HANSLAB (PTY) Ltd

ENVIRONMENTAL AND GROUND ENGINEERING SPECIALIST

2017

DRAFT BASIC ASSESSMENT REPORT

PROJECT NAME: UPGRADE OF SQUBUDU Ext

AREA/MUNICIPALITY: NQUTHU MUNICIPALITY

CLIENT: KZN DOT DUNDEE

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Department :
Economic Development, Tourism and Environmental Affairs
PROVINCE OF KWAZULU-NATAL

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

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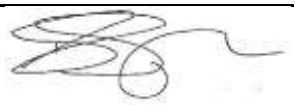
SIGNED	
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EXECUTIVE SUMMARY

The KwaZulu-Natal Department of Transport (Applicant) proposes to upgrade Squbudu Extension from an existing mud track, to a type 7A gravel road within the Nquthu Municipality. The existing mud track is 4.284 km in length. The road traverses three major watercourses, therefore, the applicant proposes to construct portal culvert causeway structure and pipe culverts at the major crossing points to allow for the natural flow of water within the channel.

According to the risk rating after all significant impacts were taken into consideration, the preferred route is said to have a **low environmental significance** after all impacts were rated individually. The impacts are related to the construction phase of the project, the identified impacts will be mitigated against should all recommendations outlined in the attached EMP be strictly adhered. The impacts are short term, local in extent, not intense in its effect and may not be likely to occur.

SECTION A: ACTIVITY INFORMATION

PROJECT TITLE:

The proposed construction of portal culvert causeway structure and pipe culverts along Squbudu Ext. as part of the road upgrade, within the Nquthu Local Municipality.

PROJECT DESCRIPTION:

The KZN Department of Transport (Applicant) proposes to upgrade Squbudu Ext from a mud track to a type 7A gravel road. The road will be approximately 4.284 km in length, 6 m in width with a road reserve of 20m which conforms to the DOT standards for local road upgrades. The road traverses three major watercourses, therefore, the applicant proposes to construct portal culvert causeway structure and pipe culvert structures at the major crossing points to allow for the natural flow of water within the channel.

- **Pipe Culvert Structure:**

  Two alternative designs for the pipe culvert structures have been outlined below and will be assessed within the DBAR:

  - **Design Alternative 1:** Precast concrete pipe culvert and associated headwalls;
  - **Design Alternative 2:** Concrete pipe culvert with stone pitched/ gabion headwalls.

- **Causeway Structure – Portal Culvert Causeway**

  It must be noted that only one alternative has been investigated w.r.t the causeway structure design, as the designs have taken into consideration best practice in terms of engineering and minimizing the impacts to the receiving environments.

The listed activities below are triggered as per the EIA Regulations of 2014 (*Listing Notice 1, GNR 983*):

Listing Notice 1 of 2014, Listed Activity 12:

The development of –

***(iii)* bridges exceeding 100 square meters in size;**
(xii) infrastructure or structures with a physical footprint of 100 square meters or more.

where such development occurs-

(a) within a watercourse.

DESCRIPTION OF ACTIVITY:

The Department of Transport (DOT) proposes to construct a portal culvert causeway structure. Based on DOT standard details for a portal culvert causeway structure, the approximate width is 8.45m and length is 7.4 m which varies according to the stream width. The physical footprint of the activity is greater than 100 m^2 and therefore triggers activity 12 of listing notice 1 as mentioned above.

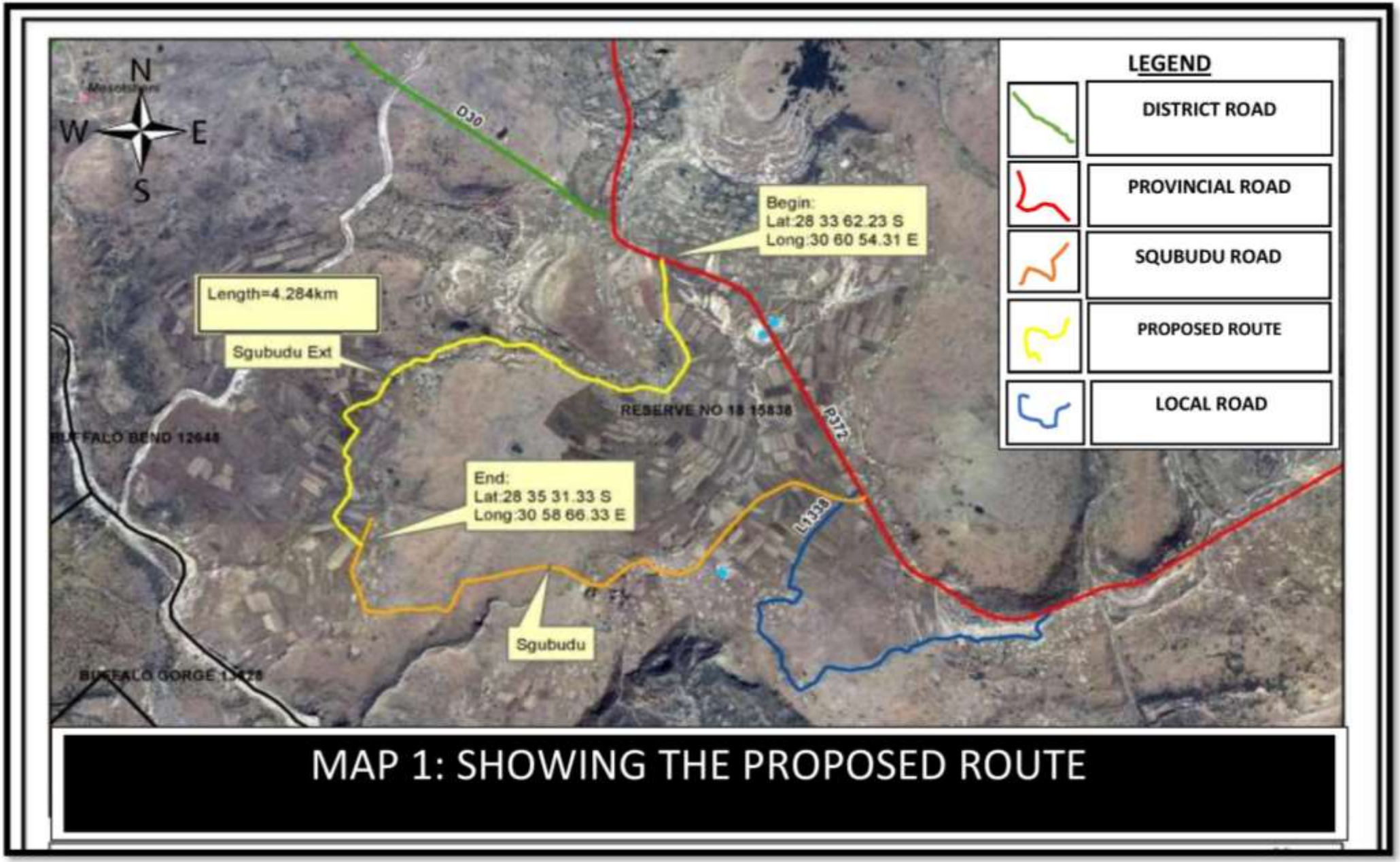
Listing Notice 1 of 2014, Listed Activity 19

The infilling or depositing of any material of more than 5 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic meters from -

(i) ***a watercourse***

DESCRIPTION OF ACTIVITY:

The Applicant proposes to construct a portal causeway and pipe culvert structures as part of local road upgrade from a mud track to a gravel road. The proposed activity will require the temporary removal of soil from the watercourse for the proposed construction of the causeway and pipe culvert structures. Approximately **$10m^3$** of soil will be removed from the watercourse to allow for the construction. The bed and banks of the stream will also be modified during the construction phase, as to allow for the linking/re-alignment of the upgraded local road to the proposed structure.



MAP 1: SHOWING THE PROPOSED ROUTE

FEASIBLE AND REASONABLE ALTERNATIVES

Site Alternative – Causeway Structure:

The proposed construction of the causeway structure will take place along a point which has already been disturbed by human activities, the river banks have become prone to erosion, and inundated during periods of high rainfall.

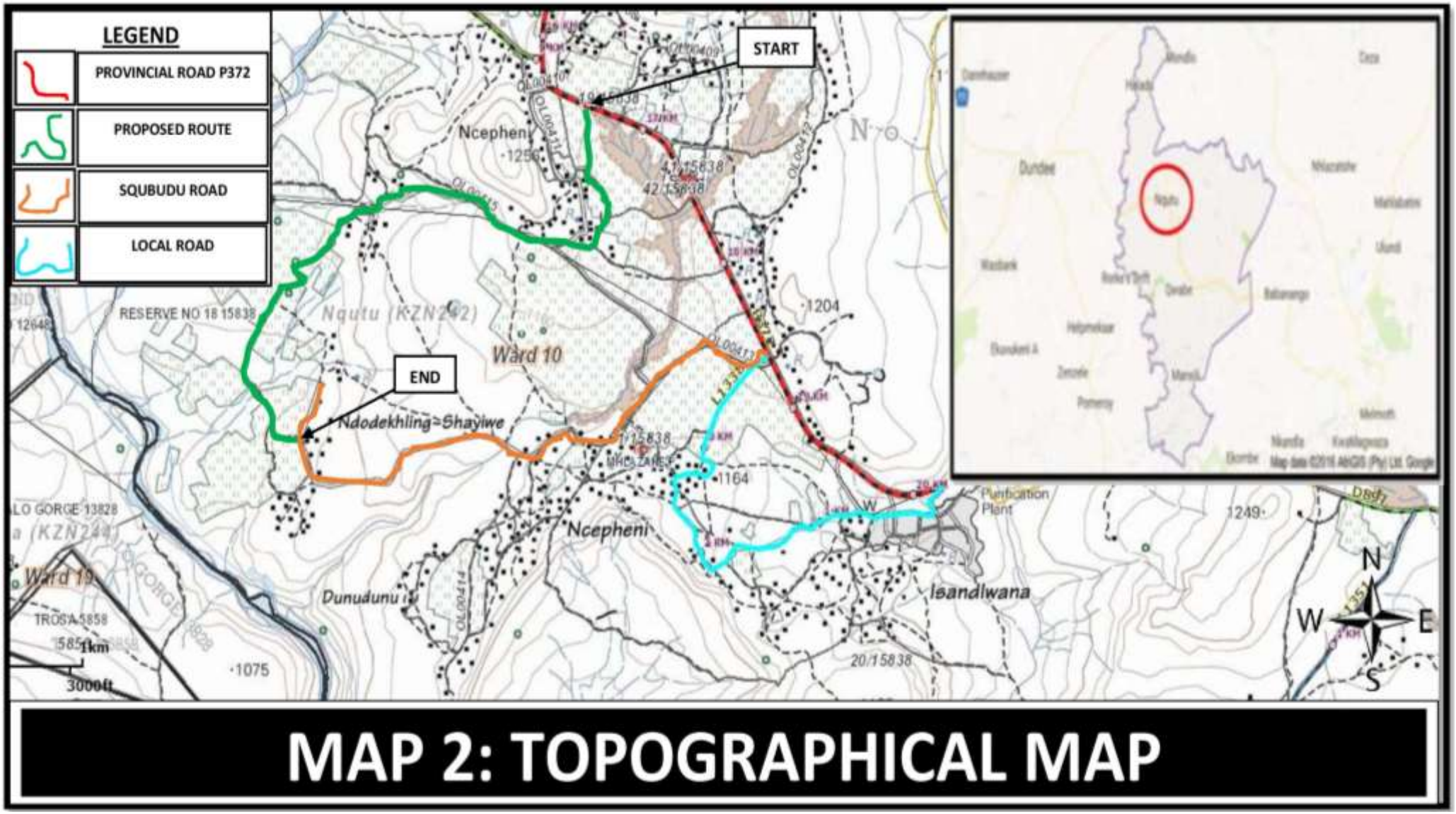
There are no site alternatives with respect to the position/location of the causeway structure as the existing mud track transverses the watercourse at this specific crossing point, furthermore the existing crossing point has been utilized by the community members over many years.

Site Alternative – Pipe Culverts:

The proposed construction of pipe culverts will take place along points that have already been disturbed by tracks left behind by grazing animals & people; the river banks have become prone to erosion, and inundated during periods of high rainfall. In most cases the drainage lines form micro-channels that flow directly over the mud track into the main channel & adjacent tributaries of the Batshe river. The construction of pipe culverts at these locations will favour the natural flow of water through the mud track into the nearest river channel.

Table 1: Table showing the Location of Pipe Culverts & Causeway structure

Location of the pipe culverts & causeway structure:	Latitude (DDMMSS)	Longitude (DDMMSS)
Drainage Line 1(Pipe Culvert):	28° 20’ 33” S	30° 35’ 51” E
Drainage Line 2 (Causeway Structure):	28° 20’ 31” S	30° 35’ 28” E
Drainage Line3 (Pipe Culvert):	28° 21’ 07” S	30° 35’ 07” E



MAP 2: TOPOGRAPHICAL MAP

TECHNOLOGY ALTERNATIVES

Preferred Option – Standard Portal Causeway

Based on DOT standard details for a causeway the approximate width is 8.45 m and length is 7.4 m which varies according to the stream width. The physical footprint of the structure is > 100 m^2. The causeway structure will be supported on pad foundation founded on bedrock**.** The preferred alternative has been considered as the best practical option by the applicant, as it has a longer life span, and much more cost effective to install and maintain.

Figure 1: Showing an example of a portal culvert causeway structure.

- **Pipe culvert structure**

  A pipe culvert structure will be constructed at drainage line 1 and 3 along the upgraded route. The physical footprint of the structure is < 50 m^2 in size.

Alternative 1 - Concrete Pipe Culvert Structure:

Figure 2 below depicts an example of the preferred technology to be implemented. 600mm Diameter, class 100D pipes of 2.44m lengths spanning, covered by a minimum of 150mm compacted back-fill material will be constructed at the drainage lines. Concrete head-walls will be constructed on the inlet and outlet sides of the culverts. Refer to **Appendix C.2.** for facility illustration.

Figure 2: Showing a concrete pipe culvert structure with headwalls.

Alternative 2: Stone pitched pipe culvert:

Pipe culvert structures with stone pitched or gabion headwalls will be constructed as depicted in **Figure 3** below. 600mm class 100D pipe culverts as well as inlet and outlet headwalls will be constructed within the drainage line. The length and width of the pipe culvert structures takes into consideration the existing mud track dimensions. **Refer to Appendix C.3 for facility illustration**

Figure 3: Showing stone pitched pipe culverts with headwalls

NO-GO ALTERNATIVE:

The mud track will not be upgraded with an appropriate structure at the water crossing point, therefore there will be no negative impacts associated with construction activity. However, there will also be no positive impacts associated with the road upgrade, for instance, enhanced connectivity and access for the local community. Community members that utilize the road will continue to experience difficulties, with regards to access to roads in the event of floods. Difficulty will be experienced when access is frequently overtopped by flood water, making access impossible at times of high flow. Erosion along the road is evident in areas as a direct result of poor drainage along the existing mud track. The banks along the track are highly eroded due to poor drainage and inadequate storm water control structures. There is no formal crossing structure therefore no public transport can be accessed by the community members. The track becomes muddy and slippery during high rainfall seasons making it difficult for community members to access transportation and basic services.

PHYSICAL SIZE OF ACTIVITY:

Alternative:	**Size of the activity – Causeway Structure**
Alternative A1[1] (preferred activity alternative)	>100 m²
Alternative A2 (if any)	N/A m²
Alternative A3 (if any)	N/A m²

Alternative:	**Size of the activity – Pipe Culvert Structures**
Alternative A1[2] (preferred activity alternative)	<50 m²
Alternative A2 (if any)	<50 m²
Alternative A3 (if any)	N/A m²

Length of upgraded road: 4.284 km

Locality map

A locality map serves as a tool to provide a visual representation of information in a particular geographical context. Refer to **Appendix A.2.**

Site photographs

Refer to **Appendix B.**

Facility illustration

A detailed illustration has been provided and attached as an Appendix to the report. Refer to **Appendix C.1** for the design of the standard slab structure.

ACTIVITY MOTIVATION:

1. Is the activity permitted in terms of the property's existing land use rights?	YES X	NO	Please explain
The proposed causeway is located on Squbudu Ext, providing access to the local communities, and school children. The structures will be constructed to ensure safe access to pedestrians, motorists and school kids. This activity is in line with the property's existing land use rights.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES X	NO	Please explain
According to the SDF (2015), secondary and tertiary roads exist in the area. The general qualities of these roads are of a good standard apart from the access routes which are located in the rural areas. The Nquthu region is predominately rural and access to basic developmental areas is limited. Development in this area will provide opportunities and create new development. Therefore, the activity is in line with the PSDF.			
(b) Urban edge / Edge of Built environment for the area	YES X	NO	Please explain
The crossing point is not in a built urban environment; thus, urban edge policies are not affected.			
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES	NO X	Please explain
The Nqutu Municipality IDP was examined in detail and the requirement of access routes where emphasised in the report. According to the IDP (2015/2016), tertiary development corridors enable access between settlements and serve as strategic areas for the location of public facilities. They also form the basis for the identification of settlement webs. The IDP has prioritized road development and transport nodes, therefore, the activity is in line with both the IDP and SDF of the local municipality.			

(d) Approved Structure Plan of the Municipality	YES X	NO	Please explain
The activity is in line with the approved structure plan of the municipality, as identified in the IDP.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES	NO X	Please explain
According to the uMzinyathi District Municipality's Draft EMF (2016), the objective of the mitigations and environmental practices is to enhance natural resources for sustainable equitable use, to protect and enhance the quality as well as the safety of the environment. Promoting the conservation and sustainable utilization of our resources to enhance economic growth, and also protecting and improving the quality and safety of the environment Therefore, no existing environmental management priorities for the area will be compromised, as the activity will contribute to the EMF.			
(f) Any other Plans (e.g. Guide Plan)	YES	NO X	Please explain
N/A			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES X	NO	Please explain
According to the Nquthu municipal IDP (2015/2016) the proposed development is in line with the municipal five-year service delivery plan. The proposed activity contributes to improved access routes within the local municipality, and therefore is in line with the IDP and SDF.			

4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	YES X	NO	Please explain
The community will benefit directly from the proposed causeway structures and road upgrade, as they are left stranded during periods of intense rainfall as there is no formal crossing structure along the watercourse area. The construction process will bring about increased employment opportunities for the local community, as the contractor will employ local labour and provide them with the relevant skills training. The proposed development is therefore a high societal priority, as this will be socio-economically uplifting for the community.			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	YES X	NO	Please explain
All necessary services are available for the activity to commence.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?	YES	NO X	Please explain
No infrastructure planning is envisaged by the municipality with regards to this project. The project costs are borne by the Department of Transport.			
7. Is this project part of a national programme to address an issue of national concern or importance?	YES	NO X	Please explain
The proposed activity is site specific and is at a localized level.			

8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES X	NO	Please explain
The site location is highly degraded. The banks along the road are highly eroded due to poor drainage of the existing track. Therefore, the location factors favour this activity, as the site will be rehabilitated once construction is completed.			
9. Is the development the best practicable environmental option for this land/site?	YES X	NO	Please explain
The proposed site has been assessed and a favourable position for the road construction has been identified with all stakeholders. This will significantly decrease the overall costs of proposing to construct an entirely new gravel road. The upgrade of the existing mud track will minimize the negative environmental impacts in the surrounding area.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES X	NO	Please explain
The proposed construction of the structure will positively impact the local community by providing access to basic facilities and services, minimizing the negative impact of flooding, and reducing soil degradation.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NO X	Please explain
No precedent will be set in the area; however, the upgrade of the road from a track to a gravel road will improve accessibility for community members			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES	NO X	Please explain
No dwellings will be relocated as the existing track does not transverse any properties or infringe on the rights of the residents.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YES	NO X	Please explain
The project is located in a rural area, and therefore the urban edge is not affected.			

14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES	NO X	Please explain
This is a localized site specific activity, and will benefit the local community members			
15. Any other need and desirability considerations related to the proposed activity?			Please explain
According to the IDP (2015/2016) there is a critical need to improve roads within the local municipality. The area is predominately rural and developmental initiatives are limited with regards to funding. The Department of Transport has funded the project and similar projects within the District.			
16. How does the project fit into the National Development Plan for 2030?			Please explain
The National Development Plan for 2030 sets out strategic goals in terms of access to basic services and amenities. Although this project is site specific in nature, it contributes to the cumulative effect of developmental nodes of rural communities to the urban environments.			
17. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.			
According to section 23 of NEMA, appropriate Environmental Management Tools have been put in place to ensure the Integrated Environmental Management of activities. The EAP which has been appointed by the client (DOT) has assessed negative as well as positive impacts of the proposed development. Mitigation measures have been outlined in order to reduce negative impacts. The EAP has identified socio-economic conditions, cultural heritage as well as the risks and consequences of alternatives. The DBAR will be circulated into the public domain as part of the public participation process.			

18. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.
Section 2 of NEMA encourages environmental management that places people and their needs at the forefront of it concern, to be able to meet their physical, developmental, cultural and social interests. Taking this into consideration the communities will therefore be able to access basic amenities at all times because of the proposed development. Economically, the proposed activity will ensure that communities gain access to facilities and allow easy access for potential investments. All factors mentioned in Section 2 (4) of NEMA were taken into consideration, assessed and discussed in Section D. Through Section 2 of NEMA it is understood that the principles as set out in this section have been taken into account through the proper application of a Basic Assessment Process as described by NEMA, and by assessing the predicted and actual impacts of the proposed activity in order to assist the Competent Authority in adequately making an informed decision. Section D of the BAR addresses possible impacts such as land and water pollution, ecological disturbances, noise and socio-economic impacts as required by NEMA as well as possible mitigation measures.

APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

- **NEMA and the Environmental Impact Assessment Regulations, 2014**

  The EIA Regulations 2014, promulgated under NEMA (1998), focus primarily on creating a framework for co-operative environmental governance. NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by State Departments and to provide for matters connected therewith.

  In terms of the EIA Regulations of 2014 and activities listed in GN No. 983 and GN No. 985 (requiring a Basic Assessment (BA) process), there are listed activities that are triggered. The listed activities are deemed to include activities that could potentially have an impact on the social and biophysical state of an area and as such, the applicant is required to obtain an Environmental Authorization (EA) by way of a BA process.

- **National Heritage Resources Act, 1999 (Act No. 25 of 1999)**

  This Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 hectares (ha) and where linear developments (including roads) exceed 300 meters in length. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by Amafa KwaZulu-Natal, the Provincial Heritage Resources Authority.

- **Constitution of Republic of South Africa (Act No 108 of 1996)**

  The project falls within the boundaries of South Africa. The Constitution of the Republic of South Africa has major implications for environmental management. The main effects are the protection of environmental and property rights, the change brought about by the sections dealing with administrative law, such as access to information, just administrative action and broadening of the locus standing of litigants. These aspects provide general and overarching support and are of major assistance in the effective implementation of the environmental management principles and structures of the NEMA. Section 24 in the Bill of Rights of the Constitution specifically states that:

  Everyone has the right –

  - To an environment that is not harmful to their health or well-being; and
  - To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
  - Prevent pollution and ecological degradation;
  - Promote conservation; and
  - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

- **National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)**

  The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed. This Act is applicable to this application for environmental authorization as it requires the project applicant to consider the protection and management of local biodiversity.

- **National Water Act, 1998 (Act No. 36 of 1998)**

  The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways. Of specific importance to this application is Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and must therefore comply with any prescribed waste standard or management practices.

- **Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)**

  To provide for the health and safety of persons at work and for the health and safety of persons about the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or about the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

WASTE, AFFLUENT, EMISSION AND NOISE MANAGEMENT:

- **Solid waste management**

Will the activity produce solid construction waste during the construction/initiation phase?	YES X	NO
If YES, what estimated quantity will be produced per month?	Approx.3 m^3	

How will the construction solid waste be disposed of?

All solid waste accumulated during construction will be kept in designated areas and disposed weekly by the constructor at the registered local landfill site. This will be addressed in the EMPr. The ECO will audit the EMPr and submission will be made to the CA for review.

Where will the construction solid waste be disposed of?

The construction solid waste will be disposed of at the registered municipal landfill site by the contractor.

Will the activity produce solid waste during its operational phase?	YES	NO x
If YES, what estimated quantity will be produced per month?		

- **Liquid effluents**

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	NO X

Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	NO X

- **Emissions into the atmosphere**

Will the activity release emissions into the atmosphere other that exhaust emissions and dust associated with construction phase activities?	YES	NO X
If YES, is it controlled by any legislation of any sphere of government?	YES	NO X

- **Waste permit**

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM: WA?	YES	NO X

- **Generation of noise**

Will the activity generate noise?	YES X	NO
If YES, is it controlled by any legislation of any sphere of government?	YES	NO X

Describe the noise in terms of type and level:

Noise will only be generated during the construction phase (from operating machinery, generators etc.) The level of the noise generated will be low and below 70 decibels threshold limit. No noise will be generated during the operational phase; therefore, the impact is temporary in nature and can be minimized with effective monitoring and auditing by the ECO.

WATER USE

Water will be transported to the site via water trucks as to minimise strain placed on the local municipal system. No water will be abstracted from any watercourse during the construction phase of the project. A water use application in terms of section 21 (I) and (c) must be lodged with the Department of Water and Sanitation for impeding and diverting the flow of water in a watercourse, and altering the bed and banks of the watercourse. The application will run concurrently with EIA process.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Property Description/ Physical Address:

Province	KwaZulu-Natal
District Municipality	UMzinyathi District Municipality
Local Municipality	Nquthu Local Municipality
Ward Number(s)	WARD 10
Farm name and number	RESERVE NO: 18 15838
Portion number	20/15838
SG Code	NOGT00000001583800020

GRADIENT OF THE SITE:

Alternative S1:

Existing Track

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
		X				

Drainage line 1

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
	X	X				

Drainage line 2

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
			X			

Drainage line 3

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
	X		X			

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Baseline Biophysical Conditions

Climate

Nquthu enjoys a subtropical climate with warm to hot summers and cold winters climate of the area is influenced by its lack of vegetation. Cold fronts are usually preceded by clear weather and north-easterly winds. As the front passes over conditions change rapidly from sunny and clear to become overcast and cold with south-westerly winds (Nqutu IDP, 2015/2016).

Rainfall

Nqutu lies within a summer rainfall area. The mean annual rainfall for Nqutu varies from 919mm in the southeast to 646mm in the southwest, while the northern and central areas receive in the region of 738mm. Mean monthly rainfall for the area ranges from a high of 127mm in February to a low 26mm in July (Institute of Natural resources, 1998). Rain is usually associated with either thunderstorms (particularly in the summer months) or cold fronts. Thunderstorms generally produce localized downpours, which often result in flash floods (Nquthu IDP, 2015/2016). Rainfall associated with cold fronts is generally in the form of soaking rains over a period of one or more days. Aside from flash resulting from thunderstorms and similar rainfall events, phenomena such as cut off low-pressure systems and tropical cyclones may also result in high rainfall and cause significant flooding (Nquthu IDP, 2015/2016).

Temperature

The study area experiences mild winters and warm to hot summers. The mean annual temperature is 16.7^{o}C, with warm to hot summers experiencing a mean maximum of 23.2^{o}C, but reaching 25.7^{o}C along the Buffalo River. Winters are cool with colds spells, and moderate to light frosts. The average monthly temperatures range from high of 28°C to low of 10.5 °C Maximum recorded temperatures at the Weather Bureau area, throughout the year, in the mid to upper 30's reaching 40°C in summer. Discomfort indices temperatures calculated taking factors such as humidity into account-may rise as high as the mid to upper 40's during the height of summer (Nquthu IDP, 2015/2016).

Topography

The Nquthu municipal area is characterised by rolling to partly broken terrain with slopes of between 5% and 12%. The terrain becomes more broken and steep (>12%) in the south, with valleys along the Buffalo River its south-western boundary. Nquthu lies inland of the relatively flat plain of Kwazulu Natal and lies between approximately 125 and 450 metres above mean sea level (Nquthu IDP, 2015/2016). The mean elevation (m above sea level) ranges from 689 above sea level, to 1,551m above sea level. The area is characterized by broken topography with plateaus comprised of rounded hilltops and bisected by gentle slopes incised river valleys in the East and a step escarpment falling into isandlwane south (Nquthu SDF, 2015). The main topographical components of the study area are the deeply incised river valleys running in a southeasterly direction across the site and separated by a narrow ridge. Much of the gentle land occurs in the central, southern and western parts of the study area. Only Nondweni is situated on the lower lying areas, whilst most of the settlements are situated in the western areas of the Municipality (Nquthu IDP, 2015/2016).

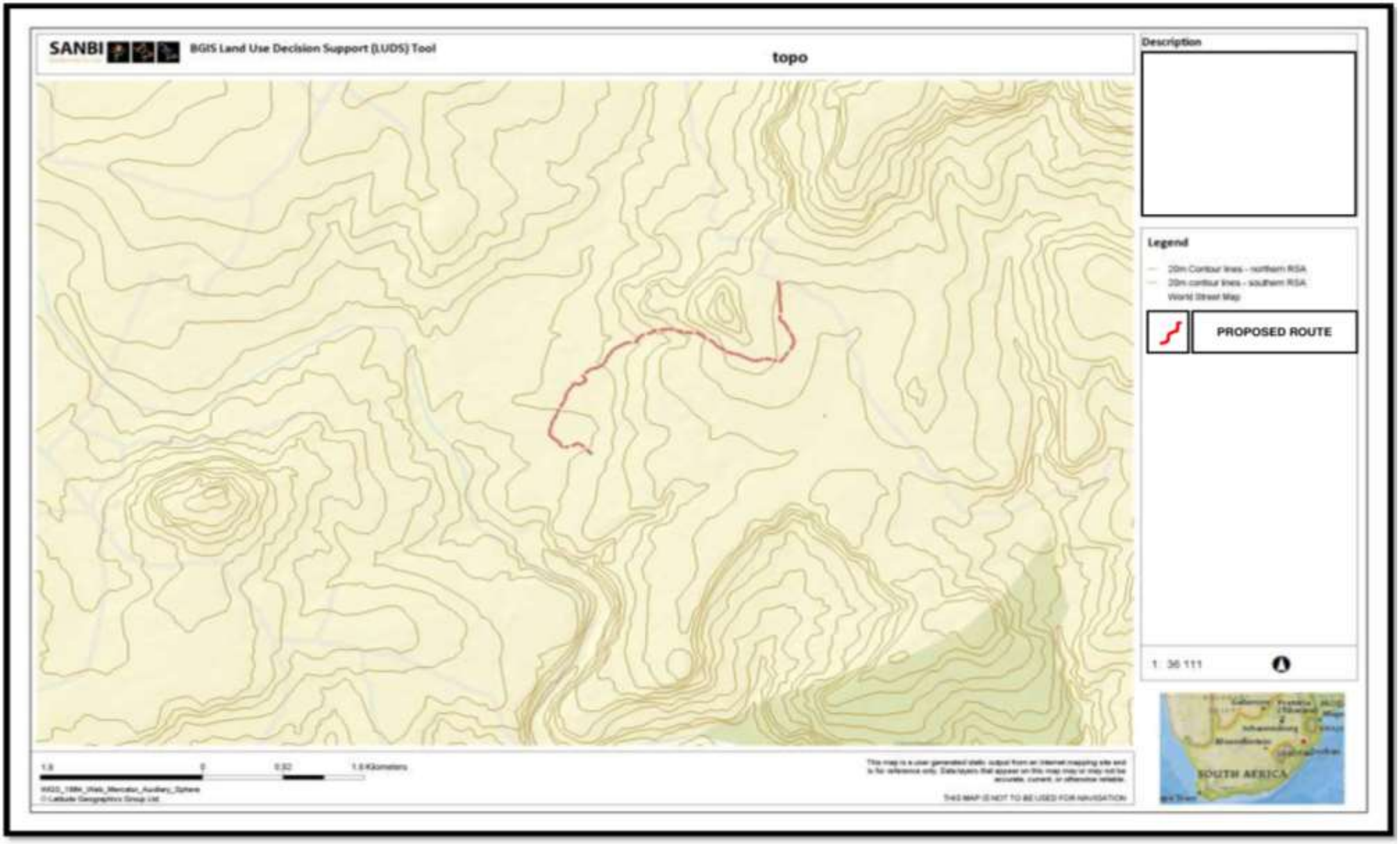


Figure 4: Depicting the Topography of the proposed study area

Geology / Soils

The dominant soil classes present in the study area are Imperfectly drained soils, often shallow and often with a plinthic horizon, and Lithosols, which are shallow soils on hard or weathering rock (Sanbi, 2016). There is extensive soil erosion especially along the non-perennial stream as well as the banks of the stream, this is due to poor stormwater management as well as uncontrolled livestock drinking activities along the stream as well as removal of the riparian vegetation during wood harvesting activities.

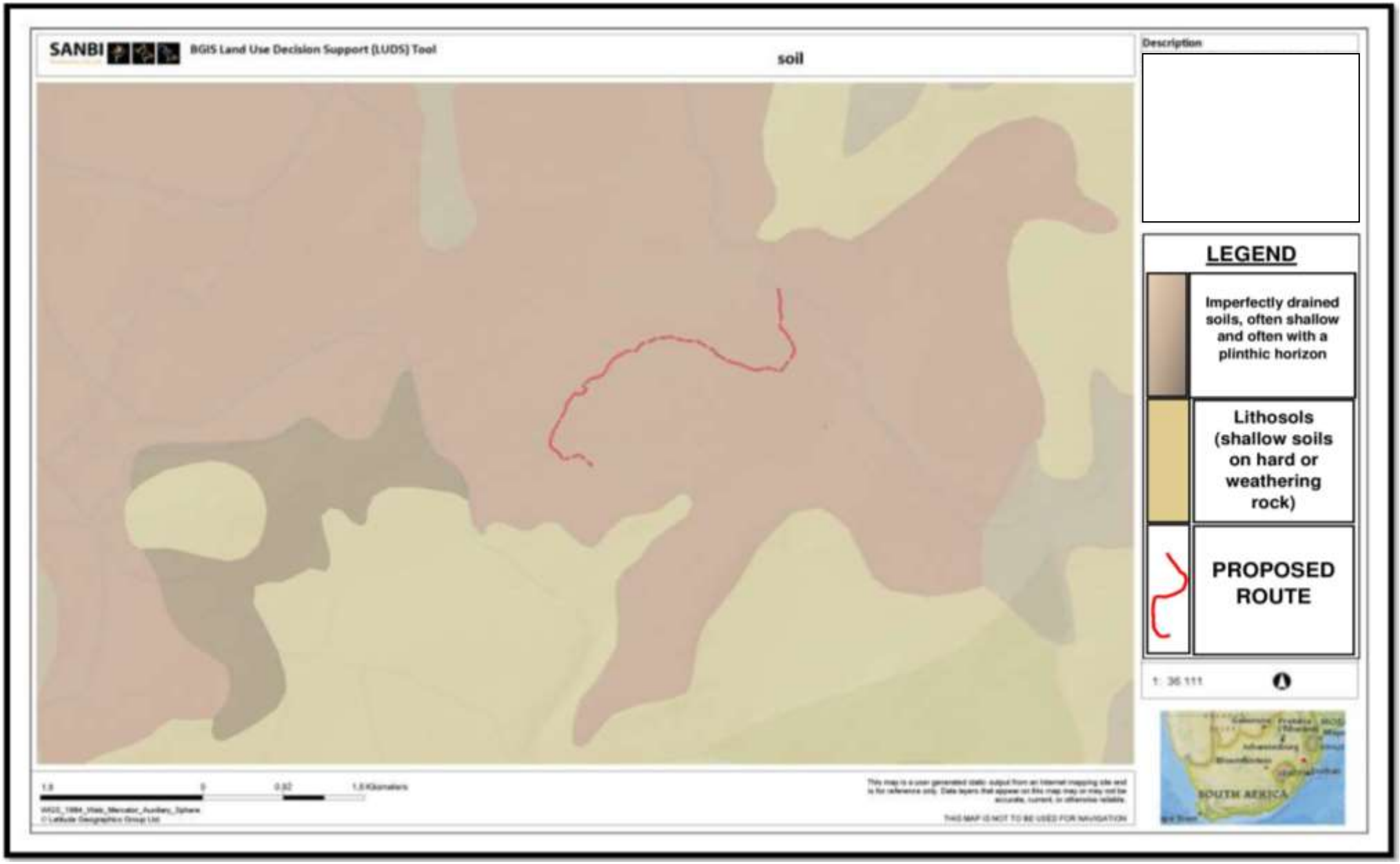


Figure 5: Depicting the Geology/ Soil classes of the study area

Vegetation

The proposed construction falls within the Income Sandy Grassland vegetation unit which falls under the grassland biome. According to Mucina and Rutherford (2006), the Income Sandy Grassland falls within the grassland biome and is associated with very flat extensive areas with generally shallow, poorly drained sandy soils supporting low, tussock-dominated sourveld forming a mosaic with wooded grasslands on well drained sites with trees.

The second type of vegetation that is found in the study area is Thukela Thornveld. This vegetation unit falls within the Savannah Biome and occurs in KwaZulu-Natal in the upper Thukela River basin fringing the Thukela Valley Bushveld unit on its upper border in a series of discontinuous patches. The largest section occurs east of Estcourt-Colenso and includes Ladysmith, with some outliers on slopes south of Dundee. It occurs at an altitude between 900 and 1300 m. Topographically, the dominant landscape features are valley slopes to undulating hills. The vegetation comprises *Acacia* dominated bushveld of variable density, ranging from wooded grassland to dense thicket, with dense grassy undergrowth.

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Figure 6: Depicting biome types present within the study area

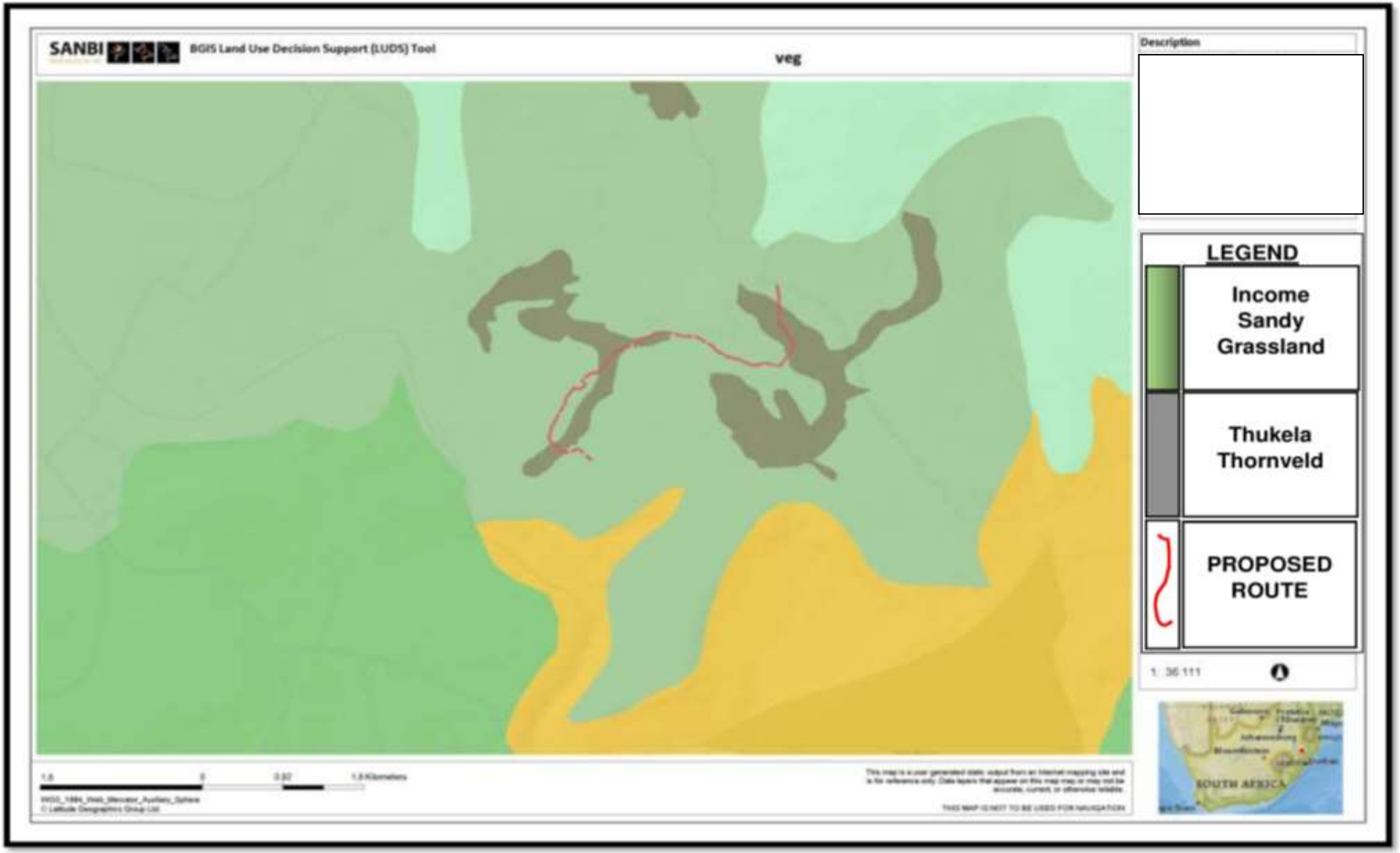


Figure 7: Depicting the type of Vegetation present within the study area

Land use character of surrounding area

Natural area	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station [H]
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	**Plantation**
Informal residential [A] (Rondavels & Mud huts)	Church	**Agriculture (Commercial & Subsistence farming)**
Retail commercial & warehousing	Old age home	**River, stream (river)**
Light industrial	Sewage treatment plant [A]	Nature conservation area
Medium industrial [AN]	Train station or shunting yard [N]	Mountain, ridge
Heavy industrial [AN]	Railway line [N]	Museum
Power station	Major road (4 lanes or more) [N]	Historical building
Office/consulting room	Airport [N]	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam [A]	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:	YES	**NO**
	Uncertain	
Awaiting AMAFA comments.		

Will any building or structure older than 60 years be affected in any way?	YES	**NO**
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	**NO**

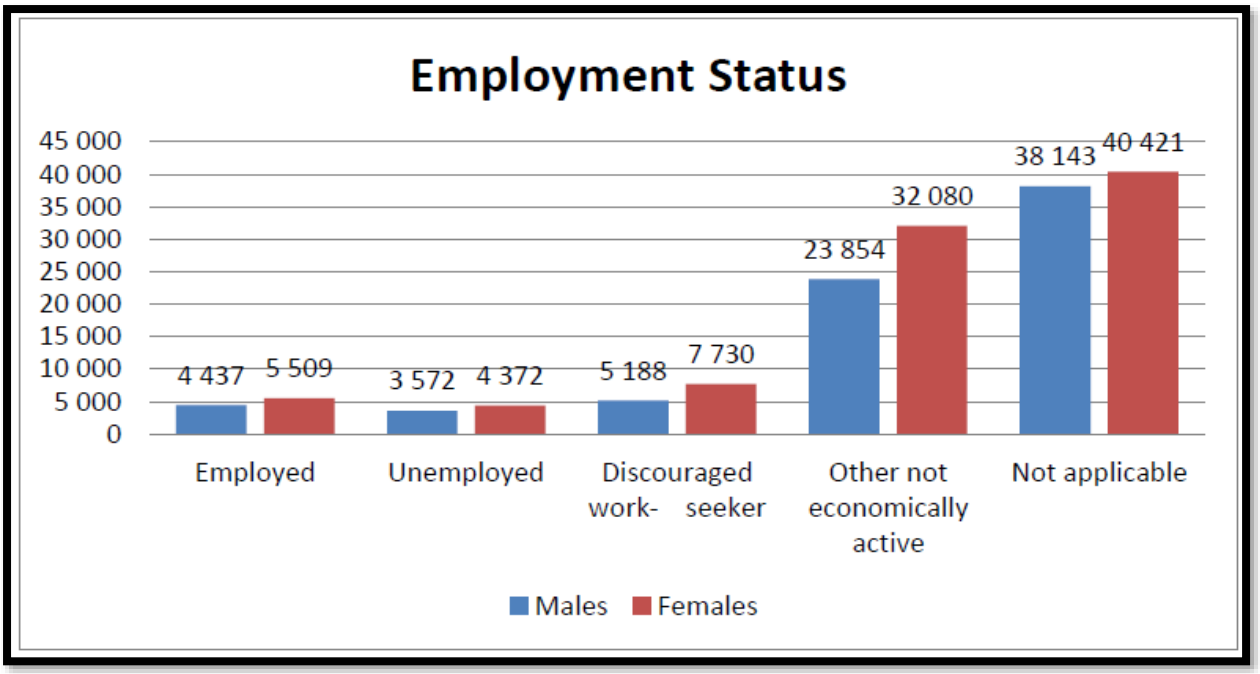
SOCIO-ECONOMIC CHARACTER:

Nquthu Local Municipality is one of four municipalities in the Umzinyathi District Municipality, KwaZulu-Natal. The municipality covers an area of 1 962 km² and is predominantly rural in nature with expansive low-density rural settlements being one of its major features. The municipality is located along the north-eastern boundary of the district, bounded by eMadlangeni and Abaqulusi in the north, Ulundi in the east, Nkandla in the south and Msinga and Endumeni in the west. 99,7% of the 165 307-people living in Nquthu Local Municipality are black African. In terms of education, 30,1% of those aged 20 and above have some secondary education, 1 in 5 (20,3%) have completed matric, and 3,8% have some form of higher education. 18,3% do not have any formal schooling. The Nquthu Socio-Economic Study indicated that 58.13% of the population does not pay for services. Nquthu consist of a large rural population over (90%), with less than 10% its people living in the semi-urban areas of Nquthu Town (3,44% living in Nquthu Town), Nondweni, Isandlwana and Ngolokodo. Roads and storm water in these rural areas are in a poor condition. This places enormous pressure on the services for the municipality.

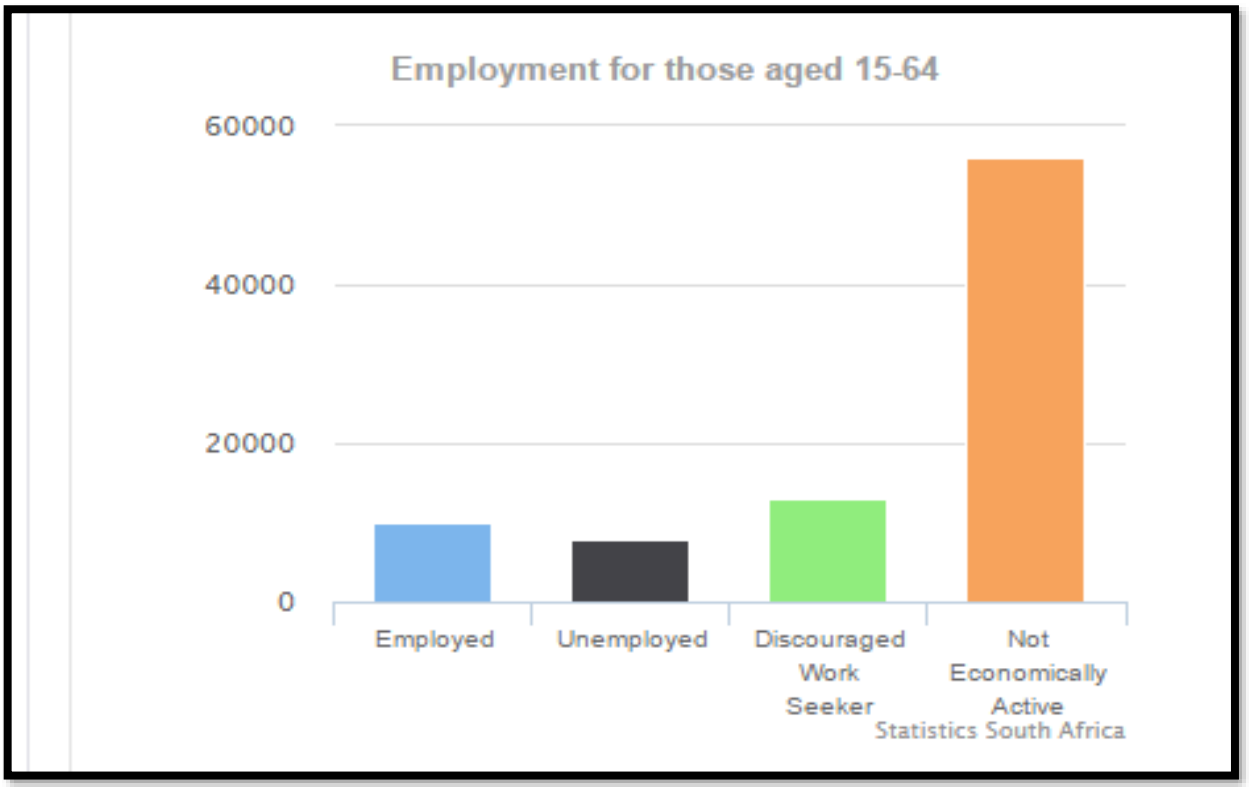
- **Local Municipality**

Level of Unemployment

Employment levels are exceptionally low with only 9 946 of the economically active population being employed. Of the total population, 55 954 are not economic active as this include people with disability, school children and pensioners while 12 918 are discouraged work seekers and the rest of the potential labor force is not economically active (students, housewives etc.). With such high unemployment, the dependency levels are also very high and it is estimated that for every employed person there are 28 unemployed people who need support. Refer to **graph 1 and 2** below



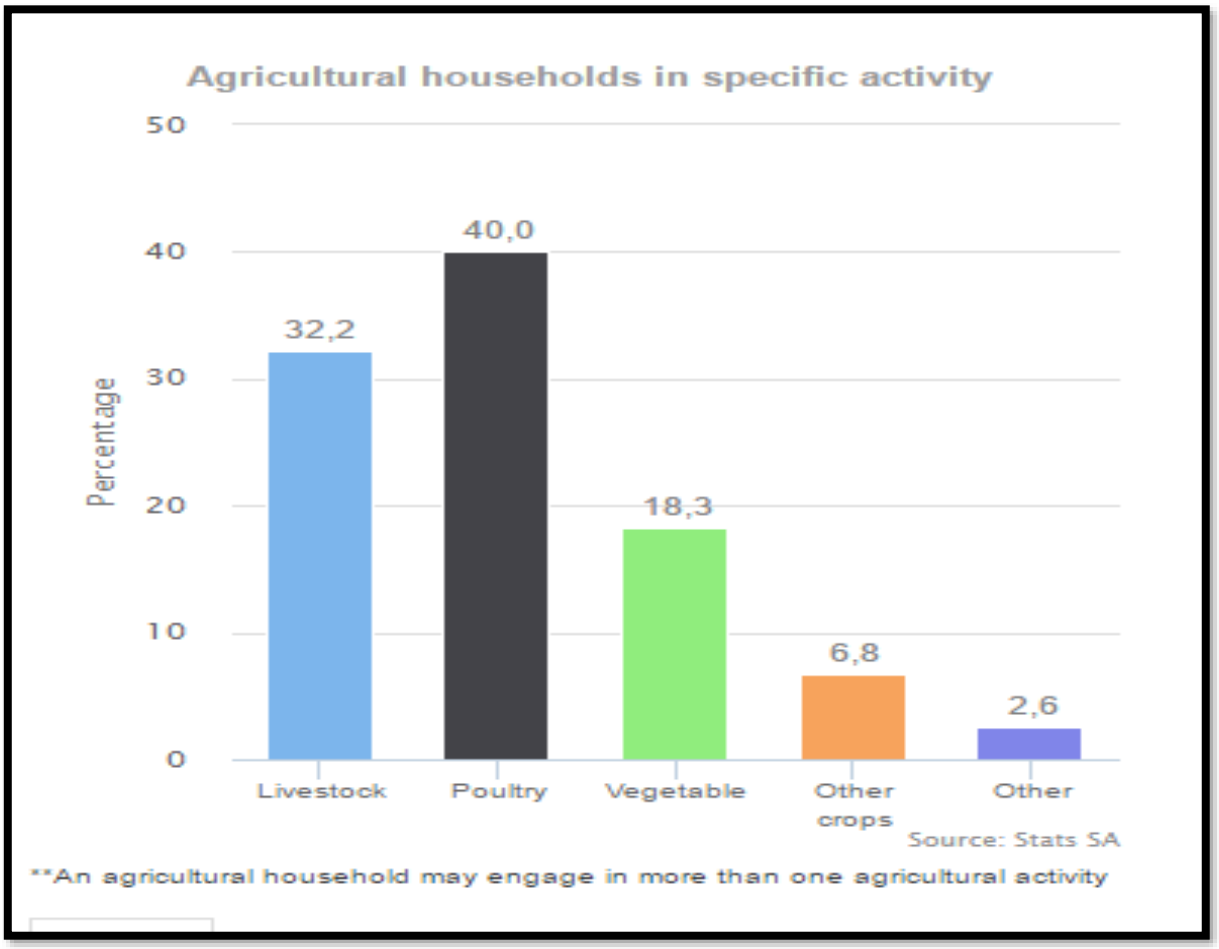
Graph 1: Representing the unemployment rate by gender (IDP, 2015/2016)



Graph 2: representing unemployment level by age (Stats SA, 2011)

Economic profile of local municipality:

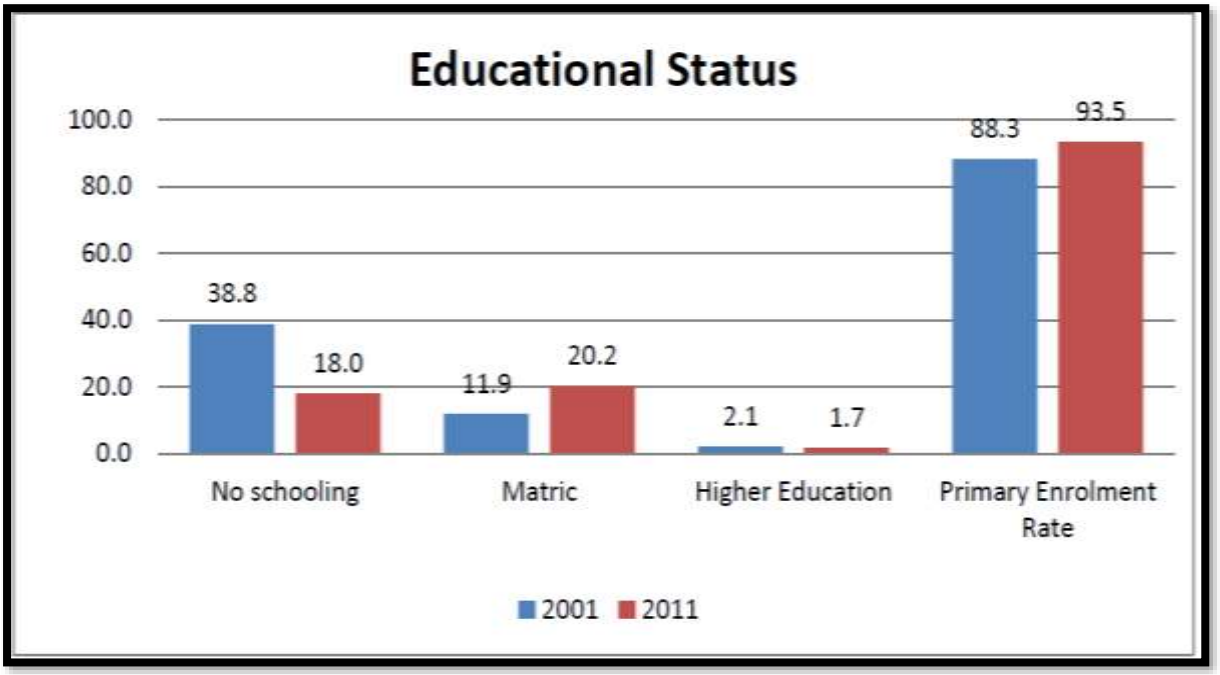
Nquthu Municipality currently relies on subsistence agriculture, livestock; wool; manufacturing; SMMEs, government grants and migrant worker income to sustain its residents. There is extremely limited agricultural potential due to settlement pressure, traditional farming methods, poor bio-resource groupings and limited irrigation potential. Most residents sustain their families though subsistence agriculture. Refer to **Graph 3** below.



Graph 3: Showing income generation by household agricultural activities (Stats SA, 2011)

Level of Education:

According to stats SA, 38.8% of the total population of the municipality has no formal schooling which is an enormous population that is deprived in terms of education. It is also noted that low portions of the population have a form of higher education and this can be related to the fact that the area is mostly rural and transport facilities are limited. There are a limited number of higher education facilities located within the municipal area. The Department of Education has established an FET College in Nquthu in order to increase the population rate with higher education and different skills and there is one private nursing college, which is up and running. Refer to **Graph 4** below.



Graph 4: Showing the education levels of Nquthu Municipality (Stats SA, 2011).

SOCIO-ECONOMIC VALUE OF THE ACTIVITY:

What is the expected capital value of the activity on completion?	R1.9 million	
What is the expected yearly income that will be generated by or as a result of the activity?	N/A	
Will the activity contribute to service infrastructure?	YES X	NO
Is the activity a public amenity?	YES X	NO
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	15	
What is the expected value of the employment opportunities during the development and construction phase?	R750 000	
What percentage of this will accrue to previously disadvantaged individuals?	100%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	N/A	
What is the expected current value of the employment opportunities during the first 10 years?	N/A	
What percentage of this will accrue to previously disadvantaged individuals?	100%	

SECTION C: PUBLIC PARTICIPATION PROCESS

- **Advertisement and Site Notices**

Publication name	Greytown Gazette		
Date published	18th January 2017		
Site notice position	**Site notice No.**	**Latitude**	**Longitude**
	1	28° 20' 12" S	30° 36' 20" E
	2	28° 20' 24" S	30° 36' 20" E
Date placed	18th January 2017		

A newspaper article (IsiZulu) was published in the Greytown Gazette on the 18th of January 2017. This process allowed for the public to register on the database as an Interested & Affected Party (I&AP). Refer to **Appendix E.3** for proof of newspaper advertisement.

Furthermore, site notices were placed at strategic points on the 18th of January 2017 along the proposed route to allow Interested and Affected Parties to register and comment on the proposed development. Refer to **Appendix E.4** for site notice.

- **Meeting with Ward Councillor and Tribal Authority**

The elected ward councillor as well as the tribal authority of the area was made aware of the proposed development. A formal meeting was held on the 18th of January 2017. During the meeting the ward councillor and the tribal authority were informed about the proposed construction and used the time to express their concerns. A formal letter outlining the nature of the proposed development was made available to the ward councillor and tribal authority during the meeting. The letter affirms that the ward councillor and the Induna were made aware of the proposed development and have no objections to the proposed development.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2) (b) of GN 983

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Mr. B.J Ngwenya	Ward Councillor	073 838 2916
Mr. C.J Ngobose	Induna	076 060 4456

- **Issues raised by Interested and Affected Parties**

Summary of main issues raised by I&APs	Summary of response from EAP
Awaiting responses.	

- **Comments and Responses Report**

  Refer to **Appendix E.1** for comments and responses report.

- **Authority Participation**

  Authorities and organs of state identified as key stakeholders:

  The Draft Basic Assessment report was circulated to the following state Departments for review and comments.

Authority/Organ of State	Contact person (Title, Name and Surname)	Tel No	e-mail	Postal address
Economic Development, Tourism and Environmental Affairs	Mr. G. Willis Smith	034 299 9679	Willis-smith@kznded.gov.za	26 Beaconsfield St, Dundee, 3000
AMAFA	Ms Bernadet	033 394 6543	bernadetp@amafapmb.co.za	P.O. Box 2685 PMB 3201
KZN Wildlife	Mr D. Wieners	033 845 1999	Dominic.Wieners@kznwildlife.com	P.O. Box 13053 3202
DWS	Mr. S Govender	031 336 2759	GovenderS2@dwa.gov.za	88 Field Street Durban 4001

SECTION D: IMPACT ASSESSMENT

IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

N.B All mitigation measures have been outlined in specific detail in the EMPr; therefore, this section must be read in conjunction with the EMPr. The impacts that have been outlined below relate to the activities applied for in the environmental application. Due to this being a linear development and the local road following the existing track, no alternative routes have been investigated. The proposed upgrade will follow the existing mud track which will have minimal impact to the environment as no further disturbance is envisaged.

Risk Assessment

Risk Assessment Methodology

The following presents the assessment criteria used to evaluate the impacts resulting from the proposed development.

Impact Assessment Methodology

The impacts that may result from the construction phase and operation phase of the project was assessed according to a number of criteria to arrive at an overall significance rating. The criteria used were as follows:

Ranking Scales for Environmental Risk Assessment

Probability Rating (P)

Rating	Probability
5	Definite
4	High Probability
3	Medium Probability
2	Low Probability
1	Improbable
0	None

Duration Rating (D)

Rating	Duration
5	Permanent
4	Long term (ceases with operational life)
3	Medium Term (5-15 years)
2	Short-term (0-5 years)
1	Immediate

Scale Rating (S)

Rating	Scale
5	International
4	National
3	Regional
2	Local
1	Site
0	None

Magnitude Rating (M)

Rating	Magnitude
10	Very High
8	High
6	Moderate
4	Low

After each impact is rated according to the ranking scales above, the **environmental significance** of each impact could be assessed by applying the following formula:

SP= (MAGNITUDE (M) + DURATION (D) + SCALE(S) x PROBABILITY (P)

Where SP is defined as significance points. The maximum value of significance points (SP) is 100. Environmental effects could therefore be rated as either high (H), moderate (M), or low (L) in significance and is based on the following:

Rating	SP
>60 Points	High Environmental Significance (HES)
30-60 Points	Moderate Environmental Significance (MES)
<30 Points	Low Environmental Significance (LES)

Proposed construction of causeway structures as part of a local road upgrade of Squbudu Ext within Nquthu Municipality.							
Impacts/Significance associated with the Construction Phase							
Potential Impact	**Significance Rating**						
1.SOIL EROSION							
1.1 Erosion of stockpiled material. Stockpile material include topsoil, gravel and stone. Erosion is likely to occur as a result of inappropriate stockpiling techniques.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct impact	Site	Short-term	High	High	**MES**
			1	2	4	8	**44**
	After Mitigation		Site	Short-term	Low	Moderate	**LES**
			1	2	2	6	**18**

PROPOSED MITIGATION:

- Erosion control measures must be implemented in areas vulnerable to erosion and where erosion has already occurred such as edges of slopes and exposed soil. These measures include the use of sand bags, hessian sheets, silt fences, erosion control blankets, retention or replacement of vegetation and geotextiles such as soil cells which must be used in the protection of slopes.
- Stockpiles must not be higher than 2 meters unless permitted by the engineer.
- Material must be stockpiled in such a way that it cannot capsize or cause injury or damage to properties or the natural environment.
- Once an area has been cleared of vegetation, the top layer of soil should be removed and stockpiled in a designated area.
- Materials must be stockpiled properly in order to prevent it from collapsing and causing any injuries to workers and the surrounding environment.
- Suitable pneumatic hand tools and/ or plant with pneumatic heads must be used to create an even surface for the founding of the causeway allowing for maximum contact between the underside of causeway and the bearing layer.
- Stockpiles must not surpass 2 meters in height unless otherwise permitted by the engineer. This will ensure stability.
- Stockpiles must be covered if exposed to intense weather conditions such as wind and rain.
- Stockpiles may further be protected by the construction of temporary berms or low brick walls around their bases.
- Stockpiles must be at least 50m away from a watercourse, to prevent pollution.

1.2 Poor Storm Water Management During construction, poor storm management techniques can lead to erosion and loss of soil. This could also lead to siltation of the stream.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Indirect Impact	Local	Short-term	Definite	Moderate	**MES**
			2	2	5	6	**50**
	After Mitigation		local	Immediate	Medium	Low	**LES**
			2	1	3	4	**21**

PROPOSED MITIGATION:

- Proper sediment control measures in place to prevent siltation of the stream. Proper storm water systems must be installed to avoid soil erosion; this will be achieved through prior collection of site information about the conditions of the site and relevant designs that need to be in place to mitigate erosion.
- Management may include storm water culverts and drains as per the engineer's recommendations.
- No stockpiling of any materials may take place adjacent to the watercourse.
- A drainage system must be established for the construction camp to ensure that storm water doesn't not flow over exposed soil and erode it.
- The drainage system must be checked to ensure that no blockages obstruct the water flow.

Potential Impact	Significance Rating						
2.HAZARDOUS SUBSTANCES							
2.1 Spillages Construction vehicles may leak oil that may contaminate soil and water. The presence of fuels and other chemicals on-site may have a negative impact on groundwater.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Site	Immediate	High	High	**MES**
			1	1	4	8	**40**
	After Mitigation		Site	Immediate	Low	Low	**LES**
			1	1	3	4	**12**

PROPOSED MITIGATION:

- All waste generated during construction is to be disposed of as per an Environmental Management Programme (EMPr) and no washing of containers, wheelbarrows, spades, picks or any other equipment adjacent to or in any of the watercourses adjacent to the road is strictly permitted.
- Efforts should be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on site.
- Temporary bunds must be constructed around chemical or fuel storage area that is outside the 1:100 flood line of the stream.
- Cement must be mixed off-site and construction vehicles kept at a distance from the stream.
- Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded area as soon after detection as possible to minimize the risk of contamination.
- Proper management and disposal of waste must occur during the lifespan of the project, including during the operational phase.
- Do not locate the construction camp or any depot for any substance which causes or is likely to cause pollution within 100m of the riparian zone.
- The bulk diesel bunkers must be stored at least 100m away from any watercourse and must be stored in a roof, bunded area.
- The bunded area should be constructed of a material resistant to/not affected by the chemical stored in the banded. Alternatively, it must be lined with corrosive resistant material.
- It is the duty of the contractor to ensure the prevention of spillages of chemicals or hazardous substances on-site, to inhibit the contamination of the soil or ground water on present within the proposed project area

Potential Impact	Significance Rating						
3.IMPACT ON VEGETATION							
3.1 Alien Invasive Plants. Alien species generally out-compete indigenous species for water, light, space and nutrients as they are well adaptable to changing conditions and can easily invade a wide range of ecological niches. Alien invasive plant species pose an ecological threat as they alter habitat structure, lower biodiversity, change nutrient cycling and productivity, and modify food webs.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Short-term	High	Moderate	**MES**
			2	2	4	6	**40**
	After Mitigation		Local	Short-term	Low	Low	**LES**
			2	2	2	4	**16**

PROPOSED MITIGATION:

- The contractor must try to protect as much indigenous vegetation as possible.
- The Contractor should be responsible for implementing a programme of weed control (in areas where the soil has been disturbed); and grassing any remaining stockpiles to prevent weed invasion.
- Ongoing alien plant control must be undertaken after the construction phase and during the operational phase and particularly in the disturbed areas.
- Post-construction rehabilitation is essential to mitigate the negative impacts of construction activities and must be implemented as soon as possible

3.2 Damage and removal of existing vegetation. A direct disturbance and loss of vegetation because of unregulated vegetation clearance.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Immediate	High	Moderate	**MES**
			2	1	4	6	**36**
	After Mitigation			Immediate	Low	Minor	**LES**
			1	1	2	2	**8**

PROPOSED MITIGATION:

- As the work front progresses the Contractor is to check that vegetation clearing has the prior permission of the Engineer.
- All indigenous vegetation must be marked and avoided as far as practically possible.
- Regular maintenance including irrigation and organic fertilization where necessary must be included in the rehabilitation plan.
- Plants that are removed for the installation of the culvert must be kept on site. Hydrophytic plants must be kept damp in the river using for example a coffer dam.
- An invasive alien control programme must be implemented to prevent further spread of these species as per the legislative requirements specified under the Conservation of Agricultural Resources Act, 1983 amended in 2001 and the National Environmental Management: Biodiversity Act 2004 (Act No, 10 of 2004). An ongoing management plan must be implemented for the eradication of alien species. They must be monitored, controlled and removed from the site as they emerge.
- Only trees that have NOT been marked beforehand are to be removed.
- Gathering of firewood, fruit, muthi plants, crops or any other natural material on site or in areas adjacent to the site is prohibited.
- Immediate re-vegetation of stripped areas and removal of aliens by weeding must take place. This significantly reduces the amount of time and money that must be spent on alien plant management during rehabilitation.
- While restoration of vegetation to pristine conditions is virtually impossible, post-construction rehabilitation is essential to mitigate the negative impacts of construction activities and must be implemented as soon as possible.
- Vegetation clearing must not be undertaken more than 10 days in advance. Vegetation clearing must be kept to a minimum and grass buffer strips must be implemented wherever possible at the development edge at the start of construction.
- Effective rehabilitation of the development footprint as well as the implementation of erosion control measures is of vital importance to mitigate the risks.

- Grass planted with fertilizer are very effective at covering exposed soil. It is important to note the use of fertilizers, must be undertaken with caution and must not be allowed, in any circumstances, to run into drainage lines, rivers, wetlands, to avoid any possible Eutrophication impacts
- Only vegetation that needs to be removed, should be removed in a phased and controlled manner.

Potential Impact		Significance Rating					
4. IMPACT ON FAUNA							
4.1 Hunting and Poaching by construction workers.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Short-term	High	Moderate	**MES**
			2	2	4	6	**40**
	After Mitigation		local	Short-term	Low	Low	**LES**
			2	2	2	4	**14**

PROPOSED MITIGATION:

- The animals on site and in surrounding areas is strictly prohibited and workers must be instructed that hunting, poaching and fishing is directly a noncompliance of the authorized activity.
- Traps on site and in surrounding areas are prohibited.
- Guidelines must be set out by the ECO during the construction phase, which must be adhered too, in order to ensure that no possible impacts occur.
- The ECO will monitor such activities for non-compliance

4.2 Habitat Fragmentation Development can act as barriers or filters to animal movement and lead to habitat fragmentation. Many species will not cross the open space created by a development due to the threat of predation. This barrier effect can prevent species from migrating and re-colonizing areas where the species has gone locally extinct as well as restricting access to seasonally available recourses.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Scale	Long-term	Medium	Moderate	**MES**
			2	4	3	6	**36**
	After Mitigation		Local	Long-term	Low	Low	**LES**
			2	4	2	4	**20**

PROPOSED MITIGATION:

- To prevent possible collisions with animals in natural areas, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit should be followed.
- All food should be securely stored away to prevent attraction of faunal species and all rubbish should be disposed of away from the site. Bins should have tightly fitting lids to prevent faunal species raiding the bin

Potential Impact	Significance Rating						
5. IMPACT ON THE WATERCOURSE							
5.1 Degradation of the stream and surrounding environment by pollution Mismanagement of waste and pollutants like hydrocarbons, construction waste and hazardous chemicals will result in these substances entering and polluting sensitive natural environments either directly through surface runoff during rainfall events, or subsurface water movement. The linked nature of the watercourses will result in pollutants being carried downstream from the construction site having consequences on further downstream users including aquatic faunal species. An increase in pollutants will lead to changes in the water quality, affecting their ability to act as an ecological corridor.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct impact	Local	Immediate	High	Moderate	**MES**
			2	1	4	6	**36**
	After Mitigation		local	Immediate	Low	Minor	**LES**
			2	1	2	2	**10**

PROPOSED MITIGATION:

- No cement will be mixed on site; it will be transported to site.
- Storage of materials, chemicals and fuels must be kept safely in a way that does not pose a risk to the surface and ground water.
- Temporary bunds must be constructed around chemical or fuel storage area and such storages should be located outside the 1:100-year flood line of the water source.
- No depot of any substance which is likely to cause pollution is allowed within 100m of the stream. Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using correct waste facilities (not to be disposed of within the natural environment).
- Contaminated soils must be removed and the affected area rehabilitated immediately.

5.2 Modification of Flow regimes. Modification of the flow and riverine dynamics of the watercourse as a result of the mud track upgrade and proposed structure within the watercourse.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Indirect Impact	Site	Long-term	High	Moderate	**MES**
			1	4	4	6	**44**
	After Mitigation		Site	Long-term	Low	Low	**LES**
			1	4	2	4	**18**

PROPOSED MITIGATION:

- The proposed structures will aid in avoiding continuous ponding and accumulated debris within the stream, as well as undirected storm water that causes erosion in the area.
- Diversion must be adequately dissipated to prevent erosion and scouring at the outlet of downstream water flow velocities by using rocks for stability.
- Design options should be thoroughly investigated to minimize the alteration of the adjacent habitats to concrete environments, whilst taking into consideration the type of structure and materials utilized.
- Channel crossing during the construction period must be restricted to a single designated crossing point of suitable design that does not restrict river flow and allows only for the passage of light vehicles.
- If water is temporarily diverted or dammed, natural flow patterns must be restored after construction has been completed, and the channel/wetland rehabilitated/restored to their original or natural configurations.
- Water diversions must be monitored, with only one diversion made at a time.
- Under no circumstance may the excavation of an alternative channel or the damming of the stream be undertaken.
- When sandbags are used to temporarily divert/impound water then these bags must be in good condition and wrapped in an impermeable material.
- All imported or repositioned sediment and materials within the river channel and on the riverbanks must be removed, and the disturbed environment(s) must be returned to its pre-construction state, or an improved state, once construction is complete or as soon as practicably possible.

5.3 Weathering and Sedimentation as well as placement of causeway and pipe culverts		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
Construction activities such as excavation exposes soil to environmental factors such as wind and rain, this may increase sedimentation of the stream as well as cause exposed soils and rocks to be eroded through chemical and mechanical weathering.	**Before Mitigation**	Direct Impact	Site	Long-term	High	Moderate	**MES**
			1	4	4	6	**44**
	After Mitigation		Site	Long-term	Low	Low	**LES**
			1	4	2	4	**18**

PROPOSED MITIGATION:

- Terrestrial areas with steep slopes and high erosion potential must be identified by the site engineer prior to the commencement of construction.
- Install sediment barriers across the entire construction right-of-way immediately upslope of the stream to prevent sediment flow into the stream.
- Avoid construction activities that disturb soil during periods of expected heavy or lengthy rainfall. Preserve grassed areas and vegetation where possible because they help filter sediment from storm water before it reaches the drainage system and stop rain turning exposed soil into mud.
- Other sediment control techniques include but are not limited to silt fences, rock check dams and fibre logs.
- The installation of culverts must span the entire width of the watercourse channel to maintain the channel functions.
- The placement of the causeway must be within the existing road footprint, where disturbance has already taken place.
- The culverts must be designed to avoid excessive ponding at the inlet which may cause accumulation of floating debris, culvert clogging, and alterations to the hydrological and geomorphologic processes which govern the stream/wetland.
- The culvert must be wider than the channel width. Undersized culverts constrict the stream flow and become perched, causing soil erosion downstream of these structures.
- The culvert must be set at the correct elevation; the slope of the culvert must follow the slope of the channel. The base of the culvert must have a minimum of 800mm stone base to allow water to flow under the concrete base.
- Should the causeway be constructed on the existing stream bed, it is recommended that it is seated at least 0.50m below river bed level to prevent the ingress of water between the underside of the causeway and the bearing layer.
- The causeway must be constructed perpendicular to the direction of flow of the river to avoid differential forces from acting on the walls of the causeway during times of peak flow.

- The site must be managed to prevent excessive runoff from disturbed areas running into the watercourses by:
  -Encouraging groundwater infiltration;
  -Retaining stormwater runoff and slowly releasing it;
  -Allowing natural plant buffers around the stream.
  -Protect the entire culvert structure with cut-off walls, riprap, gabions, concrete slabs, or other scour protection.
- Appropriate storm water management must be implemented at the worksite as well as at the construction site camp.
- A shallow drain network can be constructed during the land clearing phase to contain any soil lost during rainy periods.
- For in stream works, the construction of sand berms and platforms must be restricted to specific areas, and reduced in size and for a short duration.
- All soft edges including berms & platforms must be stabilized.
- Soil erosion and downstream deposition must be monitored regularly to timeously apply appropriate mitigation measures.
- Restoration and re-vegetation of exposed areas must take place as soon as practically possible to reduce the chances of erosion

Potential Impact		Significance Rating					
6. WASTE							
6.1 Improper storage and disposal of waste on site.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Site	Short-term	High	Moderate	**MES**
			1	2	4	6	**36**
	After Mitigation		Site	Immediate	Low	Low	**LES**
			1	1	2	6	**12**

PROPOSED MITIGATION:

- All solid waste generated during the construction process must be placed in a designated waste collection area within the construction camp and must not be allowed to blow around the site, be accessible by animals, or be placed in piles adjacent to the skips/ bins.
- Proper waste bins separated by material type will be placed on site. Waste will be disposed at a permitted landfill site and recycling material such as glass, paper and plastic will be encouraged. This will prevent wind or rain from carrying waste off-site into water bodies.

6.2 Littering around the site may cause visual, land and water pollution.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Short-term	High	Moderate	**MES**
			2	2	4	6	**40**
	After Mitigation		Local	Short-term	Low	Low	**LES**
			2	2	2	4	**16**

PROPOSED MITIGATION:

- Sufficient bins or skips must be provided on site.
- Regular inspections and tiding will be done on site before workers are dismissed for the day so that the site will be tidy at all times.
- Recycling is to be encouraged by providing separate bin plastics.

6.3 Improper disposal of rubble.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Site	Immediate	High	Moderate	**MES**
			1	1	4	6	**32**
	After Mitigation		Site	Immediate	Low	Low	**LES**
			1	1	2	4	**12**

PROPOSED MITIGATION:

- Construction rubble shall be disposed of in a demarcated spoil dumps that has been approved by the Engineer for temporary storage, thereafter all rubble must be transported to a registered landfill site.
- The contractor will collect a certificate for disposal from the landfill site for record purposes.

6.4 Lack of appropriate sanitation facilities could lead to pollution of the water table.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Site	Short-term	High	Moderate	**MES**
			1	2	4	6	**36**
	After Mitigation		Site	Short-term	Low	Low	**LES**
			1	2	2	4	**14**

PROPOSED MITIGATION:

- Portable chemical toilets must be made available on site and must be situated 50m from the stream.
- The chemical toilet company will maintain and service the facilities every two weeks throughout the duration of the construction.
- Portable toilets must be placed outside of the 1:100-year flood line from streams or 30m away from the riparian zone, whichever is the greatest.

6.5 Improper disposal of chemical toilet waste resulting in the contamination of water resources.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Short-term	High	Moderate	**MES**
			2	2	4	6	**40**
	After Mitigation		Local	Immediate	Low	Low	**LES**
			2	1	2	4	**14**

PROPOSED MITIGATION:

- A registered chemical waste company is to be used to remove waste from chemical toilets on site and will be disposed at an appropriate and licensed waste disposal facility.
- Care must be taken to avoid contamination of soils and water.

Potential Impact	Significance Rating						
7. NOISE QUALITY							
7.1 Increased Noise Levels Noise from the construction vehicles, construction machinery and construction workers may disturb the community peace as well as surrounding environment.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Short-term	Definite	Moderate	**MES**
			2	2	4	6	**40**
	After Mitigation		Local	Immediate	Medium	Low	**LES**
			2	1	3	3	**18**

PROPOSED MITIGATION:

- Construction machinery such as jackhammers, construction vehicles such as sand and water trucks loaded with stone and water tanks will create noise. Such noises will be generated in a discontinuous fashion during the day only while the road is being developed.
- The level of the noise generated will be low and below 70 decibels threshold limit.
- No noise will be generated during the operational phase; therefore, the impact is temporary in nature and can be minimized with effective monitoring and proper maintenance of tools and equipment.

Potential Impact	Significance Rating						
8. AIR QUALITY							
8.1 Accumulation of Dust High levels of dust is emitted into the atmosphere by construction activities.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Immediate	Definite	High	**MES**
			2	1	5	8	**55**
	After Mitigation		Local	Immediate	Medium	Minor	**LES**
			2	1	3	2	**15**

PROPOSED MITIGATION:

- During the construction period, areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust and construction vehicles must adhere to the allocated speed limit of 30km/hr. to avoid excessive dust emission.
- Do not exceed the freeboard levels when transporting construction related materials
- Use dust abatement techniques, such as spraying from a water tanker, on unpaved, un-vegetated surfaces to minimise airborne dust and during earthmoving activities, prior to clearing, before excavating, backfilling, compacting, or grading.
- Camp construction areas / Access road / work face –that have been stripped of vegetation must be dampened periodically to avoid excessive dust. This must apply particularly in instances of high wind speed or when dust is seen to be generated in significant quantities.
- Cover construction materials, skips and stockpiled soils if they are a source of dust.
- Access and other cleared surfaces must be dampened whenever possible, especially in dry and windy conditions to avoid excessive dust.
- Excavation during periods of high winds should be temporarily put on hold to avoid pollution.

8.2 Fume Emissions from construction vehicles and on-site machinery.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Short-term	Definite	Moderate	**MES**
			2	2	5	6	**50**
	After Mitigation		Local	Short-term	Medium	Low	**LES**
			2	2	3	4	**24**

PROPOSED MITIGATION:

- Vehicles must be well maintained to minimize vehicular fumes. Should excessive emissions be observed, the Contractor must remove the vehicle from the site immediately.

Potential Impact	Significance Rating						
9. VISUAL QUALITY							
9.1 Aesthetic value of the site Should appropriate housekeeping measures not be implemented by the contractor; this will have an adverse impact with respect to environmental aesthetics of the site.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Immediate	Definite	Moderate	**MES**
			2	1	5	6	**45**
	After Mitigation		Local	Immediate	Medium	Minor	**LES**
			2	1	3	2	**15**

PROPOSED MITIGATION:

- Facilities such as toilets, bins, tanks and stockpiles must never be left uncovered or unfenced to minimize negative visual impact on the community as well as potentials visitors in the area.
- The ECO must regularly inspect the site to ensure that it is neat and clean especially in and around the construction site.

Potential Impact	Significance Rating						
10. SOCIO-ECONOMIC							
<u>10.1 Positive Impact:</u> **Improved living standards**. The construction phase will be associated with positive socio-economic impacts as construction creates temporary employment for community members. The road would increase the potential for residents to improve their business potential both locally and give them better access to outside markets.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct/ Cumulative Impact	Local	Long-term	High	N/A	**LES**
			2	4	4	N/A	**N/A**
	After Mitigation		N/A	N/A	N/A	N/A	**N/A**
			N/A	N/A	N/A	N/A	**N/A**

- Access to basic amenities such as schools and clinics due to proper roads and structures
- Temporary employment for locals during the construction and operational phase (for maintenance purposes)
- Community members can expand their local business by going and selling their local produce in town.
- The construction site will be rehabilitated which will increase the aesthetic value of the area
- The development might open doors for future developments to take place
- Locals can learn from what was taught during the induction to further their own commercial and subsistence farming by speaking to construction workers

10.2 Negative Impact: **Increase accessibility to the community could lead to increase criminal activities by interlopers**. The potential in-migration of workers and job-seekers is likely to result in other cumulative impacts, such as conflict with existing community members, social inconveniences, and conflict for resources.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Long-term	Medium	Moderate	**MES**
			2	4	3	6	**36**
	After Mitigation		Local	Long-term	Low	Minor	**LES**
			2	4	2	2	**16**

PROPOSED MITIGATION:

- To mitigate most of these impacts, the Nquthu Municipality should consider the establishment of a Community Monitoring Forum (CMF) to monitor the construction phase and the implementation of the recommended mitigation measures. The CMF should be established before the construction phase commences, and should include key stakeholders, including representatives from local communities, local councillors, affected landowners and the contractor(s). The CMF should also be briefed on the potential risks to the local community associated with construction workers.

Potential Impact		Significance Rating					
11. IMPACTS ON HEALTH & SOCIAL WELL-BEING							
11.1 Occupational Health and Safety (OHS) The Occupational Health and Safety (OHS) Act (Act 85 of 1993) provides for the protection of the health and safety of employees and other persons at a workplace. The prevention and management of work related incidents are addressed by the OHS Act.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	Local	Long-Term	Medium	Moderate	**MES**
			2	4	3	6	**36**
	After Mitigation		Local	Long-Term	Low	Low	**LES**
			2	4	2	4	**20**

PROPOSED MITIGATION:

- Construction related public health impacts due to possible air/dust pollution, noise pollution, light pollution and vibration should also be considered in terms of the OHS Act 85 of 1993.
- Furthermore, it is advised that the contractor ensure that everyone working at the construction site is competent at the work they do. They must be properly trained and have the experience and knowledge to work in a safe and responsible manner to ensure unnecessary accidents do not occur.
- Areas of the project where there are particular health or safety hazards need to be marked and treated as danger areas. All people, other than those who have been specifically authorized to enter, must be excluded from such areas, for example by erecting warning signs and barriers. The barriers should clearly identify the boundary of the danger area and make entry impossible without a conscious effort.

Potential Impact	Significance Rating						
12. IMPACTS ON HERITAGE SITES AND GRAVES							
12.1 Grave and heritage resource disturbances. Potential for grave disturbance during construction activities as well as heritage resource disturbance / destruction during construction.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct	Local	Long-Term	High	High	**MES**
			2	4	4	8	**56**
	After Mitigation		Local	Long-Term	Low	Low	**LES**
			2	4	2	4	**20**

PROPOSED MITIGATION:

- Prior to construction activities commencing the contractor and project manager must ensure that the adequate measures have been taken to identify underground / hidden services and potential features of heritage significance which could potentially be on / at the specific site.
- The construction and design requirements of the owners of any underground services must be adhered to at all times.
- Should any features of heritage of significance or graves be identified / uncovered during construction events then work in that area must cease immediately until an archaeologist has inspected the feature and is satisfied, or the necessary authorizations to continue with work have been obtained from AMAFA

Potential Impact	Significance Rating						
13. NO-GO OPTION							
13.1 Should the project not go ahead this will pose a major safety concern for the local community and people who utilize the road. During rainy seasons, the stream is flooded and the crossing point becomes inaccessible. The local community's safety will therefore be compromised as well as the environment due to floods which can erode and leave soils waterlogged. This leads to various other negative impacts both environmentally and socially.		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
	Before Mitigation	Direct Impact	-	-	-	-	**-**
			-	-	-	-	**-**
	After Mitigation		-	-	-	-	**-**
			-	-	-	-	**-**

Proposed construction of causeway structure as part of a local road upgrade of Squbudu Ext within Nquthu Municipality.							
Impacts/Significance associated with the Operational Phase							
Potential Impact	**Significance Rating**						
1. SOIL EROSION		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
1.1 The risk and potential impact of soil erosion during the operational phase as a result of poorly maintained structures and ineffective storm water control techniques.							
	Before Mitigation	Direct Impact	Site	Permanent	Definite	Moderate	**HES**
			1	5	5	6	**60**
Dilapidation of the slab structure and poor stormwater techniques could lead to possible erosion.	**After Mitigation**		Site	Permanent	Medium	Low	**MES**
			1	5	3	4	**30**

PROPOSED MITIGATION:

- The duration of exposed soil must be kept to a minimum and rehabilitation must be initiated as soon as decommissioning is completed.
- The contractor must stabilize cleared areas to prevent and control erosion and/or sedimentation.
- Stockpiled topsoil must be replaced following construction activities and be shaped to match the natural topography of the site. All stripped topsoil MUST be appropriately replaced on the site.
- Any vegetation that requires removal during the decommissioning phase must be done so in a phased manner that does not damage other vegetation unnecessarily.
- Areas sensitive to erosion must be identified, and monitored to ensure that erosion risks are minimised.
- Any erosion features must be stabilised following construction activities with soft engineering (preferred over hard engineering options) such as re-sloping and stabilising. Where risks are high, unstable/eroding banks must be reinforced/stabilised using appropriate engineering works such as gabions/rock pack/geotextile bags
- On-going maintenance must be implemented by the Applicant.
- The river banks need to be rehabilitated and re-vegetated to prevent any possible erosion once decommissioning is complete.
- Control measures must be implemented during decommissioning and care should be taken to prevent any rubble or other waste material entering the watercourse.

Potential Impact	Significance Rating						
2. SURFACE RUN-OFF		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
2.1. Impermeable surfaces increase run-off. Impervious surfaces such as roads reduce infiltration of water into the ground and accelerate runoff to ditches and streams. In addition to increasing imperviousness, removal of vegetation and soil, grading the land surface, and constructing drainage networks increase runoff volumes and shorten runoff time into streams from rainfall.	.	**Before Mitigation**	Cumulative	Site	Permanent	High	Moderate	**MES**
				1	5	4	6	**48**
		After Mitigation		Site	Permanent	Medium	Low	**MES**
				1	5	3	4	**30**

PROPOSED MITIGATION:

- The duration of exposed soil must be kept to a minimum and rehabilitation must be initiated as soon as decommissioning is completed.
- The contractor must stabilize cleared areas to prevent and control erosion and/or sedimentation.
- Any vegetation that requires removal during the decommissioning phase must be done so in a phased manner that does not damage other vegetation unnecessarily.
- On-going maintenance must be implemented by the Applicant.
- The river banks need to be rehabilitated and re-vegetated to prevent any possible erosion once decommissioning is complete.
- If the runoff during or after construction will cause erosion in a channel, the channel must be lined or flow control methods must be installed. The first choice of lining is grass as this will reduce runoff velocities and provide water quality benefits through filtration and infiltration. Should the velocity in the channel erode the grass, turf reinforcement mats, riprap, gabions or reno-mattresses must be used.
- Watercourse crossings must be regularly checked to ensure they are not being degraded or causing degradation and that, openings (under or at a culvert opening) are kept clear to avoid impeding flows to downstream areas. This minimises erosion.
- All storm water runoff from the site must be supplemented by an appropriate road drainage system that must include swales, U-drain rather than simply relying on underground piped systems or concrete V-drains.
- Control measures must be implemented during decommissioning and care should be taken to prevent any rubble or other waste material entering the watercourse

Potential Impact	Significance Rating						
3. NO-GO ALTERNATIVE		**Impact Type**	**Scale**	**Duration**	**Probability**	**Magnitude**	**Significance Points (SP)**
3.1 If the project does not go ahead, community members will continue experiencing safety risk crossing the stream during periods of high water flow and flooding as well as muddy surfaces due to there being no gravel roads in place.							
	Before Mitigation	Direct Impact	-	-	-	-	**-**
			-	-	-	-	**-**
	After Mitigation		-	-	-	-	**-**
			-	-	-	-	**-**

ENVIRONMENTAL IMPACT STATEMENT

Preferred Alternative

The preferred route has been carefully planned to cater for the substantiated needs and requirements of the community while being mindful of imposing the least negative environmental impacts. The preferred route occurs within the existing road servitude. Vegetation clearance will be restricted to alien invasive vegetation; no indigenous vegetation will be removed as the upgrade follows the existing track indicating disturbance. The preferred route does not traverse any environmentally sensitive area such as wetlands and no homesteads will be re-located. It is more cost effective and considered a more practical alternative from an environmental and engineering perspective. Furthermore, the route follows the existing track which has resulted in significant alteration of the natural habitat. According to the risk rating after all significant impacts were taken into consideration, the preferred route is said to have a **low environmental significance** after all impacts were rated individually. It was found that most of the impacts listed and rated have a low environmental significance. These impacts have low negative risk to the quality of the receiving environment. In this case, most of the impacts are short term, local in extent, not intense in its effect and may not be likely to occur. A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.

Alternative 2

No alternative site or route has been identified. Alternative alignments would require additional disturbance to the environment with very little potential of improvement in terms of environmental performance. This is a linear activity and the proposed gravel road will be upgraded on the existing track to minimise negative impacts to the environment, furthermore DOT has assessed other options and none were cost effective. As a new road, will require relocation of dwellings and disturbance to the natural state of the surroundings. Therefore, upgrading the existing track to a gravel road with the proposed structures along the existing crossing points is the most feasible option.

No – Go Alternative:

THE NO-GO ALTERNATIVE WOULD BE TO NOT UPGRADE THE EXISTING MUD TRACK AND TO NOT PUT A CAUSEWAY STRUCTURE AND PIPE CULVERTS AT THE CROSSING POINTS.

The No-go Alternative has been considered and assessed. The current situation is deemed unfavourable due to the current state of the mud track which is prone to erosion because of inadequate structures along the route. This is not a feasible and reasonable option, as the proposed upgrade will have a net positive impact on the receiving environment.

CONCLUSION

It is the opinion of the EAP that all potential impacts that could potentially occur during the construction and operational phase of the road construction and causeway and culvert installation have been identified and key impacts and their mitigation measures are provided in this report. There are no route alternatives as the existing road will be upgraded to a gravel road causing minimal negative impact to the environment. No fatal flaws were identified during the Basic Assessment Process, which included a comprehensive Public Participation Process. Most of the impacts will occur during the construction phase, and therefore is temporary in nature and extent. The EMPr has been compiled as to provide adequate mitigation measures for the proposed activities including the proposed pipe culvert construction.

The construction would result in minor environmental impact whilst promoting development in the area. The proposed construction of the pipe culvert structures, portal causeway and upgrade of the road from an environmental perspective will result in an improved situation with reducing erosion and damage caused by storm water run-off. It is the EAP's opinion that if all mitigations presented in the report are adhered to, there will be minimal impact to the receiving environment. The construction of these pipe culverts from an environmental perspective will result in an improved situation with less erosion and damage to the drainage line when compared to the current informal crossing. It is not logical to upgrade the existing road without constructing a proper crossing point, therefore both activities are recommended provided the construction EMP is strictly adhered to and an ECO is appointed during the construction phase.

Should the proposed construction of both the road and the structures not go ahead, the site would be exposed to on-going erosion as well as major safety concerns for crossing the existing track during high rainfall periods. The proposed construction has positive impacts with minimal environmental impacts.

EAP RECOMMENDATIONS

- The EMPr must be strictly adhered to and implemented during the construction and operational phases.
- An ECO must be appointed by the applicant to undertake Environmental audits monthly and submit **monthly reports** to the Competent Authority.
- All mitigation measures and factors outlined in the BAR must be considered.
- The site engineer must ensure that proper storm water management takes place on site during the construction phase.
- Any pollution problems arising from the activity must be addressed immediately by the contractor with the assistance of the appointed ECO.
- All spillages must be cleaned immediately with appropriate tools and disposed at registered sites.
- Site rehabilitation must take place directly after construction ceases.
- Waste recycling must be encouraged among construction workers.
- Prior to construction all relevant permits must be obtained.
- Local labour must be recruited for the proposed construction where possible.
- Should cultural artefacts be found in close proximity to the site, construction must cease immediately and the applicant must appoint a heritage specialist to submit a report to AMAFA. The construction will continue thereafter depending on specialist recommendations.
- The activities are in keeping with the land use of the surrounding area and it is therefore the EAP ‘s recommendation that the preferred option be approved.
- Based on the impacts identified in this assessment report and the subsequent mitigation measures proposed, it is the opinion of the Environmental Assessment Practitioner (EAP) that the said activities be authorized by the Competent Authority.

_____ _____

UVISHKAAR SOHAN **DATE**

_____ _____

SHELDON SINGH **DATE**

Appendix A: Maps

- **A.1 – Aerial Map**
- **A.2 – Locality Map**

A.1 – Aerial Map

A.2 – Locality Map

Appendix B: Site Photo’s

Appendix C: Facility illustration(s)

- **C.1 – Standard Portal Culvert Causeway Structure**
- **C.2 – Concrete Pipe Culvert Structure**
- **C.3 – Stone Pitched Culvert Structure**

C.1 – Standard Portal Culvert Causeway Structure

C.2 – Concrete Pipe Culvert Structure

C.3 – Stone Pitched Culvert Structure

Appendix D: Specialist Studies

Appendix E: Public Participation

E.1 – Summary of comments/ responses from I&AP's

E.2 – Proof of receipts

E.3 – Copy of newspaper advertisement

E.4 – Copy of site notices

E.5 – Comments from AMAFA

E.6 – Comments from KZN Wildlife

E.7 – Comments from Water and Sanitation

E.8 – Attendance Register

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Appendix F: Environmental Management Programme (EMPr)