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**FINAL BASIC ASSESSMENT REPORT FOR THE  
PROPOSED CONSTRUCTION OF APPROXIMATELY  
2.1KM GRAVEL ROAD, OQUNGWENI WARD 3,  
WITHIN THE JURISDICTION OF ALFRED DUMA  
LOCAL MUNICIPALITY, KWAZULU NATAL PROVINCE.**



EDTEA Ref no.: DC23/0010/2019

## **COPYRIGHT WARNING**

This report has been prepared by ESIMZWA Environmental Services Pty (Ltd) for Siyandiza Consulting Engineers on behalf of Alfred Duma Local Municipality for conducting a Basic Assessment Report. This report is confidential to the client. We accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such parties rely on this report at their own risk.

This BA Report has been drafted in accordance with the EIA Regulations, 2014 and adheres to the requirements contained in Appendix 1 of GNR 982, as noted in Table 1.

**Table 1: Content of BA Report (2014 EIA Regulations)**

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
Appendix 1, Section 3 (a)	Details of – (i) The EAP who prepared the report; and the expertise of the EAP; and (ii) The expertise of the EAP, including a curriculum vitae.	Section 2 & Appendix 1
Appendix 1, Section 3 (b)	The location of the activity, including – (i) The 21-digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Section 3
Appendix 1, Section 3 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 3
Appendix 1, Section 3 (d)	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered; (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Section 4
Appendix 1, Section 3 (e)	A description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the	Section 5

	preparation of the report, and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools framework and instruments.	
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 6
Appendix 1, Section 3 (h)	<p>A full description of the process followed to reach the proposed preferred activity, site and location within the site, including-</p> <ul style="list-style-type: none"> <li>(i) Details of all alternatives considered;</li> <li>(ii) Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;</li> <li>(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;</li> <li>(iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</li> <li>(v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- <ul style="list-style-type: none"> <li>(aa) Can be reversed;</li> <li>(bb) May cause irreplaceable loss of resources; and</li> <li>(cc) Can be avoided, managed, or mitigated.</li> </ul> </li> <li>(vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</li> <li>(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic,</li> </ul>	<p>Section 7</p> <p>Section 8</p> <p>Section 8</p> <p>Section 9</p> <p>Section 11</p> <p>Section 11</p> <p>Section 12</p>

	<p>physical, biological, social, economic, heritage and cultural aspects;</p> <p>(viii) The possible mitigation measures that could be applied and level of residual risk;</p> <p>(ix) The outcome of the site selection matrix;</p> <p>(x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;</p> <p>(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.</p>	<p>Section 13</p> <p>Section 13</p> <p>Section 13</p> <p>Section 13</p>
Appendix 1, Section 3 (i)	<p>A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including-</p> <p>(i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and</p> <p>(ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.</p>	Section 11
Appendix 1, Section 3 (j)	<p>An assessment of each identified potentially significant impact and risk, including-</p> <p>(i) Cumulative impacts;</p> <p>(ii) The nature, significance and consequences of the impact and risk;</p> <p>(iii) The extent and duration of the impact and risk;</p> <p>(iv) The probability of the impact and risk occurring;</p> <p>(v) The degree to which the impact and risk can be reversed;</p> <p>(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and</p> <p>(vii) The degree to which the impact and risk can be avoided, managed or mitigated.</p>	Section 12
Appendix 1, Section 3 (k)	<p>Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been</p>	Section 10

	included in the final report.	
Appendix 1, Section 3 (l)	An environmental impact statement which contains- (i) A summary of the key findings of the environmental impact assessment; (ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Section 14
Appendix 1, Section 3 (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.	Section 15
Appendix 1, Section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 15
Appendix 1, Section 3 (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 16
Appendix 1, Section 3 (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 15
Appendix 1, Section 3 (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	Section 17
Appendix 1, Section 3 (r)	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and	Section 18

	(iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	
Appendix 1, Section 3 (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	N/A
Appendix 1, Section 3 (t)	Where applicable, any specific information required by the Competent Authority.	N/A
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	N/A

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**ACRONYMS**

BAR	Basic Assessment Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EDTEA	Department of Economic Development, Tourism and Environmental Affairs (KZN)
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GNR	Government Notice Number
I&APs	Interested and Affected Parties
IAR	Impact Assessment Report
IDP	Integrated Development Plan
KZN	KwaZulu Natal

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NEMA	National Environmental Management Act of 1998 as amended
NWA	National Water Act of 1998
PPP	Public Participation Process
SEPT	Spatial Environmental Planning Tool

## 1 INTRODUCTION

ESIMZWA Environmental Services (Pty) Ltd has been appointed by Siyandiza Consulting Engineers, on behalf of the Alfred Duma Local Municipality, to undertake the Basic Assessment process required for the proposed construction of the gravel road, Oqungweni Ward 3 within the jurisdiction of Alfred Duma Local Municipality, KwaZulu-Natal. The proposed project will include the widening of the road to accommodate a road reserve of 6 meters in width and 2.1km long gravel road crossing few watercourses which require Environmental Authorization from the Provincial Department of Economic Development, Tourism and Environmental Affairs (EDTEA).

In order to ensure that the proposed gravel road considers and manages the environmental attributes in all phases of the proposed gravel road, ESIMZWA Environmental Services (Pty) Ltd prepared an Environmental Management Programme (EMPr) to provide recommendations and guidelines according to which compliance monitoring can be undertaken during all phases of the proposed gravel road, including the construction and operational phases of the proposed gravel road, as well as to ensure that all relevant factors are considered to ensure an environmentally responsible proposed gravel road.

The application has been submitted as per GN R982 of the EIA Regulations, 2014 as amended. A Basic Assessment process must be undertaken in such a manner that the environmental outcomes, impacts and residual risks of the proposed Listed Activity being applied for are noted in the Basic Assessment Report and assessed accordingly by the Environmental Assessment Practitioner. In this regard, the requirements of the BA Process are noted in the amended EIA Regulations (2014), Listing Notice 1, Appendix 1 of GNR 326 and are consequently adhered to in this report (please refer to Table 1).

Ultimately, the outcome of the BA Process is to provide the Competent Authority (the Department of Economic Development, Tourism and Environmental Affairs), with sufficient information to provide a decision on the application in terms of Environmental Authorisation (EA), in order to avoid or mitigate any detrimental impacts that the activity may impose on the receiving environment.

## 2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

As previously mentioned, ESIMZWA Environmental Services (Pty) Ltd has been appointed by Siyandiza Consulting Engineer, on behalf of Alfred Duma Local Municipality, to undertake the Basic Assessment process required for the proposed construction of gravel road, Oqungweni Ward 3, Alfred Duma Local Municipality, KwaZulu Natal. Details of the qualified EAP involved in undertaking the BA Process are noted in Table 2 and the Curriculum Vitae (CV) of the relevant EAP is attached as Appendix 1.

**Table 2: Details of the EAP**

EAP	Qualifications & Professional affiliations	Experience	Contact details
Charmaine Mudau	BSc Hon. Environmental Science Cand. Sci. Nat Registration No: 118108 Water Institute of Southern Africa Membership No: 25894	7	Cell: (065) 867 2105
Bheki Mndawe, Environmental Consultant	MSc Environmental Management, IAIAsa' SACESHA	14 years	ESIMZWA Environmental Services (Pty) Ltd Tel: (072) 814 5409 Email: <a href="mailto:esimzwa@gmail.com">esimzwa@gmail.com</a>

## 3 LOCATION OF THE ACTIVITY

The proposed gravel road will be located at Oqungweni rural area approximately 60km north east of Ladysmith town via the P32 road and will cross through watercourses. The coordinates are detailed below in (Table 3).

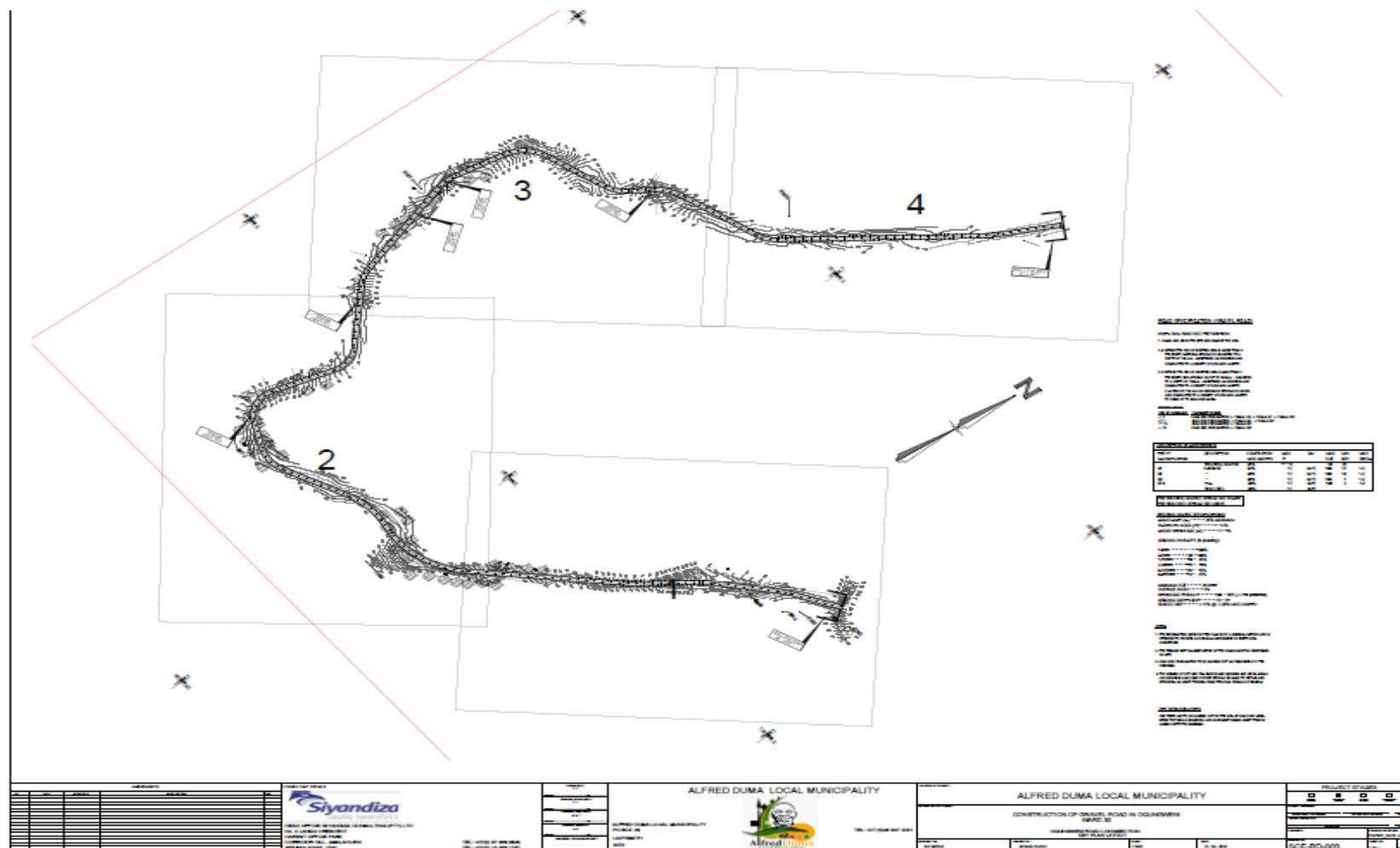
**Table 3: GPS coordinates of the proposed site**

<b>Start</b>	28°40'39.14" S; 30°12'28.77" E
<b>Middle</b>	28°41'09.39" S; 30°12'15.60" E
<b>End</b>	28°40'54.02" S; 30°12'37.06" E

A google map showing the proposed gravel road is included as Figure 1 and site layout plan as Figure 2 respectively.



**Figure 1: A map showing the proposed gravel road**





## 4 DESCRIPTION OF THE SCOPE PROPOSED ACTIVITY

### 4.1 Applicable Listed Activities

In terms of the amended EIA Regulations (2014), promulgated in terms of the National Environmental Management Act, 1998 (NEMA), certain Listed Activities are specified for which either a Basic Assessment (GN R983 and 985) or a full Scoping and EIA (GN R 984) is required. In terms of this Application, a proposed activity is a gravel road which requires an Environmental Authorization prior to the construction as the road crosses through the watercourses. The following is therefore applicable:

*GNR 983 - Item 19: "The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from (i) a watercourse."*

Watercourses are present on site which bisect the proposed gravel road. This will require the movement of 10m<sup>3</sup> or more into or from a watercourse.

Based on the above proposed activity a BA Process is required for the proposed gravel road.

### 4.2 Description of Activities, Associated Structures and Infrastructure

The activity includes construction of a gravel road 2.1 km's to link to villages and about 5 culverts of 600m (Culverts drawings included as Appendix 10). Subsistence vegetable gardens were identified adjacent to the road alignment. Any infrastructure damaged during construction will be re-established like for like, if not in a better condition. This includes fencing for vegetable gardens.

## 5 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

**Table 4: Applicable legislation, policies and/or guidelines.**

Title of legislation, policy or guideline:	Administering authority:	Date:
National Environmental Management Act (Act 107 of 1998) – for its potential to cause degradation of the environment.	Department of Environmental Affairs	1998
Environmental Conservation Act (Act 73) – for potential environmental degradation.	Department of Environmental Affairs	1989
National Water Act (Act 36 of 1998) – for potential to cause pollution of water resources defined under	Department of Water Affairs and Forestry	1998

the Act.		
Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) – for protection of agricultural resources and for control and removal of alien invasive plants.	National Department of Agriculture	1983
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) – for protection of biodiversity.	Department of Agriculture and Environmental Affairs & Ezemvelo KZN Wildlife	2004
The National Heritage Resources Act (Act No 25 of 1999 as amended) – for the identification and preservation of items of heritage importance.	Department of Arts and Culture (Amafa KwaZulu Natal)	1999
Guideline 4: Public Participation in support of the EIA Regulations (2005)	Department of Environmental Affairs and Tourism	2006
Guideline 7: Detailed Guide to Implementation of the Environmental Impact Assessment Regulations (2006)	Department of Environmental Affairs and Tourism	2007
uThukela District Municipal By-Laws	uThukela District Municipality	2015

## 6 NEED AND DESIRABILITY

The Oqungweni Community consists largely of informal and semi-rural settlements. Very little formal infrastructure exists to provide basic services to the community. Most of the existing roads are informal roads, which move between existing informal households. During the rainy season the informal roads become channels for stormwater which causes soil erosion. Additionally, as population increases in this area, the demand for transport will increase, thereby increasing the number of vehicles on the road, which results in further degradation of informal roads. The proposed gravel road will eliminate this problem and is a preferred site because it is located near the households and it will result in minimal environmental degradation with all mitigation measures implemented. The road will also link the two separated settlements.

## **7 MOTIVATION FOR THE PREFERRED SITE, ACTIVITY AND TECHNOLOGY ALTERNATIVE**

### **7.1 Preferred Site**

Prior to this application being lodged, an Engineering Assessment was undertaken to determine the suitable engineering requirements for the proposed construction of the gravel road. A Heritage Impact Assessment was also undertaken to determine if any items of cultural or historical value will be impacted during construction; and an Ecological Assessment was also undertaken to determine the impact that the proposed road would have on the surrounding terrestrial and riparian biophysical ecosystem.

The preferred site will result in short term negative impacts to rivers, wetlands, vegetation, fauna, residents and surrounding landowners, however if mitigation measures are adhered to these impacts will be reduced and managed throughout the construction phase. If the rehabilitation measures are implemented effectively, the area would benefit from positive impacts as a result of the road re-alignment and upgrade. Temporary job opportunities and skills development is expected during the construction phase of the road upgrade.

### **7.2 The No-go Alternative**

The no-go alternative would be not to construct the proposed road, and this would result in the following:

- There will be no change to the existing informal road and no formal access will exist Oqungweni community.
- There will be more soil erosion within the area;
- There will be aggravated potholes;
- There will be no disturbance to local fauna and flora;
- Unsafe transportation medium for vehicles.
- There will be no employment opportunities or skills development and/or transfer will be created for the surrounding community.

## **8 PUBLIC PARTICIPATION PROCESS**

The public participation process that was followed for proposed project is governed by Chapter 6 Section 41 of GNR. 982 of 04 December 2014 as amended and as outlined below:

### **8.1 Site Notice Boards**

Site notice boards were placed along the proposed site. The notices were written in English and later amended and translated to isiZulu. Please see Appendix 2. The purpose of this site notice boards was to inform the public of the proposed Basic Assessment application for the proposed gravel road. The details of the EAP was also provided, should any member of the public require additional information or wish to register as an Interested and Affected Parties (I&AP's) for the proposed project.

### **8.2 Written Notices**

An I&AP's register was compiled in terms of Section 42 of EIA Regulations, 2014. The register included all relevant organs of state, owners and occupiers of land adjacent to the properties earmarked for development and surrounding community. The register will regularly be updated. A copy of I&AP's register is included as Appendix 3.

### **8.3 Notification Letters**

The notification letters were compiled and circulated to all identified I&AP's by email and post. The purpose of the notification letters was to provide preliminary information regarding the project and its location. A copy of the notification letters is included as Appendix 4 of this report.

### **8.4 Draft BAR Circulation**

The Draft BAR was circulated to the following key stakeholders:

- Department of Water and Sanitation
- Department of Transport
- Department of Cooperatives Governance and Traditional Affairs
- Department of Agriculture, Forestry and Fisheries
- Amafa Heritage
- Ezemvelo KZN Wildlife
- Ward 3 Councillor

Another copy was placed at Oqungweni local school.

### **8.5 Newspaper Advertisement**

The newspaper advertisements were placed in the Ladysmith newspaper on 12 April 2019. The newspaper advertisements were published in English. Please see attached in Appendix 5.

### **8.6 Public Meeting**

A meeting was announced however it was poorly attended, the community are only interested on the start date and way of appointment.

### **8.7 Comments Received**

A summary of the comments and the response is included in the Final Basic Assessment Report.

## **9 DESCRIPTION OF THE BASELINE ENVIRONMENTAL ATTRIBUTES**

### **9.1 Geology**

The terrain within the Ladysmith is characterised as predominantly rolling terrain and secondary broken terrain. The slope within the Ladysmith is predominantly moderate however there are also some steep slope areas. The Grassland Biome is characterised by a topography that is mainly flat and rolling, and it includes the escarpment. The geology of Ladysmith area is characterised by shales, mudstones and fine-grained sandstones of the Eccra and Beaufort Groups and of the Karoo Supergroup. According to the Mucina L. and Rutherford M.C. (2006) the geology of the area is characterised by various Karoo Supergroup rocks such as Dwyka, Eccra and Beaufort Groups and limited Jurassic dolerite intrusions.

### **9.2 Topography**

The topography of the region is diverse and is characterised by hilly, undulating landscapes, broad valleys, moderate and steep slopes, rolling hills and flat plains. The dominant landscape features are valley slopes and undulating hills and the west of Ladysmith is characterised of small dolerite koppies and steeper slopes of ridges. Ladysmith is located on the foothills of the Drakensberg Mountains, approximately 26kms from the Van Reenen pass. The Drakensberg Mountain Range features approximately 60kms to the west and southwest. The Drakensberg Mountain Range forms the escarpment.

### 9.3 Climate, Rainfall, and Temperature

Alfred Duma Municipality is characterised by summer rainfall pattern with limited rainfall events in the winter months. The mean annual precipitation is approximately 700mm with 73% occurring between November and March. These high intensity rainfall conditions are conducive to high levels of surface runoff and subsequent erosion where soils are shallow, occur on steep slopes or are overgrazed. Erosion often occurs due to a combination of factors listed above. Frost is generally common with the area experiencing an average of 15 frost days per annum (SEPT, 2010).

The wettest month of the year is January with an average rainfall of 136mm while the driest month of the year is June with approximately 01 mm of rainfall. The long-term average rainfall specific to the site ranges from 550 – 880mm. The seasonality of precipitation is a driving factor behind the hydrological cycles of rivers and drainage lines within the area. Typically, rivers and drainage lines have a higher flow rate during the summer months. Temperatures are also relatively high with maximum temperatures ranging from 19.8°C in June to 28.9°C in January. The region is coldest in July with minimum temperatures of 1.9°C on average. The altitude of the study site is  $\geq 1185\text{m ASL}$  (SEPT, 2010).

### 9.4 Soils

The dominant soil classes present in the study area are undifferentiated texture contrast soils, with other soils in the area not tested, and are under the class of non-soil land class (SANBI, 2017). The dominant soil classes present in the study area have minimal development, usually shallow, on hard or weathering rock. There is also soils with a marked clay accumulation, strongly structured and non-reddish colour (SANBI, 2017). Geology terrain is braded by the predominately rolling terrain and the second broken terrain, the slopes range moderately but there are some steep slopes areas. As the municipality is dominated by the Grass and the Savanna biomes there are mainly flat plains and rolling within the escarpment itself. The landscape geology is characterized by mudstones, shales and fine-grained sandstones of the Beaufort and Eccu groups along with Karroo super-group and limited Jurassic dolerite intrusion (IDP 2015/2016).

### 9.5 Vegetation

The proposed study area is located within the Sub-Escarpment Grassland Bioregion and Grassland Biome (SANBI, 2017). The local municipality is comprised of the Grassland (25 0135 ha; 84%) and Savannah Biomes (46 348 ha; 15%) (Alfred Duma IDP, 2016-2017). According to the National Vegetation Map of Southern Africa

(2012), the surrounding vegetation associated with the study area is of the Northern KwaZulu-Natal Moist Grassland vegetation type.

This vegetation unit is distributed within the northern and north-western regions of the KwaZulu-Natal Province. This vegetation unit forms a discontinuous rim around the upper Thukela Basin and is situated almost entirely within the Thukela River Catchment. Moist Grassland veld is comprised of tall tussock grasslands dominated by *Themeda triandra* and *Hyparrhenia hirta*. This vegetation unit is typically associated with rolling and hilly landscapes. Encroachment of wooded vegetation (*Vachellia* spp) is often confined to valleys and disturbed areas embedded within the Sub Escarpment Grassland assemblages (SANBI, 2017).

It was investigated and found that the sections of the study area covered with Bushveld can be considered a remnant of the Thukela Valley Bushveld, with an occasional gradual transition to Thukela Thornveld. Vegetation was found to be relatively dense across.

Sections of the study area covered with Bushveld can be considered a remnant of the Thukela Valley Bushveld, with an occasional gradual transition to Thukela Thornveld. Vegetation was overall relatively dense, dominated by *Euclea crispa* in the 2-3m high shrub layer, with very sparse undergrowth. Occasionally, individual succulent- or other trees protrude from the shrub layer. Where the vegetation is more open due to either edaphic factors or cleared deliberately, there is a slightly denser low layer of vegetation, dominated either by grasses or succulents such as Aloes. Of all the habitats, the species diversity was highest in the Bushveld, but still much lower than the diversity would be for pristine vegetation. Table below are the most prominent species recorded in the Bushveld unit and a typical picture of the site (Detailed species are attached on the specialist report)

Growth Form	Species
Woody shrubs and trees	<i>Diospyros whyteana</i> , <i>Dombeya rotundifolia</i> , <i>Euclea crispa</i> s. <i>crispa</i> (d), <i>Rhamnus prinoides</i> , <i>Searsia dentata</i> , <i>Searsia rehmanniana</i> , <i>Searsia tumulicola</i> , <i>Vachellia natalitia</i> , <i>Vachellia sieberiana</i>
Dwarf shrubs	<i>Indigofera hiliaris</i> , <i>Lantana rugosa</i>
Grasses	<i>Eragrostis chloromelas</i> , <i>Hyparrhenia hirta</i> , <i>Melinis repens</i> s. <i>repens</i> , <i>Themeda triandra</i>
Forbs	<i>Dicliptera clinopodia</i> , <i>Hermannia depressa</i> , <i>Ocimum obovatum</i> , <i>Ruellia cordata</i> , <i>Sida spinosa</i>
Succulents	<i>Aloe greatheadii</i> , <i>Aloe mudenensis</i> , <i>Euphorbia ingens</i>
Observed species diversity	65 of which: <ul style="list-style-type: none"> <li>63 Indigenous species, including: <ul style="list-style-type: none"> <li>6 Protected species</li> </ul> </li> </ul>





## 9.6 Biodiversity

The study is situated between mountains or higher ridges, which are on its southern, western and northern sides. The new gravel road will basically be across the lower footslopes of these relatively steep mountains, forming a 'wide C'. It is thus not surprising that the proposed alignment is traversed by several smaller ephemeral drainage channels, which drain towards the Osimba River. Whilst the width and nature of these small drainages varies, the vegetation is not significantly different to the surrounding Bushveld. What is distinctive though is the increased height of the shrub layer, as well as a larger presence of low trees – the latter both microphyllous and broad-leaved. Also, where the channel is not overly shaded, there is usually a dense herbaceous layer. These channels are slightly to severely eroded, and also have a low to high cover of alien invasive plant species.

In addition to the drainage channels, towards the northern extent of the study area are small hillslope seepage areas. Although this is not strictly riparian vegetation, it is included in this habitat type as its dynamics are driven by higher seasonal soil moisture levels, and the road surface will have to be built with adequate drainage to prevent a rapid deterioration of the gravel road in these areas. The vegetation on these seepages is dominated by *Imperata cylindrica* (Cottonwool Grass). Below are the most prominent species recorded in the Riparian Vegetation unit.



Growth Form	Species
<b>Woody shrubs and trees</b>	<i>Euclea crispa s. crispa</i> , <i>Gymnosporia buxifolia</i> , <i>Olea europaea s. africana</i> , <i>Searsia dentata</i> , <i>Searsia rehmanniana</i> , <i>Vachellia karroo</i>
<b>Dwarf shrubs</b>	<i>Asparagus africanus</i>
<b>Grasses</b>	<i>Hyparrhenia hirta</i> , <i>Hyparrhenia tamba</i> , <i>Imperata cylindrica</i>
<b>Forbs</b>	<i>Cheilanthes viridis v. viridis</i> , <i>Ocimum obovatum</i>
<b>Geophytes</b>	<i>Eucomis sp.</i>
<b>Observed species diversity</b>	55 of which: • 50 Indigenous species, including: - 1 Protected species



There is a high biodiversity and endemism levels within the area attributed to the diversity of habitats and biophysical gradients. Due to the high biodiversity within the local and district municipalities, an efficient biodiversity management system is imperative to continue conservation of these sites and the ability of these sites to

achieve conservation targets. The combination of biodiversity and development as well as the coordinated planning between environmental organisations and prospective developers is a primary driver in the sustainable conservation of these sensitive areas.

The most significant concerns from a biological functioning perspective would be the impacts on water resources; water pollution, faunal impacts, loss of protected vegetation composition and protected plant species, as well as the encroachment of alien plant species and lack of habitat connectivity. The maintenance of landscape connectivity and ecological corridors are important for the persistence of functioning ecological systems. Currently the Tugela Drift Nature Reserve is the only formal protected area within the municipality (Alfred Duma Municipality IDP, 2016-2017). Due to continual development, floral and faunal diversity outside of protected areas are vulnerable to habitat loss.

## **9.7 Hydrology**

The study area falls within the Eastern Escarpment Mountains Ecoregion. The proposed gravel road upgrade project falls within Thukela Water Management Area (WMA). The Thukela Water Management Area (WMA) consists of the entire catchment of the Thukela River. The Thukela River rises in the Drakensberg Mountains, close to the border with Lesotho, and meanders through central KwaZulu-Natal and discharges into the Indian Ocean.

The Upper Thukela lies upstream of the confluence with the Bushmans River, and includes the towns of Bergville, Ladysmith, Colenso and Weenen (DWAF, 2004). The major rivers within the Water Management Area catchment are the Thukela, Sundays and Klip Rivers. These rivers experience significant levels of high-water demand related stress, particularly during drought seasons. Many of these surrounding communities rely on fresh water from these rivers throughout the year (DWAF, 2004).

The dominant land use surrounding the road upgrade site is low density rural homesteads, subsistence agricultural and grazing land. Historic impacts experienced by this catchment include the replacement of indigenous grassland and riparian vegetation with alien invasive species, conversion and over utilisation of grasslands and degradation of wetland systems by agricultural land as well as erosion (due to overgrazing and degraded soil profiles). The transformation of biophysical characteristics causes impacts such as erosion, sedimentation and reduced water quality within the catchment.

## 9.8 Cultural, Historical and Archaeological Resources

The heritage assessment could not find any heritage sites or features on the footprint. A rock art site occurs approximately 7km to the north east of the footprint at S 28° 38' 23.71" E 30° 15' 25.85" (Fig 3). The development will not threaten this heritage sites. As contemplated on the heritage assessment, there are no apparent heritage sites on the proposed footprint, however, should they be encountered during construction further investigation must be conducted. There is no need for mitigation graves may occur in association with rural homesteads in the area. Some homesteads are situated almost immediately adjacent to the existing road (Fig 3). It is therefore recommended that the developer maintains a buffer of at least 10m around all homesteads in the area.

It can be argued that the dispersed Nguni settlement pattern as observed in sections of the project area is part of a bigger "cultural landscape" as this settlement pattern predates European settlement of the sub-continent. However, it must be noted that the proposed road upgrade follows the existing road network that already exists in the project area. The impact of this development on the "cultural landscape" will be minimal – if any. The detailed study is attached on the report.

## 9.9 Air Quality

Air quality is not a problem within the proposed site as there are no companies or industries around the area. However, informal roads may result to minor dust nuisance due to vehicles using these roads.

## 9.10 Socio-Economic

Alfred Duma Local Municipality forms part of the UThukela District Municipality, with Ladysmith and Colenso as main urban areas. Ladysmith is the primary urban area, located along the N11 national route, 20 kilometres off the N3 national route (IDP, 2016/2017). The population of Ladysmith local municipality is largely dominated by African ethnicity, which makes up about 92% of the population. The area has a number of primary and high school and only one tertiary institution.

There are two main hospitals that serve the whole municipality and surrounding regions (IDP, 2016/2017). The priority development issues for Alfred Duma Local

Municipality are physical infrastructure and services; social development and services; economic development; land reform, etc. Urban areas have far more services than rural ones but a much smaller population, indicating a clear imbalance in service provision (IDP, 2016/2017). The Driefontein Complex has been identified as an area for priority spending. It has the highest population concentration but the lowest service standards.

#### **9.10.1 Level of Employment**

In Alfred Duma Local Municipality about 72 249 people are economically active (employed or unemployed but looking for work), and of these, 34.0% are unemployed. Of the 39 523 economically active youth (15 – 35 years) in the area, 43.4% are unemployed.

#### **9.10.2 Economic Profile**

Alfred Duma Local Municipality currently relies on subsistence agriculture, fishing and forestry; mining and quarrying; manufacturing; water; electricity; construction; wholesale and retail trade government services, government grants and migrant worker income to sustain its residents. There is extremely limited agricultural potential due to settlement pressure, traditional farming methods, poor bio-resource groupings and limited irrigation potential. Most residents sustain their families through subsistence agriculture or wage work in factories in and around Ladysmith, Estcourt and Weenen. One of the major economic issues facing the municipality is the fact that there are no major markets for the delivery and resale of products in the municipal area, and development nodes are minimal.

#### **9.10.3 Level of Education**

There are no institutions of higher learning within the municipality. After matriculation, children either go to Ladysmith Technical College to further their studies or move out of uThukela District. The latter is not always practical and affordable as most people in the area cannot afford to provide their children with better education opportunities outside of the municipal area as the cost is too much. At primary and secondary levels, the facilities are distributed all over the municipality and these are well utilized by the communities. There is, however, a need to extend or renovate most of the schools, as most are unsuitable for proper education purpose. Of those aged 20 years and older,

4,6% have completed primary school, 33,2% have some secondary education, 30,9% have completed matric, and 9,0% have some form of higher education, while 8,1% of those aged 20 years and older have no form of schooling.

### **9.11 Current Land Use**

The pproject site is surrounded by informal settlements and informal roads. A number of subsistence vegetable gardens are present throughout the area.

## **10 SPECIALISTS STUDIES**

The following studies were recommended by the department and were under

- Ecological assessment
- Desktop Heritage Impact Assessment
- Geotechnical study

## **11 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY**

The EIA Regulations, 2014, prescribes requirements to be adhered to and objectives to be reached when undertaking Impact Assessments. These are noted in the following sections contained within the EIA Regulations (2014):

- Regulation 982, Appendix 1, Section 3 Basic Assessment Impact Requirements; and

In terms of these Regulations, the following should be considered when undertaking an Impact Assessment:

- Nature of the impact;
- Significance of the impact;
- Spatial Extent of the impact
- Duration of the impact;
- The probability of the impact occurring;

A combined quantitative and qualitative methodology are used to describe impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in Table 5 below.



**Table 5: Quantitative rating and equivalent descriptors for each of the impact assessment criteria.**

RATING	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE
1	Very Low	Study Area	Incidental
2	Low	Local	Short-term
3	Moderate	Regional	Medium-term
4	High	National	Long-term
5	Very High	Global	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

### 11.1 Nature of Impact

The environmental impacts of a project are those resultant changes in environmental parameters, in space and time, compared with what would have happened had the project not been undertaken. It is an appraisal of the type of effect the activity would have on the affected environmental parameter. Its description includes what is being affected, and how.

### 11.2 Significance Scale

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1000 km<sup>2</sup>) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type was known. The impact would be VERY LOW if the grassland type were common. A more detailed description of the impact significance rating scale is given in Table 3 below.

**Table 6: Description of significance rating scale**

RATING	DESCRIPTION
5	Very High Impact of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial

		impacts, there is no real alternative to achieving this benefit.
4	High	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	Moderate	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	Very Low	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity is needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	No Impact	There is no impact at all - not even a very low impact on a party or system.

### 11.3 Spatial Extent of scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale which is described in more detail in Table 7.

**Table 7: Description of the Spatial (extent) Scale**

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible and will be felt at a regional scale (District Municipality to Provincial Level).
3	Local	The impact will affect an area up to 5 km from the proposed site.
2	Study Area	The impact will affect an area not exceeding the Boundary of the study site
1	Isolated Sites/Proposed Site	The impact will affect an area no bigger than the development footprint.

### 11.4 Temporal Scale

In order to accurately describe the impacts, it is necessary to understand the duration and persistence of an impact on the environment. The temporal scale is rated according to criteria set out in Table 8.

**Table 8: Description of the temporal rating scale**

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium-term	The environmental impact identified will operate for the duration of life of plant.
4	Long-term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.



### 11.5 Degree of Probability

Probability or likelihood of an impact occurring is described in terms of the risk assessment procedure currently in use by the plant. The description of probability is shown in Table 9 below.

**Table 9: Description of the degree of probability of an impact accruing**

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen/has occurred

### 11.6 Degree of Certainty

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard “degree of certainty” scale is used as discussed in Table 10. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

**Table 10: Description of the degree of certainty rating scale.**

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring
Possible	Between 40 and 70% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact, or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

## 12 IMPACTS IDENTIFIED AND MITIGATION MEASURES

The preferred site will create limited environmental damage given that there are minor environmental attributes in the area and the site will be accessible to every households. There are no other alternative exists that would meet the need and desirability of this application. No other reasonable and/or practical technology alternative exists that would meet the need and desirability of this application other than the proposed technology. The no-go alternative is to not construct the gravel road. The informal roads will continue to function as they do in their current state, resulting in continued degradation, soil erosion and the continuation of an unsafe medium for transportation.

The potential impacts as identified by the specialists, and the EAP, and utilising the ranking scales for environmental risk assessment as mentioned above will be provided in this section. All potential impacts associated with the proposed gravel road during the planning, construction and operation of the project lifecycle have been considered and assessed in the following sections including mitigation measures. Since the activity is expected to be permanent in nature, the decommissioning phase impacts have not been considered in this report.

The impacts identified for the proposed construction of the road and the associated mitigation measures are provided in Table 11 below.

**Table 11: Impacts identified and associated mitigation measures**

IMPACT	DESCRIPTION	MITIGATION
Potential Impact on Soil	<ul style="list-style-type: none"> <li>• Potential disturbances include compaction, physical removal and potential pollution;</li> <li>• The exposed soil surfaces have the potential to erode easily if left uncovered which could lead to the loss of vegetation;</li> <li>• Potential loss of stockpiled topsoil and other materials if not protected properly;</li> <li>• Insufficient stormwater control measures may result in localised high levels of soil erosion, possibly creating dongas or gullies, which may lead to decreased water quality in surrounding watercourses;</li> <li>• Increased erosion could result in increased sedimentation which could impact on ecological processes;</li> <li>• The additional hardened surfaces created</li> </ul>	<ul style="list-style-type: none"> <li>• Soil erosion prevention measures should be implemented such as gabions, sandbags etc. whilst energy dissipaters should be constructed at any surface water outflow points. The sites should be monitored weekly for any signs of off-site siltation. All areas impacted by earth-moving activities should be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding. All exposed earth should be rehabilitated promptly with suitable vegetation to stabilize the soil; and</li> <li>• Any exposed earth should be rehabilitated promptly with suitable vegetation to protect the soil. Vigorous grasses planted with fertiliser are very effective at covering exposed soil. It is important to note, that the use of fertilisers, must be undertaken with caution and must not be allowed, in any circumstances, to run into drainage lines/wetlands, to avoid any possible eutrophication impacts.</li> </ul>

	<p>during construction will increase the amount of stormwater runoff, which has the potential to cause erosion;</p> <ul style="list-style-type: none"> <li>• Physical disturbance of the soil and plant removal may result in soil erosion/loss; and</li> <li>• Erosion and potential soil loss from cut and fill activities.</li> </ul>	
Potential Impacts on Vegetation and fauna	<ul style="list-style-type: none"> <li>• Disturbance of the site may lead to encroachment of alien plant species on-site and to the surrounding areas;</li> <li>• Increase in alien invasive species, therefore a possible loss in biodiversity;</li> <li>• Potential off-site pollution as a result of accidental spillages of petrochemicals or bituminous substances; and</li> <li>• Increase in road strikes of birds and wildlife, especially slow-moving organisms such as frogs.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal clearing of vegetation to site only will have low impacts. Site personnel must undergo Environmental Training and be educated on keeping any vegetation and faunal disturbance to a minimum;</li> <li>• Poaching or harvesting of indigenous flora / fauna is strictly forbidden;</li> <li>• Alien plant encroachment must be monitored and prevented as outlined in the EMP; and</li> <li>• All exposed earth should be rehabilitated promptly with suitable vegetation to protect the soil. Vigorous grasses planted with fertiliser are very effective at covering exposed soil. Necessary rehabilitation measures (e.g. burning, seeding, removing alien plants etc.) should be introduced to ensure species composition reverts to a more natural state (with regards to affected areas). Indigenous vegetation with deep set root systems are advisable to limit soil loss on site. Alternatively,</li> </ul>

		<p>water dissipating mechanisms such as gabions may be implemented on site to help stabilize the surrounding soil and provide a platform for the growth of vegetation.</p> <ul style="list-style-type: none"><li>• No hunting is permitted on site or the surrounding areas;</li><li>• No animals required for hunting e.g. dogs, under the supervision of construction workers, should be allowed into the area. All construction personnel on the property should be informed of this ruling;</li><li>• Any construction personnel found to be poaching in the area should be subjected to a disciplinary hearing; and</li><li>• Soil erosion must be monitored, and any scars must be repaired.</li><li>• It is suggested that these trees be identified and marked during the survey stages of the project to determine if they will be impacted upon by the road upgrading.</li><li>• It is recommended that when the final design is available for the road alignment a specialist is to identify and mark all these trees that might be affected along the alignment</li><li>• To further ensure that watercourses are not impacted upon by the road, it is suggested that the boundary of the watercourses plus a 32 metre buffer be demarcated along the edge of the watercourse that is nearest to the road and be designated as a “no-go” area during the construction phase.</li></ul>
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		<ul style="list-style-type: none"> <li>It is believed that the establishment of the gravel road will not impact on the present ecological conditions that prevail in the watercourse. This can be further ensured by demarcating a 32-metre buffer from the edge of the watercourse between the watercourse and the road that must be classified as a “no-go” area during the construction process. The watercourse should also under no circumstances be used as a source of water for any of the construction activities</li> <li>Landscaping and the planting of indigenous plants will be carried out along the footprint of the proposed roads upgrade footprint to ensure the stabilisation of the embankments.</li> </ul>
Potential Impacts on Air quality and noise pollution	<ul style="list-style-type: none"> <li>Potential dust generation from soil stripping, vehicle traffic on the access roads and motor vehicle fumes will have an impact on air quality;</li> <li>Potential increase in noise from the operation of machinery and equipment, as well as the construction vehicle traffic;</li> <li>Dust and noise will be created during the Construction Phase, which may impact on the local community; and</li> <li>Disruption to residents through increased</li> </ul>	<ul style="list-style-type: none"> <li>All construction machinery and equipment must be regularly serviced and maintained to keep noise, dust and possible leaks to a minimum, as per the requirements of the EMP; and</li> <li>Road dampening must be undertaken to prevent excess dust during construction.</li> <li>All construction machinery and equipment must be regularly serviced and maintained to keep noise, dust and possible leaks to a minimum, as per the requirements of the EMP;</li> <li>Operational Hours: No works shall be executed between sunset and sunrise and on the non-working and special non-working days as stated in the Contract Data unless otherwise agreed between the Engineer and</li> </ul>

	activity, noise and dust pollution in the area	<p>Contractor; and</p> <ul style="list-style-type: none"> <li>• Construction personnel must be made aware of the need to prevent unnecessary noise such as hooting and shouting.</li> <li>• A Community Liaison Officer should be appointed in order to could inform residents of commencement of works, duration and who to lodge complaints with.</li> </ul>
Potential Impacts on Waste	<ul style="list-style-type: none"> <li>• There is potential for the site and surrounding areas to become polluted if construction activities are not properly managed (e.g. oil/bitumen spills, litter from personnel on-site, sewage from ablutions etc.); and</li> <li>• Waste generation could be created by the following: <ul style="list-style-type: none"> <li>• Solid waste - plastics, metal, wood, concrete, stone, asphalt;</li> <li>• Chemical waste- petrochemicals, resins and paints; and</li> <li>• Sewage as may be generated by employees.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials is supported;</li> <li>• All solid wastes should be disposed of at a registered landfill site and records maintained to confirm safe disposal;</li> <li>• Adequate scavenger-proof refuse disposal containers must be supplied to control solid waste on-site;</li> <li>• It should be ensured that existing waste disposal facilities in the area are able to accommodate the increased waste generated from the proposed construction;</li> <li>• Chemical waste must be stored in appropriate containers and disposed of at a licensed disposal facility;</li> <li>• Portable sanitation facilities should be erected for construction personnel. Use of these facilities should be enforced (these facilities should be kept clean so that they are a desired alternative to the</li> </ul>

		<p>surrounding vegetation). These facilities should also be monitored and serviced regularly so as to prevent contamination of the water resources.</p> <ul style="list-style-type: none"> <li>• The construction site should be inspected for litter on a daily basis. Extra care should be taken on windy days.</li> <li>• Soil that is contaminated with, e.g. cement, petrochemicals or paint, must be disposed of at a registered waste disposal site.</li> <li>• It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical contamination of the environment (ground and surface water and soil contamination). Hazardous substance storage must not take place within 100m of a wetland or within the 1:100 year floodline; and</li> <li>• Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / Municipality etc.) and must be remediated as per the EMPr.</li> </ul>
Potential Impact on Socio-	<ul style="list-style-type: none"> <li>• Creation of job opportunities for skilled personnel (e.g. engineers, specialists etc.) and non-skilled personnel (e.g. labourers);</li> </ul>	<ul style="list-style-type: none"> <li>• Inform the surrounding communities and general public of the proposed activity as soon as possible. This will serve to ease potential social anxiety. Such notification has been conducted through the Public Participation Process;</li> </ul>



Economic Activities	<ul style="list-style-type: none"> <li>• Skills development of the local community through employment opportunities;</li> <li>• Social anxiety may arise should the surrounding community not be adequately notified of the proposed activity; and</li> <li>• Possible economic benefits to local suppliers of building materials as goods and services may be purchased from these entities during the construction phase.</li> </ul>	<ul style="list-style-type: none"> <li>• Local people should be employed where possible; and</li> <li>• A Community Liaison Officer could assist in raising any concerns / complaints noted by the affected community to the Construction Team.</li> </ul>
Potential Impacts on Safety and security	<ul style="list-style-type: none"> <li>• There is potential for construction labour to trespass onto neighbouring properties; and</li> <li>• Construction personnel / construction vehicles movement of construction personnel and vehicles may pose a potential health and safety risk to road users and local residents.</li> </ul>	<ul style="list-style-type: none"> <li>• Any construction personnel found to be trespassing must be subjected to a disciplinary hearing;</li> <li>• Construction workers' / construction vehicles should take heed of normal road safety regulations; thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner should be enforced and maintained so as not to cause harm to any individual; and</li> <li>• A designated speed limit should be set by the developer to limit possible road strikes.</li> </ul>

<p>Potential Impacts on Water Resources</p>	<ul style="list-style-type: none"> <li>• Contamination of ground and surface water and soil;</li> <li>• Accidental spillages of petrochemicals from vehicles and equipment, or concrete;</li> <li>• The additional hardened surfaces created during construction will increase the amount of stormwater runoff, which has the potential to cause erosion and create turbidity;</li> <li>• Possible damage to the riparian surrounds;</li> <li>• Risk of initiating erosion gullies; and</li> <li>• Construction of a bridge and the associated impacts from working within a watercourse.</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate stormwater / surface water management measures must be put in place before construction commences and maintained throughout the lifetime of the development;</li> <li>• An appropriate number of toilets (1 toilet for every 20 workers) must be provided for labourers during the Construction Phase. These must be maintained in a satisfactory condition and a minimum of 100m away from any water resources and outside of the 1:100 year floodline,</li> <li>• Any contaminated water associated with construction activities must be contained in separate areas or receptacles such as Jo-Jo tanks or water- proof drums, and must not be allowed to enter into the natural drainage systems;</li> <li>• The Construction Camp must be positioned on previously disturbed areas (if possible) and outside of the 1:100-year floodline or 100m away from wetland areas, whichever is the greatest;</li> <li>• Soil erosion prevention measures must be implemented such as gabions, sandbags etc. whilst energy dissipaters must be constructed at any surface water outflow points. The site should be monitored by the Contractor weekly for any signs of off-site siltation. All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding;</li> <li>• Appropriate silt control mechanisms must be installed around all soil</li> </ul>
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		<p>excavations to prevent silt from entering the surrounding watercourses;</p> <ul style="list-style-type: none"><li>• Should any excavations require dewatering, this is to occur through an adequately designed silt trap prior to discharge. All silt traps are to be regularly monitored and maintained to ensure efficient and effective use;</li><li>• Landscaping and the planting of indigenous plants will be carried out along the footprint of the proposed roads upgrade footprint to ensure the stabilisation of the embankments;</li><li>• Sandbag berms will be placed at regular intervals on all steep slopes and on the trench line before and after backfilling in order to minimise erosion and the discharge of contaminated stormwater runoff onto water courses;</li><li>• At the end of the construction phase, the site must be fully revegetated to match the pre-construction condition.</li><li>• Temporary restriction of watercourses required during construction, must take place during the dry season;</li><li>• The construction servitude within watercourses must be kept to 30 metres in width;</li><li>• Should water be pumped from the dry working space within the watercourse, this water must be pumped into a retention dam/silt lagoon (or similar structure) to ensure sediment settles and clean water is released back into the watercourse;</li></ul>
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		<ul style="list-style-type: none"> <li>• No material may be stored for longer than 24-hours within the working area within watercourses. Materials sufficient for the day's work may only be allowed within the working area within the watercourse; and</li> <li>• Construction within watercourses must be monitored by the ECO on a weekly basis.</li> </ul>
Potential Impacts on Heritage	Uncovering of heritage artefacts.	<ul style="list-style-type: none"> <li>• The KwaZulu-Natal Heritage Act requires that all operations exposing archaeological and historical residues should cease immediately pending an evaluation by the heritage authorities.</li> <li>• Strictly maintain a buffer zone of 30 metre around the two Stone Age Sites. No development or removal of artefacts may take place within this zone.</li> <li>• Strictly maintain a buffer zone of 35 metre around the grave sites identified in this study area. Should the developer decide to translocate graves then a Phase Two Heritage Impact Assessment by a grave relocation expert must be initiated. A process of community consultation and negotiation must be initiated to facilitate such a process.</li> <li>• It must also be pointed out that the KwaZulu-Natal Heritage Act requires that operations exposing graves, as well as archaeological and historical residues should cease immediately pending an evaluation by the heritage authorities.</li> </ul>

### 13 IMPACT ASSESSMENT

The impact assessment findings in relation to the proposed construction activities are listed below in Table 12.

**Table 12: Assessment of impacts**

	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
<b>CONSTRUCTION IMPACTS</b>	Potential Impacts on Soil	1	1	3	2	3	2	1	1	1	0.3	0.2	2.7	1.4
	Potential Impacts on Flora and Fauna	1	1	3	2	3	2	1	1	1	0.3	0.2	2.7	1.4
	Potential Impacts on Air quality and Noise Pollution	2	1	4	3	3	1	1	1	1	0.4	0.3	4.4	2.1
	Potential Impacts Waste	2	1	3	2	3	1	1	1	1	0.4	0.2	4	1.2

Potential Impacts on Socio-economic Activities	2	2	4	4	3	3	1	1	1	0.4	0.4	4.4	2.4
Potential Impacts on Safety and Security	1	1	4	3	3	1	1	1	1	0.3	0.2	3	1.4
Potential Impacts on Water Resources	3	2	5	2	4	3	4	3	1	0.4	0.2	5	2.4
Potential Impacts on Heritage	2	1	3	2	3	1	1	1	1	0.1	0	1	0
Overall impact significance												<b>MEDIUM</b>	<b>LOW</b>

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## **14 SIGNIFICANCE**

Based on the outcome of the significance scoring noted in Table 12, the overall significance impact without mitigation, is considered to be MEDIUM, with mitigation, the overall significance impact is considered to be LOW.

The greatest impact of significance is considered to be the potential for water resource impacts, while air quality and noise impacts, traffic impacts and socio-economic impacts are rated as the second highest possible impact. However, with the correct mitigation measures employed as noted in Table 12 and as per the EMPr (Appendix 6), these impacts can be significantly reduced. As such, it is the recommendation of the EAP that the preferred site and the preferred technology should be adopted.

## **15 ENVIRONMENTAL IMPACT STATEMENT**

Assuming all phases of the project adhere to the conditions stated in the EMPr (Appendix 6) it is believed that the impacts associated with the proposed construction will have limited to no significant, adverse, long term environmental impact on the surrounding environment. Positive impacts associated with construction include:

- Local economic growth and development;
- Employment opportunities and skills development; and
- Improved road networks.

It is perceived that these impacts will be long term and have sustainable benefits. It must be ensured that the construction phase, in no way, hampers the health of any of the ecological systems or items of heritage significance identified on site, and that post-construction rehabilitation leaves the surrounding environment in and as good, if not better, state.

After the construction phase of the project, the contractors must ensure that all hazardous materials are removed from the site and that Rehabilitation plan is drawn up and approved by the Project Manager and the ECO in according to the requirements of the EMPr.

The Project Manager and Contractor must ensure that an Alien Plant Management Programme is drawn up and approved by the Project Manager and the ECO and implemented during the construction phase and must be maintained during the

construction defects/liability period. It is also critically important that drainage lines are kept free of alien plant infestation.

## 16 RECOMMENDATIONS OF THE EAP

The proposed development should not result in impacts on the natural or social environment that are highly detrimental, nor result in undue risks to the natural environment. The nature and types of negative impacts do not outweigh the potential benefits of this project, provided that the short-term localised impacts of the construction phase are adequately mitigated. In this regard, an EMPr has been compiled and is attached to this report (see Appendix 6).

It is the recommendation of the EAP that the following management and mitigation measures be incorporated into any project approvals which may be issued:

- Prior construction the contractor must produce a method statement indicating how the construction process will be undertaken. Most important in this statement will be consideration of the impacts on the watercourse crossings and the associated mitigation measures;
- Ideally, the construction work should be done in the dry season when plants are aging, and stream flows are at their lowest;
- All conditions and requirements of the project Environmental Management Programme (EMPr) (Appendix 6) must be adhered to; and
- All recommendations noted in the specialist report must be adopted and followed by the contractor
- Careful handling of road construction materials, including soil, rock, gravel, stone, tar, etc. so as to prevent their spillage into the watercourses must be done;
- Stockpiles and spoil piles must be set well back from the stream channel so that no material may be washed into the channel;
- During the construction process care must be taken to ensure that no wastes of any sort are allowed to enter the stream channels. Suitable disposal bins/containers must be provided and must be serviced regularly as needed;
- Protection of the stream banks during the construction phase and ensuring that the banks are not pushed, or allowed to slump, into the stream channel;
- Rehabilitation of the stream banks at the end of the construction phase must be used so as to ensure that they are stable and will not erode or slump into the stream channel.



- No mixing of cement or concrete may be done within 5m of a stream channel and there will be no mixing of cement on bare ground, impervious material will be used to prevent such;
- Care must be taken to ensure that no hydrocarbons (fuels, oils, tars) are allowed to enter the watercourses; and
- Chemical toilets must be provided for the use of the construction workers and must be regularly serviced.

Further, in terms of Environmental Monitoring, the following is recommended:

- An ECO must audit the site once a month during construction until completion of the rehabilitation phase of the project; and
- The Project Manager is responsible to ensure that an Environmental Audit Report is submitted to the EDTEA: Compliance and Monitoring for the duration of the construction period.

All of the above recommendations have been incorporated into the EMPr (Appendix 6).

Based on the above, it is the opinion of the EAP that application should be granted a positive decision on Environmental Authorisation.

## **17 ASSUMPTIONS, UNCERTAINTIES AND GAPS**

The following assumptions and limitations accompany the basic assessment exercise for the proposed construction of gravel road project:

- It is accepted that the project motivation and description, as obtained from the applicant, is accurate.
- It is assumed that the baseline information scrutinised and used to explain the environmental profile is accurate.

## **18 CONSTRUCTION TIMEFRAMES**

Construction timeframes have not been estimated as yet, however, it is assumed that the construction of the gravel road will take approximately 12 months to complete, as such it is requested that the Environmental Authorisation, if issued by the Competent Authority, be valid for a period of three (3) years from the date of signature.

## **19 AFFIRMATION BY EAP**

ESIMZWA Environmental Services (Pty) Ltd hereby confirms that the information provided in this report is correct at the time of compiling the report.

**EAP:** Bheki Mndawe

**Date:** 02 September 2019

## REFERENCES

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## **APPENDICES**

## Appendix 1: Details of the EAP (Curriculum Vitae)

## Appendix 2 to 5: Public Participation









## Appendix 6: Environmental Management Programme

## Appendix 7: Ecological Assessment Report

## Appendix 8: Heritage Impact Assessment

## Appendix 9: Geotechnical Investigation Report