to avoid groundwater contamination. 	<p>SP = M+D+SxP</p> <p>SP = 1+5+2x1</p> <p>SP = 8</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Construction (Negative)			
chemicals, and oils, through run-off or as a result of leaks.	High	<ul style="list-style-type: none"> ➤ 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. 	Negligible
<p>Soil erosion</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.</p>	<p>SP = M+D+SxP</p> <p>SP = 5+5+3x5</p> <p>SP = 65</p> <p>Very High</p>	<ul style="list-style-type: none"> ➤ Sediment barriers such as berms, contour ridges or contour grass strips must be maintained across all slopes. ➤ All sediment barriers must be installed or setup outside recommended aquatic buffers. ➤ There must be no construction on very steep slopes. ➤ After every rainfall event, the contractor must check the site for erosion damage and immediately repair any damage recorded. 	<p>SP = M+D+SxP</p> <p>SP = 2+2+1x1</p> <p>SP = 5</p> <p>Negligible</p>
<p>Soil Contamination and quality degradation</p> <p>Hazardous spills and leaks may also occur from construction vehicles and heavy equipment used, which may result in soil contamination.</p>	<p>SP = M+D+SxP</p> <p>SP = 4+5+3x5</p> <p>SP = 60</p> <p>High</p>	<ul style="list-style-type: none"> ➤ All construction machinery operating onsite must be routinely checked for fuel leaks or malfunctions to minimize the risk of oil spills. ➤ Any soil contaminated by hydrocarbons (fuel and oils) must be removed and the affected area rehabilitated immediately. 	<p>SP = M+D+SxP</p> <p>SP = 2+5+1x2</p> <p>SP = 16</p> <p>Very Low</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Construction (Negative)			
Air pollution; dust and chemicals Construction activities may cause a lot of dust and eventually air pollution	SP = M+D+SxP SP = 5+1+2x5 SP = 40 Medium	<ul style="list-style-type: none"> ➤ Prohibit soil excavation and transportation activities during windy conditions. ➤ Bare (unvegetated) soils can be regularly dampened with water to suppress dust during soil preparation, especially when strong winds prevail. ➤ Limit on-site vehicle speed to 15-20 km/ph. 	SP = M+D+SxP SP = 2+1+1x2 SP = 8 Negligible
Increase in general waste The amount of waste generated in the around the project site will increase during the construction phase of the project.	SP = M+D+SxP SP = 4+2+3x5 SP = 45 Medium-high	<ul style="list-style-type: none"> ➤ The contractor must ensure that the collection of waste general waste is carried out within the proposed development. ➤ New waste collection routes for collection services must be done to accommodate the proposed development. 	SP = M+D+SxP SP = 3+2+2x3 SP = 21 Low
Visual Impact 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 the construction site characterized by exposed earth and machinery. Established construction site camp and associated infrastructure will have visual impact. Although, it will be of temporal nature.	SP = M+D+SxP SP = 5+2+3x5 SP = 50 Medium High	<ul style="list-style-type: none"> ➤ Concentrate the construction activity and temporary infrastructure in a designated place. In this regard the site camp, must be constructed close enough to the construction area to avoid high visibility of construction activities. ➤ The contractor should maintain good housekeeping on-site to minimise waste generation and avoid litter. 	SP = M+D+SxP SP = 3+2+2x4 SP = 28 Low

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Construction (Negative)			
<p>Dust from construction activities: stockpiles, exposed soil might have visual impact around the project locality.</p> <p>The excavations and clearance of the vegetation can have impact on the viewers</p>		<ul style="list-style-type: none"> ➤ Dust suppression is important as dust will raise the visibility of the development. ➤ Excavated material is to be stockpiled along the trench within the working servitude for later backfilling, of not more than 2m in height. ➤ Avoid the use of floodlight at site camp. Also, the light must not face the neighbouring homesteads and oncoming traffic on the rural access roads. ➤ Progressively, rehabilitate the site so that the land will be transformed back to its natural state once the rehabilitation has been completed. 	
<p>Noise pollution</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>SP = M+D+SxP SP = 5+2+3x5 SP = 50</p> <p>Medium High</p>	<ul style="list-style-type: none"> ➤ Ensure that operating hours as determined by the EA are adhered to. Where not defined, development must be limited to working hours. ➤ All construction vehicles must be maintained in accordance with manufactures specifications to avoid excessive noise. ➤ All construction vehicles not in use must be turned off. 	<p>SP = M+D+SxP SP = 2+1+1x2 SP = 8</p> <p>Negligible</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Construction (Negative)			
<p>Destruction of Heritage Resources</p> <p>The heritage investigation did not identify any objects or sites of heritage significance within the site.</p> <p>There may be however, heritage artifacts that may be discovered during the construction phase of the proposed project</p>	<p>SP = M+D+SxP SP = 4+5+2x3 SP = 33</p> <p>Medium</p>	<ul style="list-style-type: none"> ➤ Should any human remain, graves, archaeological and historical residues be discovered, the KwaZulu-Natal Heritage Act requires that operations should cease immediately pending an evaluation by the heritage authorities. ➤ This finding must be reported to the heritage specialist or KwaZulu-Natal Amafa and Research Institute as a precaution measure 	<p>SP = M+D+SxP SP = 2+5+1x2 SP = 16</p> <p>Very Low</p>
<p>Increased Traffic</p> <p>Temporal movement in and out of the construction area may lead to increased traffic on the access roads used</p>	<p>SP = M+D+SxP SP = 5+2+3x5 SP = 50</p> <p>Medium High</p>	<ul style="list-style-type: none"> ➤ All construction vehicles must use the existing access road to the construction site. ➤ Road temporary signing, traffic control signals, delineators, message boards, used for traffic accommodation in the work zone must be visible to motorists and pedestrians. 	<p>SP = M+D+SxP SP = 2+1+2x3 SP = 15</p> <p>Very Low</p>

POST CONSTRUCTION (OPERATIONAL)

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Post-Construction Phase (Negative)			
<p>Loss of indigenous vegetation</p> <p>The development will result in the obliteration of vegetation on site for the purpose of operating and the installing of service infrastructure.</p> <p>Areas disturbed may not be able to revegetate back during the operational phase of the project.</p>	<p>SP = M+D+SxP SP = 4+5+3x5 SP = 60</p> <p>High</p>	<ul style="list-style-type: none"> ➤ All slope areas must be properly stabilized through compaction to ensure proper establishment of a vegetation cover. ➤ A Rehabilitation Management Plan must be implemented. Disturbed areas must be re-vegetated by seeding with plants that are indigenous to the area. 	<p>SP = M+D+SxP SP = 2+1+2x3 SP = 15</p> <p>Very low</p>
<p>Faunal mortality and disturbance</p> <p>Post construction activities animal's species might not come back to the area.</p>	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65</p> <p>Very High</p>	<ul style="list-style-type: none"> ➤ Restrict and control the movement of people/vehicles outside of operational/working areas. ➤ All disturbed areas must be revegetated to attract faunal species back to the site after the construction phase. 	<p>SP = M+D+SxP SP = 3+2+2x3 SP = 21</p> <p>Low</p>
<p>Loss and Fragmentation of Habitats.</p> <p>Animals separated into distinct populations may not be able to come together again, leading a disruption in gene pool and natural speciation.</p>	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65</p> <p>Very High</p>	<ul style="list-style-type: none"> ➤ Rehabilitate all affected areas to attract animals back to the disturbed area. ➤ Use indigenous plants during the revegetation of all disturbed areas. 	<p>SP = M+D+SxP SP = 3+3+2x3 SP = 24</p> <p>Low</p>
<p>Encroachment of Alien Invasive Species:</p> <p>Disturbed areas are most likely to be infested by alien vegetation after the construction phase.</p>	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65</p> <p>Very High</p>	<ul style="list-style-type: none"> ➤ An on-going proper alien invasive management plan must be developed and implemented during operational phase 	<p>SP = M+D+SxP SP = 2+1+1x1 SP = 4</p> <p>Negligible</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Post-Construction Phase (Negative)			
<p>Increased demand on bulk services Associated operation activities i.e., additional bulk services (water and electricity) are required to cater for the proposed development</p>	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65 Very high</p>	<ul style="list-style-type: none"> ➤ Energy-saving alternatives such as use of solar energy can be installed in the proposed residential units – provided that the budget for such is allocated. 	<p>SP = M+D+SxP SP = 4+5+2x4 SP = 30 Medium</p>
<p>Ground and surface water pollution (Septic Tank) The ground water pollution, as a result of unlined or sewer overflow If the septic tank is unlined it might result into the Groundwater contamination</p>	<p>SP = M+D+SxP SP = 4+5+2x4 SP = 68 Very High</p>	<ul style="list-style-type: none"> ➤ Engineering design and good construction practice to mitigate the impact sewer overflow and underground water contamination. ➤ There is no freshwater ecosystems identified within the 500m of the development, however the frenchdrain/septic tank will be underlined with an impermeable layer to avoid the contamination of water. ➤ Monitoring boreholes will be installed to monitor the potential contamination of the freshwater ecosystems outside the 500m boundary. 	<p>SP = M+D+SxP SP = 5+2+1x2 SP = 16 Very Low</p>
<p>Ground and surface water pollution (Leaks from fuel tanks) If there is no proper monitoring of the leak from the underground tanks, there might be a contamination of ground water.</p>	<p>SP = M+D+SxP SP = 5+5+2x4 SP = 68 Very High</p>	<ul style="list-style-type: none"> ➤ Engineering design and good construction practice to mitigate the impact sewer overflow and underground water contamination. ➤ The use of Above Ground Fuel Tanks 	<p>SP = M+D+SxP SP = 5+1+1x2 SP = 14 Very Low</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Post-Construction Phase (Negative)			
Spills that might occur from the tanks might contaminate the stormwater if not managed		<ul style="list-style-type: none"> ➤ Fuel tanks facility will be bounded with to contain approximately 110% capacity of fuel storage. ➤ Spill kits and hazardous waste bins within the facility ➤ Barriers will be installed to protect the tanks and limit unauthorized access. ➤ Regular inspection of fuel tanks to detect any form of leaks and corrosion 	
<p>Increase in general waste</p> <p>The amount of waste generated in the facility will increase during the operational phase of the project.</p>	<p>SP = M+D+SxP SP = 4+5+3x5 SP = 60 High</p>	<ul style="list-style-type: none"> ➤ The applicant should ensure that the collection of waste general waste is carried out within the proposed development. ➤ New waste collection routes for collection services must be done in order to accommodate the proposed development. 	<p>SP= M+D+SxP SP= 3+5+2x3 SP= 30 Low</p>
<p>Increased Traffic</p> <p>The operation of the shopping complex will increase traffic flow within and around the area.</p>	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65 Very High</p>	<ul style="list-style-type: none"> ➤ Road signing, traffic control signals, delineators, message boards, used for management of traffic during the operational phase. 	<p>SP = M+D+SxP SP = 2+5+2x2 SP = 18 Very low</p>
Aesthetic Impact;	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65</p>	<ul style="list-style-type: none"> ➤ All remaining construction infrastructure, and waste must be removed from the farm site. 	<p>SP= M+D+SxP SP= 3+5+2x4 SP= 40</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Post-Construction Phase (Negative)			
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.	Very High		Medium

DECOMMISSIONING PHASE

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Decommissioning / Rehabilitation Phase (Negative)			
Loss of indigenous vegetation Indigenous vegetation may not be able to naturally grow back after the project lifecycle.	$SP = M+D+SxP$ $SP = 5+5+3x5$ $SP = 65$ Very High	<ul style="list-style-type: none"> ➤ All slope areas must be properly stabilized through compaction to ensure proper establishment of a vegetation cover. ➤ A Rehabilitation Management Plan must be implemented. Disturbed areas must be revegetated by seeding with plants that are indigenous to the area. 	$SP = M+D+SxP$ $SP = 2+1+1x2$ $SP = 8$ Negligible
Loss of fauna Post construction and operational phases of the project, animals' species might not come back to the area.	$SP = M+D+SxP$ $SP = 5+5+4x5$ $SP = 70$ Very High	<ul style="list-style-type: none"> ➤ All disturbed areas must be revegetated to attract faunal species back to the site after the construction phase. ➤ Local and indigenous vegetation must be planted in the area to attract wildlife. 	$SP = M+D+SxP$ $SP = 2+2+2x2$ $SP = 12$ Very Low

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Decommissioning / Rehabilitation Phase (Negative)			
<p>Loss and Fragmentation of Habitats</p> <p>Animals separated into distinct populations may not be able to come together again, leading a disruption in gene pool and natural speciation.</p>	<p>SP = M+D+SxP SP = 5+5+3x5 SP = 65</p> <p>Very High</p>	<p>➤ Indigenous vegetation must be planted on the affected area as part of the rehabilitation process.</p>	<p>SP = M+D+SxP SP = 3+2+2x3 SP = 36</p> <p>Medium</p>
<p>Encroachment of Alien Invasive Species</p> <p>Disturbed areas are most likely to be infested by alien species after the construction and operational phases.</p> <p>Allowing invading species to expand will lead to a largescale alien invasion.</p>	<p>SP = M+D+SxP SP = 5+5+4x5 SP = 70</p> <p>Very High</p>	<p>➤ An on-going proper alien invasive management plan must be developed and implemented during project decommissioning phase.</p>	<p>SP = M+D+SxP SP = 1+1+1x1 SP = 3</p> <p>Negligible</p>
<p>Poor rehabilitation of moderate and highly sensitive Areas</p> <p>Poor rehabilitation of sensitive vegetation may lead to the permanent loss of these ecosystem. It will also allow invading alien vegetation species to expand.</p>	<p>SP = M+D+SxP SP = 5+5+4x5 SP = 70</p> <p>Very High</p>	<p>➤ Implement the rehabilitation plan, under the supervision of the ECO.</p> <p>➤ All sloping areas must be properly stabilized through compaction to ensure proper establishment of a vegetation cover.</p> <p>➤ Disturbed areas must be re-vegetated using plants that are natural to the area.</p>	<p>SP= M+D+SxP SP= 2+1+2x2 SP= 10</p> <p>Negligible</p>
<p>Soil erosion due to loss of vegetation cover</p> <p>Poorly rehabilitated areas may trigger soil erosion</p>	<p>SP = M+D+SxP SP = 5+5+2x5 SP = 60</p>	<p>➤ All sloping areas must be properly stabilized through compaction to ensure proper establishment of a vegetation cover.</p>	<p>SP = M+D+SxP SP = 1+1+1x1 SP = 3</p>

Potential Impacts	Impact Significance without Mitigation	Proposed Mitigation Measures	Impact Significance with mitigation
Decommissioning / Rehabilitation Phase (Negative)			
	High	➤ Disturbed areas must be re-vegetated by seeding with plants that are natural to the area.	Negligible
Aesthetic Impact After the lifecycle of the project, residents who live in close proximity to or overlook the proposed project site will experience a change in their existing views as residents.	SP = M+D+SxP SP = 5+5+3x5 SP = 65 Very High	➤ All remaining construction infrastructure, and waste must be removed from the site.	SP = M+D+SxP SP = 2+5+2x4 SP = 32 Medium

16 CUMULATIVE IMPACT ASSESSMENT AND MITIGATION MEASURES

In terms of the EIA Regulations, a cumulative impact is considered from a holistic point of 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. The activity itself may not be significant, but when combined with the existing and reasonably foreseeable impacts eventuating from similar or diverse activities may result in a significant change. “Cumulative impacts can be additive, synergistic, time crowding, neutralizing and space crowding” (DEAT, 2004b;14).

Table 5: Cumulative Impacts

Impact	Description	Mitigation
Synergistic: Fragmentation of indigenous Habitat	The transformation of natural sites which are identified to meet biodiversity patterns and process thresholds will disintegrate the network of these natural habitats.	All construction activities must take place within an area demarcated for the development. The type of fencing used must allow for faunal migration and indigenous vegetation spreading.
Soil erosion: Removal of vegetation on steep slopes	The clearance of vegetation, construction, and as well as a number of activities during the project cycle may trigger loosen soil particles, which may lead to soil erosion, especially during heavy rainfall periods.	There must not be any clearance of vegetation, or movement of vehicles and people on steep slopes. All steep slopes must be vegetated with indigenous vegetation.
Deterioration of water quality in nearby water courses	Potential for increased sediments to enter the system through surface water dispersion causing siltation and other water pollution, as a result of excavation at riparian and riverine areas. The potential for hydrocarbon spills from the pump operation, during construction and operational phase.	Vegetation must remain intact where possible, to limit high surface flows and mobilisation of sediments. An ECO must oversee the implementation of the EMPr during all the phases of the project, with riverine, riparian, and streams areas as a priority.

Alien invasive plant species	The clearing of the area for construction purposes, as well as disturbed areas in the project area are most likely to be infested by the alien vegetation.	An alien removal plan must be developed and implemented during the whole lifecycle of the project. All sites disturbed must be monitored for colonization by exotics or invasive plants and should be controlled as they emerge throughout the project life cycle.
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17. RECOMMENDATIONS BY SPECIALISTS

A total of three specialist studies undertaken for this Environmental Assessment, and during the preliminary study, namely:

- Engineering Geotechnical Investigation
- Heritage Impact Assessment
- Terrestrial Biodiversity / Ecological Impact Assessment

The following specialists' studies were picked up by the screening tool:

Name of the Study	Motivation for not undertaking the study
Landscape/Visual Impact Assessment	The development is within settlement area, adjacent government buildings etc. The development will streamline with adjacent environment. Also, Environmental Sensitivity did not pick out the visual sensitivity theme.
Paleontological Impact Assessment	The Heritage Impact Assessment Study was conducted and according to the Heritage Specialists the area did not require the Paleontological but the Heritage Study. The initial Screening Report suggested the Heritage Study, instead of the Paleontological Impact Assessment.

Aquatic Biodiversity Impact Assessment	There are no wetlands and fresh water bodies within 500m buffer coverage of the project site.
Avian Impact Assessment	The development is adjacent existing infrastructure, schools and library. This will not transform the ability of avian. Also, there are no tower and power lines that will be developed as a result of this development.
Socio-Economic Assessment	Covered under needs and desirability. There will be no displacement or relocation.
Plant Species Assessment	Was covered by the Terrestrial Biodiversity Impact Assessment
Animal Species Assessment	Was covered by the Terrestrial Biodiversity Impact Assessment

17.1 Engineering Geotechnical Investigation

The Geotechnical Investigation for this project was conducted by ASCONSO LAB.

a) SUMMARY

According to the available geological information, the study area is partially underlain by red sand and red calcarenite and marine glauconitic siltstone.

The site does not reflect any risk for the formation of sinkholes or subsidence caused by the presence of carbonic rocks which are water-soluble rocks (dolomite or limestone), and no evidence of seismic active region and mining activity beneath the study area has been revealed.

The area is suitable for any housing development. It is also confidently indicated that from these findings the site can be classified as **NHBRC Site Class C1/H1 as a worst-case scenario**. Special precautionary measures are therefore required relating to the founding of the structures.

b) RECOMMENDATIONS:

The following mitigative measure are recommended;

PROPOSALS FOR FOUNDING AND CONSTRUCTION

- It is important to ensure that the materials conform to SABS standards.
- Where necessary, mix designs should be approved before contractors are allowed to proceed with the construction of foundations.
- Regular samples and test cubes should be taken and tested at an approved and accredited laboratory to ensure that the required strengths are obtained.
- Reinforcement used in the raft foundations and elsewhere in the structures should conform to the applicable SABS specifications.
- Raft foundations be used with light reinforcement in the masonry.
- It is further recommended that all inner walls be constructed with butt joints with the outer walls, tied together with concertina ties to form articulation joints that will allow some differential movement without causing serious damage to the masonry brickwork.

PRECAUTIONS AGAINST MOISTURE

- it is advisable to install a DPC layer to ensure that problems are not experienced with moisture or damp penetrating through the floors of houses or moving upwards in the walls.
- It is, therefore, recommended that a waterproof membrane, 250 micron damp proof course (DPC) be installed under all floors.

FOUNDATION CONDITIONS

- One foundation solution is recommended.
- The solution involves the construction of raft foundations with variable beam depths and mass reinforcement.
- The rafts should be designed to withstand the expected differential movement that can be expected as a result of settlement of the in situ material due to the loads imposed by the construction of the house.

17.2 Heritage Impact Assessment

The Heritage Impact Assessment for this project was conducted by Tsimba Archaeological Footprints.

c) Summary

The village has elements of evolving cultural environment and features. These mostly include modern development with some rural elements. It also boasts of the Ndumo Game Reserve. However, no archaeological or historical resources were identified within the project footprint. This Heritage Study concluded that the proposed project is acceptable.

d) Recommendations:

The report sets out the potential impacts of the proposed development on heritage resources and recommends appropriate safeguard and mitigation measures that are designed to minimize the impacts where appropriate. The Report makes the following recommendations:

- The proposed development may be approved by KZN Amafa Research Institute to proceed as planned subject to periodic heritage monitoring measures being incorporated into the project construction EMP.
- In case of human burials being found during construction phase, the burials must be preserved in situ and barricaded to avoid any accidental damage and a qualified archaeologist should be called on site (see below).

17.3 Ecological Impact Assessment

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

a) Summary

The study area is an open savannah with *Vachellia spp.*, and had a short grassland dominated by *Bothriochloa insculpta* (Pinhole grass) and *Eragrostis spp.* and patches of bare ground. The alien invasive species such as bugweed and paperthorn were common. The study site was not very diverse in terms of plant species that were encountered there. A total of 17 plant species comprised of trees, grasses and forbs were identified. There were no species of conservation concern (SCC) encountered during the field visit. The vegetation condition of the study site was relatively poor based on the current observation of the dominance by *Bothriochloa insculpta*, some alien invasive plants that included a very abundant *Alternanthera caracasana* (Paperthorn) and patches of bare ground.

The project area is in close proximity (about 1,7 km) to a protected area, Ndumo Game Reserve. 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.

Under the provincial KwaZulu-Natal Freshwater Systematic Conservation Plan (FSCP), the conservation status of the catchment at the study site is Earmarked, which is a remaining sub catchment selected in the prioritizing process. Thus, inappropriate development such as dam construction and the loss of riparian vegetation is not recommended.

b) Recommendations:

During the Planning and Design, construction and Post-construction Phases of the proposed project, all mitigations outlined below need to be adhered to.

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 activities must be limited to the designated footprint of the project area.
- Where vegetation has been cleared, site rehabilitation in terms of soil stabilization and re-vegetation must be undertaken.

Construction phase

- Construction activities need to be restricted to the areas demarcated by the project plans.
- No indigenous vegetation outside the demarcated project 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.

18. RECOMMENDATIONS FROM THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

The EAP is of the view that the Environmental Authorization may be granted on certain conditions that are outlined in this section. After an Authorization has been granted, it is the applicants' responsibility to ensure that all recommendations outlined in this report as well as in the EMPr are properly implemented.

18.1 Recommendations during construction

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, namely:

- a) Appoint an ECO to oversee and advise on site-specific environmental management requirements when needed.
- b) Mitigation measures for carbon footprint reduction must be considered to reduce risks of climate change.
- c) Construction vehicles and machinery must be kept in good working order so to avoid the generation of excessive noise levels.
- d) Storage areas must be managed properly by applying the suggested mitigation measures recommended in this document and EMPr.
- e) All employees and contractor staff must undergo environmental training covering the following areas: The Environmental Authorisation, the EMPr, Spill Management, Waste Management, Emergency Procedures and Evacuation Procedures.
- f) No workers are permitted to be accommodated overnight in the site except for essential security personnel.

- g) Only indigenous vegetation should be used during rehabilitation, and rehabilitation success should be monitored.
- h) Protected Areas and areas identified as critical for biodiversity or ecosystem maintenance, by the BSP, must be appropriately buffered from development and land use change impacts.
- i) Where possible limit the removal of existing trees or shrubs. The local community must take priority when it comes to employment and all skills that can be sourced from the local communities. Only specialized skills not available within must be sourced from outside of the surrounding communities.
- j) Ensuring that local suppliers, in particular SMMEs, are capacitated to provide goods and services to the hostels.
- k) Where technical construction skills are not available among local workers and builders in the immediate vicinity skills development programmes from the municipality should be run in conjunction with the project as far as is possible,
- l) Where local contractors and sub-contractors do not have the necessary capacity and business-to-business linkages to fully participate in the project, enterprise development programmes (such as contractor development programmes) are important to ensure that contractors have the capacity to better participate.
- m) All reasonable precautions must be taken to minimize noise generated on-site.

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. A Basic Assessment Report (BAR) 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 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 socio-economic option and that the preferred Alternative can meet the required objections to offset the No-Go option (subject to the implementation of recommended development mitigation measures). This Draft BAR (DBAR) 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 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.

This DBAR is available for a review and comment period of 30 days, from the 28th of September 2021 to the 8th of November 2021. Comments and submissions received in response to this report will be submitted to the competent authority.

Written submissions must be addressed to:

Emvelo Quality and Environmental Consultant (Pty) Ltd

Attention: **Ms Phumzile Lembede**

PO Box 101672, Meerensee, 3901

Tel: 035 789 0632 Fax: 086 577 5220

Email: admin@emveloconsultants.co.za

20. REFERENCES

Climate-Data.Org. Ndumo Climate. (Accessed from <https://en.climate-data.org/africa/south-africa/kwazulu-natal/ndumo-715226/#climate-graph> on 03 March 2021).

DEAT (2002) Stakeholder Engagement, Integrated Environmental Management, Information Series 3, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

DEAT (2002) Specialist Studies, Information Series 4, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

DEAT (2004a) Criteria for determining Alternatives in EIA, Integrated Environmental Management, Information Series 11, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

DEAT (2004b) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

DEAT (2006) Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations, 2006. Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

FitzPatrick Institute of African Ornithology (2019). MammalMAP Virtual Museum. [Accessed at: <http://vmus.adu.org.za/?vm=MammalMAP>].

FitzPatrick Institute of African Ornithology (2019). BirdPix Virtual Museum. [Accessed at: <http://vmus.adu.org.za/?vm=BirdPixMAP>].

Mucina, L. and Rutherford, M.C. 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute. Pretoria. pp 349-436.

National Planning Commission (NPC). 2012. Our Future – make it work. National Development Plan 2030. Pretoria, South Africa.

Weather Atlas (2002-2020) Monthly weather forecast and climate. Bergville. South Africa. <https://www.weather-atlas.com/en/south-africa/bergville-climate>.

APPENDICES

APPENDIX A. DECLARATION OF INFORMATION

I, the undersigned Phumzile Lembede, on behalf of **Emvelo Quality and Environmental Consultant**, hereby declare that the information provided in this application is correct and true.

02nd June 2021

Signature

Date

EAP

**Emvelo Quality and Environmental
Consultant**

Position

Company

APPENDIX B. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

APPENDIX C. SITE PHOTOGRAPHS AND LOCALITY MAPS

C-1: SITE PHOTOGRAPHS

C-2: LOCALITY MAP

APPENDIX D. SITE LAYOUT

APPENDIX E. PUBLIC PARTICIPATION PROCESS

E-1: PUBLIC PARTICIPATION PLAN

E-2: PRE-APPLICATION MEETING MINUTES

E-3: ONSITE NOTICES

E-4: NEWSPAPER ADVERT

E-5: REGISTER OF I&AP

E-6: BACKGROUND INFORMATION DOCUMENT

APPENDIX F: EAP'S CV(S)

APPENDIX G: SPECIALIST STUDIES

G-1: GEOTECHNICAL INVESTIGATION REPORT

G-2: HERITAGE IMPACT ASSESSMENT REPORT

G-3: TERRESTRIAL ECOLOGICAL STUDY REPORT

APPENDIX H: WEB-BASED ENVIRONMENTAL SCREENING REPORT