**NEAS REF NO: KZN/EIA/0015627**
**EDTEA REF NO: DC23/004/2021**


# Proposed Construction of Culvert on Local Road L1511 in Okhahlamba Local Municipality Kwazulu-Natal

# Consultation Basic Assessment Report

**Prepared by:** @Gedezar Consulting *Green is the Future!!!*

**Prepared for:** transport Department: Transport PROVINCE OF KWAZULU-NATAL

**Client**:
KwaZulu-Natal Department of Transport [KZN DoT]

**Reference Document as:**
Consultation Basic Assessment Report (cBAR) for the Proposed Construction of Culvert on Local Road L1511 in Okhahlamba Local Municipality Kwazulu-Natal

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**Report Compiled by**:
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**Date of Report**:
10 April 2021

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KwaZulu-Natal Department of Transport.

**Competent Authority:**
Department of Economic Development, Tourism and Environmental Affairs [KZN EDTEA]

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# NOTICE

This document and its appendices are a public document and made available to the Competent Authority [CA], commenting authorities, stakeholders, Interested and Affected Parties [I&APs], and the general public. This **Consultation Basic Assessment Report [cBAR]** is available for comment for a period of **30 days** from **13 May 2021 & 14 June 2021**. This report will then be amended and updated in response to the comments received during this review period. Once finalised the BAR will be submitted to the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, eThekwini District [KZN EDTEA] for decision-making.

Copies of this cBAR are available at strategic public places in the project area [see below] and upon request from At Gedezar Consulting.

- Amangwane Traditional Council Court/Offices;
- Okhahlamba Local Municipality ward 3 Councillor Offices

**OPPORTUNITIES PUBLIC REVIEW**

The following methods of public review of the cBAR are available:

- Completing the comment sheet enclosed with the Background Information Document [BID – which was circulated on 13 May 2021 and can be requested from At Gedezar Consulting];
- Written submissions by post, e-mail or fax; and
- Telephonic submissions.

**DUE DATE FOR COMMENT ON CONSULTATION BASIC ASSESSMENT REPORT [cBAR]: 14 June 2021**

**SUBMIT COMMENTS AND QUERIES TO:**

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Disclaimer

The opinions expressed in this cBAR are been based on the information supplied to At Gedezar Consulting. At Gedezar Consulting has exercised all due care in reviewing the supplied information. Whilst At Gedezar has compared key supplied data with expected outcomes, and duly interrogated all information supplied to us, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. At Gedezar does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of At Gedezar's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this cBAR, about which At Gedezar had no prior knowledge nor had the opportunity to evaluate.

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## GLOSSARY

**Activity [Development]** – an action either planned or existing that may result in environmental impacts through pollution or resource use.

**Alternative** – a possible course of action, in place of another, of achieving the same desired goal of the proposed project. Alternatives can refer to any of the following but are not limited to: site alternatives, site layout alternatives, design or technology alternatives, process alternatives or a no-go alternative.

**Applicant** – the project proponent or developer responsible for submitting an environmental application to the relevant environmental authority for environmental authorisation.

**Bench Wetland** - an area of mostly level or nearly level high ground [relative to the broad surroundings], including hilltops / crests [areas at the top of a mountain or hill flanked by down-slopes in all directions], saddles [relatively high-lying areas flanked by down-slopes on two sides in one direction and up-slopes on two sides in an approximately perpendicular direction], and shelves / terraces / ledges [relatively high-lying, localised flat areas along a slope, representing a break in slope with an up-slope one side and a down-slope on the other side in the same direction].

**Biodiversity** – the diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.

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

**Cumulative Impacts** – impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities to produce a greater impact or different impacts.

**Direct Impacts** – impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.

**Ecological Reserve** – the water that is necessary to protect the water ecosystems of the water resource. It must be safeguarded and not used for other purposes. The Ecological Reserve specifies both the quantity and quality of water that must be left in the national water resource. The Ecological Reserve is determined for all major water resources in the different water management areas to ensure sustainable development.

**Ecosystem** – a dynamic system of plant, animal [including humans] and micro-organism communities and their non-living physical environment interacting as a functional unit. The basic structural unit of the biosphere, ecosystems are characterised by interdependent interaction between the component species and their physical surroundings. Each ecosystem occupies a space in which macro-scale conditions and interactions are relatively homogenous.

**Environment** – In terms of the National Environmental Management Act [NEMA] [Act No 107 of 1998] [as amended], *"Environment" means the surroundings within which humans exist and that are made up of:*

*a) the land, water and atmosphere of the earth;*

*b) micro-organisms, plants and animal life*

*c) any part or combination of [a] or [b] and the interrelationships among and between them; and*

*d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.*

**Environmental Assessment**– the generic term for all forms of environmental assessment for projects, plans, programmes or policies and includes methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.

**Environmental Authorisation [EA]** – an authorisation issued by the competent authority in respect of a listed activity, or an activity which takes place within a sensitive environment.

**Environmental Assessment Practitioner** – the individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations.

**Environmental Impact** – a change to the environment [biophysical, social and / or economic], whether adverse or beneficial, wholly or partially, resulting from an organisation's activities, products or services.

**Environmental Impact Assessment [EIA]** – the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.

**Environmental Issue** – a concern raised by a stakeholder, interested or affected parties about an existing or perceived environmental impact of an activity.

**Environmental Management** – ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

**Environmental Management Programme –** A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. This EMPr focuses on the construction phase, operation [maintenance] phase and decommissioning phase of the proposed project.

**Expansion** – means the modification, extension, alteration or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the capacity of the facility or the footprint of the activity is increased.

**General Waste** – household water, construction rubble, garden waste and certain dry industrial and commercial waste which does not pose an immediate threat to man or the environment.

**Hazardous Waste** – waste that may cause ill health or increase mortality in humans, flora and fauna.

**Indirect Impacts** – indirect or induced changes that may occur as a result of the activity. These types if impacts include all of the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

**Integrated Environmental Management** – a philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy [and principles] is interpreted as applying to the planning, assessment, implementation and management of any proposal [project, plan, programme or policy] or activity – at local, national and international level – that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools for a particular proposal or activity. These may include environmental assessment tools [such as strategic environmental assessment and risk assessment], environmental management

tools [such as monitoring, auditing and reporting] and decision-making tools [such as multi-criteria decision support systems or advisory councils].

**Interested and Affected Party** – for the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, means an interested and affected party contemplated in Section 24[4] [a] [v], and which includes – *[a] any person, group of persons or organisation interested in or affected by such operation or activity; and [b] any organ of state that may have jurisdiction over any aspect of the operation or activity*.

**Mitigate** – the implementation of practical measures designed to avoid, reduce or remedy adverse impacts or enhance beneficial impacts of an action.

**No-Go Option** – in this instance the proposed activity would not take place, and the resulting environmental effects from taking no action are compared with the effects of permitting the proposed activity to go forward.

**Rehabilitation**– a measure aimed at reinstating an ecosystem to its original function and state [or as close as possible to its original function and state] following activities that have disrupted those functions.

**Sensitive Environment** – any environment identified as being sensitive to the impacts of the development.

**Significance** – significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change [i.e. magnitude, intensity, duration and likelihood]. Impact significance is the value placed on the change by different affected parties [i.e. level of significance and acceptability]. It is an anthropocentric concept, which makes use of value judgements and science-based criteria [i.e. biophysical, social and economic].

**Stakeholder Engagement** – the process of engagement between stakeholders [the proponent, authorities and I&APs] during the planning, assessment, implementation and / or management of proposals or activities.

**Sustainable Development** – development which meets the needs of current generations without hindering future generations from meeting their own needs.

**Watercourse** – means:

*a]* *a river or spring;*

*b]* *a natural channel or depression in which water flows regularly or intermittently;*

*c]* *a wetland, lake or dam into which, or from which, water flows; and*

*d]* *any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 [Act No. 36 of 1998] and a reference to a watercourse includes, where relevant, its bed and banks.*

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

## ACRONYMS

| | |
|---|---|
| BA | Basic Assessment |
| BAR | Basic Assessment Report |
| BGIS | Biodiversity Geographic Information Systems |
| BID | Background Information Document |
| CBA | Critical Biodiversity Area |
| CBAR | Consultation Basic Assessment Report |
| CDO | Community Development Officer |
| CLO | Community Liaison Officer |
| C-PLAN | Conservation Plan |
| DAFF | Department of Agriculture, Forestry and Fisheries |
| DEA | Department of Environmental Affairs |
| DWS | Department of Water and Sanitation |
| EAP | Environmental Assessment Practitioner |
| KZN EDTEA | KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs |
| EIA | Environmental Impact Assessment [refers to environmental management tool] |
| EIS | Ecological Importance and Sensitivity |
| EKZNW | Ezemvelo KwaZulu-Natal Wildlife |
| GA | General Authorisation [refers to type of water use licence authorisation] |
| GA | General Arrangement [refers to drawing / illustration of structures] |
| GIS | Geographic Information System |
| GPS | Geographical Positioning System |
| I&AP | Interested and Affected Parties |
| IDP | Integrated Development Plan |
| KZN | KwaZulu-Natal |
| OLM | Okhahlamba Local Municipality |
| LLO | Local Liaison Officer |
| NBSAP | National Biodiversity Strategy and Action Plans |
| NEMA | National Environmental Management Act [Act No. 107 of 1998] [as amended] |
| NEM:BA | National Environmental Management Biodiversity Act [Act No. 10 of 2004] |
| NEM:WA | National Environmental Management Waste Act [Act No. 36 of 1998] [as amended] |
| NEM:AQA | National Environmental Management Air Quality Act [Act No. 39 of 2004] |
| NFA | National Forests Act [Act No. 84 of 1998] |
| NFEPA | National Freshwater Ecosystem Priority Area |
| NHRA | National Heritage Resources Act |
| NWA | National Water Act |

| | |
|---|---|
| NGO | Non-Governmental Organisation |
| OHSA | Occupational Health and Safety Act [Act No. 85 of 1993] |
| PES | Present Ecological State |
| PPP | Public Participation Process |
| PU | Planning Unit |
| REC | Recommended Ecological Category |
| RISFSA | Road Infrastructure Strategic Framework for South Africa |
| SADC | South African Development Community |
| SAHRA | South African Heritage Resources Agency |
| SAHRIS | South African Heritage Resources Internet System |
| SANBI | South African National Biodiversity Institute |
| SANRAL | South African National Roads Agency Limited |
| SARTSM | South African Road Traffic Signs Manual |
| SDF | Standard Design Flood |
| SWMP | Storm water Management Plan |
| WMA | Water Management Agency |
| WUL | Water Use Licence |

# EXECUTIVE SUMMARY

## Project Background and Introduction

Vumesa (Pty) Ltd was appointed by KZN Department of Transport to provide professional engineering services for the construction of a culvert structure on a local road L1511 in Ngoba area Bergville. The project comprises of a double celled 2.4m x 2.4m culvert box structure. This bridge will increase accessibility between the communities on either side of the stream and allow the community of Ngoba to reach Bergville town with no trouble. The culvert on road L1511, about 3 km southeast of Ngoba and South of Woodstock Dam, Bergville area, Okhahlamba Local District, southwestern KwaZulu Natal.

## The Basic Assessment [BA]

This BA follows the legislative process prescribed in the EIA Regulations [2014 as amended in 2017], as this application will be lodged under the EIA Regulations [2014, as amended in 2017]. The process is explained in the diagram below.


## Principal Objective of Report

This report constitutes the cBAR, which details the environmental outcomes, impacts and residual risks of the proposed activity. The report aims to assess the key environmental issues and impacts associated with the development, and to document I&APs issues and concerns. Furthermore, it provides background information of the proposed project, a motivation and details of the proposed project, and describes the public participation undertaken to date.

The objective of this report is to provide the project's I&APs, stakeholders, commenting authorities, and the CA, with a thorough project description and BA process description. The outcome being to engender productive comment / input, based on all information generated to date and presented herein. The document concludes by proposing what is believed to be a sound and environmentally risk calculated decision. In order to protect the environment and ensure that the development is undertaken in an environmentally

responsible manner, there are a number of significant portions of environmental legislation that were taken into consideration during this study and are elaborated on in this report.

## Technical Project Description of the L1511 Culvert structure.

### Culvert structure on L1511 structure

The proposed project is a construction of a double celled 2.4m x 2.4m box culvert structure on L1511 road. This bridge will increase accessibility between the communities on either side of the stream. The culvert will cross a small stream that seems to be perennial in nature, and is deeply incised.

## Regulatory Environmental Requirements

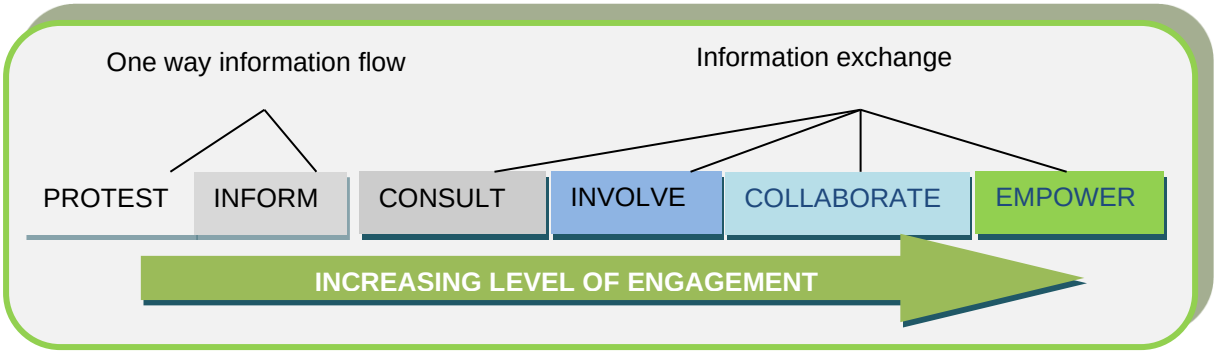
The KZN EDTEA – Okhahlamaba region is the lead / competent authority for this BA process and the development needs to be authorised by KZN EDTEA Department in accordance with the NEMA. The EIA Regulations under the NEMA consist of three [3] categories of activities 1 namely: Listing Notice 1 Activities [GNR 327 of 2014] which require a BA Process, Listing Notice 2 Activities [GNR 325 of 2014] which require S&EIR process, and Listing Notice 3 Activities [GNR 324 of 2014] which requires a BA process for specific activities in identified sensitive geographical areas.

Furthermore, this application complies with the NWA and the relevant water uses under Section 21 of the NWA are being applied for. The PPP for the WUL Application has therefore been executed in conjunction and combined with this BA process.

## Public Participation Process [PPP]

At Gedezar Consulting as the EAP is undertaking the PPP for this project as professional facilitators. It is imperative to note that the study area presents a challenge in that input from the community may be heavily reliant and dependent on the information exchange between the community leaders and a further challenge will be that of jargon barriers. However, the input from the community is essential for a complete assessment of the impacts and benefits associated with the proposed development. As such as an EAP, one is reliant on the indigenous knowledge, which will optimistically be forthcoming by the community.

The figure below depicts the approach taken by At Gedezar Consulting, where one-way information flow is avoided and information exchange is promoted, thereby enabling a higher level of engagement.




[1] *Note that a fourth listing notice has been drafted but not yet promulgated and hence not considered in the application of this BA.*

## Key Findings and Conclusions

Overall, the results of the BA process emerge as having a “negative low” significance after mitigation.

**Key findings of the specialist studies are:**

The following findings require consideration due to the significant negative and positive impacts they would likely have along the proposed alignment within the study area:

According to the **Wetland Assessment Findings**:

The Present Ecological State of the wetlands in the area show that all HGM (Hydro-Geomorphic) units are largely modified through changes within the catchment and the removal of wetland soils through erosion. The assessment of the current importance of the wetland unit in terms of ecosystem service provision indicates that wetland units provide medium to moderately-high levels of wetland functioning. The EIS (Ecological Importance and Sensitivity) score shows that the assessed unit falls into EIS Category C, which corresponds to a Moderate importance and sensitivity. All four wetlands on site have been impacted upon by subsistence crop production, livestock grazing, and changes to their hydrology (increased hardened surfaces) and geomorphology thus leading to an associated infestation by alien vegetation.

According to the **Ecological Assessment Findings**:

A total of 32 plant species were recorded during the field survey, of which 6 were alien plant species. Two plant species fall under the KwaZulu-Natal Nature Conservation Management Act were noted within the development footprint (Asparagus spp., and Ledebouria revoluta). The vegetation classification shows that biodiversity noteworthiness of the vegetation that would be immediately impacted upon by the proposed development is moderately low.

The desktop finding of the area show that there are currently 98 species as shown on the Ecological Impact assessment report which is listed in Appendix 2 of the Ecological Impact assessment. Thirty-seven species were confirmed on site which included the *Gyps coprotheres, Pycnonotus tricolor, Crithagra mozambicus* etc, the full list of identified species is available on Appendix 2 of the specialist (Ecological Impact Assessment) report. The desktop finding also flagged that there are 5 Red Data species that are possibly present on the study site, namely: *Gypaetus barbatus, Gyps coprotheres, Falco biarmicus, Ciconia nigra and Geronticus calvu.* However, the databases are frequently updated and verified by the Animal Demographic Unit at the Fitzpatrick Institude of African Ornithology. Which often result in a lack of data because there are no previous observations that have been made in an area, hence no predicted data for some species in that area. This means that verification of faunal data is essential in filling in gaps that may occur at desktop level. Due to lack of reporting rates and full protocols achieved within the study area for the various Animal Demographic Unit and South African Bird Atlas Project databases the desktop data for the area around the L1511 can be relatively inaccurate. During the site visit a kettle of Cape Vulture were identified along the proposed development site.

According to the **Heritage Impact Assessment**:

There are no heritage features that exist within the project footprint. The area is also not part of any known cultural landscape, the proposed construction of culvert along the road L1511 will not affect any heritage features therefore the proposed project may proceed from a general heritage perspective. There are no mitigation measures in place since there is no heritage features found on study site.

According to the **Palaeontological Impact Assessment**:

The study site for development is on the Adelaide Subgroup and close to Jurassic dolerite. The dolerite is of volcanic origin and it does not preserve any fossils, hence has low sensitivity.

Surface activities associated with the development may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either the wrong type to preserve fossils (dolerite) or represent transported and weathered alluvium and sands. Flowing rivers would not trap and preserve fossils. The surface is already very disturbed by the present paths and tracks. Since there is a very small chance that fossils from the Quaternary period may found nearby and may be disturbed, a Fossil Chance Find Protocol has been added to the full paleontological impact assessment report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low.

According to the **Geotechnical Survey Findings**

The study area was observed to be underlain by fill alluvium (hill wash), alluvium residual soils derived from in situ weathering of the underlaying sandstone, mudrock and rocks and weathered sandstone, dolerite and mudrock. The results from the site investigation show that the project site is stable and suitable for the proposed development.

## EAP Opinion and Recommendation to CA

This cBAR outlines an assessment of both the benefits and potential negative impacts anticipated as a result of the proposed construction of a double celled culvert structure on road L1511, KwaZulu-Natal. Having appropriately considered the proposal, there is unlikely to be any significant negative environmental impacts but rather socio-economic activities are prominent.

The findings conclude that there are no environmental fatal flaws that could prevent the proposed development, provided that the recommended mitigation and management measures contained within the EMPr are implemented.

## Way Forward

The impacts identified and assessed by way of risk ratings, have been extensively reported herein. The report at hand [i.e., cBAR] will now be made available for comment [as per the timeline diagram presented above] and amended post comment period to form the final BAR [i.e., fBAR].

The fBAR report will, together with a comprehensive issues trail, the final draft of the EMPr, and all addenda as referred to, will be submitted to the KZN EDTEA, for decision making. The fBAR report will thus be a culmination of scientific specialist studies' findings, public contribution via formal comment, comment made at meetings held, and the drawing of conclusions by the EAP as the environmental specialist.

# 1 BASIC ASSESSMENT DATA

## 1.1 Approach to the Study

This Consultation Basic Assessment Report [cBAR] has been compiled in accordance with the stipulated requirements in Government Notice Regulation [GNR] 326 Appendix 1 of the EIA Regulations [2014 as amended in 2017], which outlines the legislative Basic Assessment [BA] process and requirements for assessment of outcomes, impacts and residual risks of the proposed development. The cBAR further incorporates the findings and recommendations of the specialist studies conducted for the project.

The construction of a double celled 2,4m x 2,4m box culvert on road L1511 in Okhahlamba Local Municipality, which is one of the five (5) local municipalities making up uThukukela District Municipality. Therefore, the Competent Authority [CA] is the Department of Economic Development, Tourism and Environmental Affairs [EDTEA], uThukela Region.

## 1.2 Objectives of the Study

The BA aims to achieve the following:

- Conduct a consultative process;
- Determine the policy and legislative context within which the proposed activity is undertaken and how the activity complies with and responds to the policy and legislative context;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed project;
- Undertake an impact and risk assessment process inclusive of cumulative impacts [where applicable]. The focus being; determining the geographical, physical, biological, social, economic, heritage and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
    - The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    - The degree to which these impacts:
        - Can be reversed;
        - Can cause irreplaceable loss of resources; and
        - Can be avoided, managed or mitigated;

Ranking of the site sensitivities and possible impacts the activity will impose on the site to:

- Identify suitable measures to avoid, manage or mitigate identified impacts; and
- Identify residual risks that need to be managed and monitored.

# Basic Assessment Process – Formal 197-day process [or 247 days]

| | | | |
|---|---|---|---|
| | Prior to formal process | | Screening of project scope<br>Pre-application meeting<br>Compile application<br>Conduct specialist studies<br>The following studies were conducted:<br>▪ Wetland Delineation Assessment and Ecological Impact Assessment - Conducted by Sivest<br>▪ Heritage Impact Assessment – Conducted by active heritage.<br>▪ Paleontologically Assessment – Conducted by Paleoethological consultations.<br>Conduct PPP [BIDs, Site notices and Advertisement if permitted by CA]<br>Develop consultation BAR to completion<br>Develop EMPr<br>Submit Application form to CA |
| **197 [or 247] days of formal BA process** | 90 days [or 140 days] | 30 days | Place consultation BAR for review |
| | | 60 days [or 110] | Incorporate comments<br>Finalise for submission to CA [or request 50 day extension, 30 of which must include a repeat of placement for public review]<br>Submit to CA |
| | 107 days | | Decision by CA |
| | 90 days | | Complete appeal process |
| | No less than 3 months prior to expiry of EA | | Application for amendment of EA |
| | 30 days | | CA must acknowledge amendment application |

BA = Basic Assessment
BAR = Basic Assessment Report
CA = Competent Authority [EDTEA eThekwini]
EA = Environmental Authorisation
EMPr = Environmental Management Programme
PPP = Public Participation Process

**FIGURE 1: BASIC ASSESSMENT PROCESS**

Figure 1: Illustrates the approach / methodology employed.

### *1.2.1 Details of the Project Proponent*

The Applicant for the proposed project is the KZN Department of Transport Okhahlamba region . The details of the Applicant are as follows.

**TABLE 1: APPLICANT DETAILS**

| Applicant | KwaZulu-Natal Department Transport | |
|---|---|---|
| **Representative** | Mr.D.N. Miller | |
| **Physical Address** | 1 Sharrat Street, Bergville | |
| **Postal Address** | 1 Sharrat Street, Bergville | |
| **Postal Code** | 3350 | |
| **Telephone** | 036 448 2018 | |
| **E-mail** | Nkululeko.Miller@Kzntransport.gov.za | |

### *1.2.2 Details of the Environmental Assessment Practitioner*

The environmental team of At Gedezar Consulting [hereafter referred to as At Gedezar] are appointed as the Environmental Assessment Practitioner [EAP] by the engineers on the project, Vumesa (Pty) Ltd. At Gedezar is therefore undertaking the suitable environmental studies for this proposed project.

At Gedezar has been involved in and / or managed several environmental assessments in South Africa to date. A specialist area of focus is on assessment of linear developments [national and provincial roads, pipelines and power lines], bulk infrastructure and supply [e.g. wastewater treatment works, pipelines, landfills], electricity generation and transmission. For the detailed experience of the EAP, refer to Appendix G of this cBAR.

**TABLE 2: EAP DETAILS[2]**

| | Detail | At Gedezar Consulting |
|---|---|---|
|  | **Contact Persons** | Mr Andile Mnyandu [EAP] |
| | **Address** | 31 Macleroy Road<br>Northern Park<br>Pietermaritzburg<br>3200 |
| | **Telephone** | 082 973 1291 |
| | **Facsimile** | 086 723 4520 |
| | **E-mail** | andilemn@gedezar.co.za |
| | **Qualification** | Bachelor's Degree in Geography and Environmental Management, University of KwaZulu- Natal |
| | **Experience** | 16 years |

## 1.3 Structure of the Report

This report has been structured to comply with the format required by the National Environmental Management Act [NEMA] [Act No. 107 of 1998] [as amended]. The contents are as follows:

[2] Full curriculum vitae of the above practitioners can be found in Appendix G of this report.

**TABLE 3: REPORT STRUCTURE**

| Chapter | Content |
|---|---|
| **Chapter 1**<br>**Basic Assessment Data** | This chapter includes the approach to the study and details of the project proponent and EAP. |
| **Chapter 2**<br>**Project Context and Motivation** | Contextualises the study area and provides a motivation and need for the proposed development. |
| **Chapter 3**<br>**Technical Data** | Includes a detailed description of the proposed activities. |
| **Chapter 4**<br>**Environmental Legislative Context** | Includes an explanation on all applicable legislation and the relevant listed activities applied for. |
| **Chapter 5**<br>**The Study** | A description of the biophysical and social environment. Consideration of alternatives [design / layout and no-go] for the project. Overview of the public participation process conducted to date. This section also highlights the key findings of the specialist studies conducted and other environmental considerations. Includes the impact assessment methodology. The impacts identified are rated and a significance score obtained. |
| **Chapter 6**<br>**Study Findings & Conclusions** | Conclusions and recommendations of the Environmental Impact Assessment. Declaration of independence by the EAP. |

# 2 PROJECT CONTEXT AND MOTIVATION

## 2.1 Background

Vumesa (Pty) Ltd was appointed by KwaZulu-Natal Department of Transport to provide professional engineering services for the construction of a double celled 2.4m x 2.4m culvert structure. This bridge will increase convenience between the communities on either side of the stream. The site is located west of Bergville in the KwaZulu-Natal. Access to site is via the Kingsway Road, which links with the R74 in Bergville. Road L1511 is currently a dirt road linking the Ngoba area with the Mafemfethini area. The road is currently in a state of degradation related to stormwater impacts, and the existing stormwater system has become clogged and in many areas is not capable of being repaired without replacing drains and culverts, which have collapse. The majority of the road travers's natural vegetation used for grazing of cattle, and areas of subsistence agricultural land, with some small areas of scrub thicket, and at least one borrow pit that appears to have been used to source the material for the existing road surface. Numerous small rivers run along the valley bottom areas, and drain towards the north of the culvert site. The culvert will cross a small stream that seems to be perennial in nature, and is deeply incised. In general, the site is heavily degraded, with the greatest impacts from subsistence agriculture, as well as overgrazing by livestock, and illegal dumping of building rubble, and general waste.

Construction will be carried out during the dry winter months where water flow will be reduced thus lessening the impact on the river system. This diversion will minimally affect the flow or turbidity of the water but not so that it will cause significant erosion or disturbance to the river bed or banks. Once this process is done, the next step would be to dig for foundations of the base for double celled box culvert to be placed firmly on the foundation. During construction of this culvert, it is anticipated that some boulders of rocks will be moved together with other soil material to one side of the river and be stored temporally so that it is used during the rehabilitation of the affected area. It needs to be mentioned though that the site has no big boulders as such all rock material found onsite will be used back in retaining the river banks and in assisting in strengthening the retainer structure such as gabion structure. During construction of this bridge there is no vegetation anticipated to be heavily affected other the normal grass which is already undermined by grazing which the community livestock mostly use for feeding. However, in complying with the environmental legislation, during construction the planting of accepted individual vegetation will be done to assist further enhance the rehabilitation of each side of the culvert end.

## 2.2 Property Descriptions

### *2.2.1 Surveyor General Numbers*

The proposed activity is situated on the following properties which are both state lands. The 21-digit surveyor-general codes are provided in Table 4 below.

**TABLE 4: SURVEYOR-GENERAL 21 DIGIT SITE [ERF / FARM / PORTION] REFERENCE NUMBERS**

| Road / Structures | 21 Digit Reference Number & Erf, Farm and Portion Number |
|---|---|
| Culvert on road L1511 | N0FU00000001645900000 |

### *2.2.2 Land Use Zoning*

**TABLE 5: LAND USE ZONING**

| | |
|---|---|
| The site is zoned | Rural Residential |
| Is a change of land use or a consent use application required? | No |

| | |
|---|---|
| Must a building plan be submitted to the local authority? | No |

### 2.2.3 Coordinates

The site for the proposed culvert structure is situated on the following coordinates: 28º51'57.30''S and 29º16'48.00''E. The following coordinates are provided for the culvert.

**TABLE 6: COORDINATES**

| Point | Latitude /Longitude | Degrees | Minutes | Seconds |
|---|---|---|---|---|
| **START** | South | 28° | 51' | 57.56" |
| | East | 29° | 16' | 48.78" |
| **MIDDLE** | South | 28° | 51' | 57.31" |
| | East | 29° | 16' | 48.04" |
| **END** | South | 28° | 51' | 56.95" |
| | East | 29° | 16' | 47.84" |

### 2.2.4 Access / Directions

Travel to site, from Bergville town towards Woodstock area. Turn left into Road P288 and travel on it for about 14 km then turn left into Road P388. Travel on Road P388 for about 14 km then turn right into Road L1511. The location of the structure is about 3,7 km from the intersection.

### 2.2.5 Length of the Activity

**TABLE 7: LENGTH OF THE ACTIVITY PER ALTERNATIVE**

| Infrastructure | Proposed Length | Width |
|---|---|---|
| **Culvert**<br>There is no existing structure and a suitable box culvert comprising of a double celled 2.4 m x 2.4m was found to be adequate for the required design flood. | 57.75 m | 30.50 m |

### 2.2.6 Size of Servitude

**TABLE 8: SIZE OF SERVITUDE**

| Total | Size of Servitude |
|---|---|
| **Total Servitude** | 0metres |

### 2.2.7 Surrounding Land Uses

**TABLE 9: SURROUNDING LAND USES IN PROXIMITY TO THE PROPOSED PROJECT SITE**

| | | | |
|---|---|---|---|
| Natural area | Y | ~~Light industrial~~ | ~~N~~ |
| Low density residential | Y | ~~Medium industrial~~ | ~~N~~ |
| ~~Medium density residential~~ | ~~N~~ | ~~Heavy industrial~~ | ~~N~~ |
| ~~High density residential~~ | ~~N~~ | ~~Power station~~ | ~~N~~ |
| Informal residential | Y | ~~Military or police base/station/compound~~ | ~~N~~ |
| ~~Retail commercial & warehousing~~ | ~~N~~ | ~~Spoil heap or slimes dam~~ | ~~N~~ |
| ~~Office/consulting room~~ | ~~N~~ | Dam or reservoir | N |
| Quarry, sand or borrow pit | N | ~~Hospital / medical centre~~ | ~~N~~ |
| School | Y | ~~Tertiary education facility~~ | ~~N~~ |

| | | | |
|---|---|---|---|
| Church | Y | ~~Old age home~~ | ~~N~~ |
| ~~Sewage treatment plant~~ | ~~N~~ | ~~Train station or shunting yard~~ | ~~N~~ |
| ~~Railway line~~ | ~~N~~ | ~~Major road [4 lanes or more]~~ | ~~N~~ |
| ~~Harbour~~ | ~~N~~ | ~~Plantation~~ | ~~N~~ |
| ~~Sport facilities~~ | ~~N~~ | Agriculture | Y |
| ~~Golf course~~ | ~~N~~ | River, stream or wetland | Y |
| ~~Polo fields~~ | ~~N~~ | ~~Nature conservation area~~ | ~~N~~ |
| Filling station | N | ~~Mountain, koppie or ridge~~ | ~~N~~ |
| ~~Landfill or waste treatment site~~ | ~~N~~ | ~~Museum~~ | ~~N~~ |
| ~~Historical building~~ | ~~N~~ | Protected Area | Y |
| ~~Graveyard~~ | ~~N~~ | ~~Archaeological site~~ | ~~N~~ |
| ~~Airport~~ | ~~N~~ | ~~Other:~~ | ~~N~~ |

*Key: Y = Yes P = Possibly N = No*

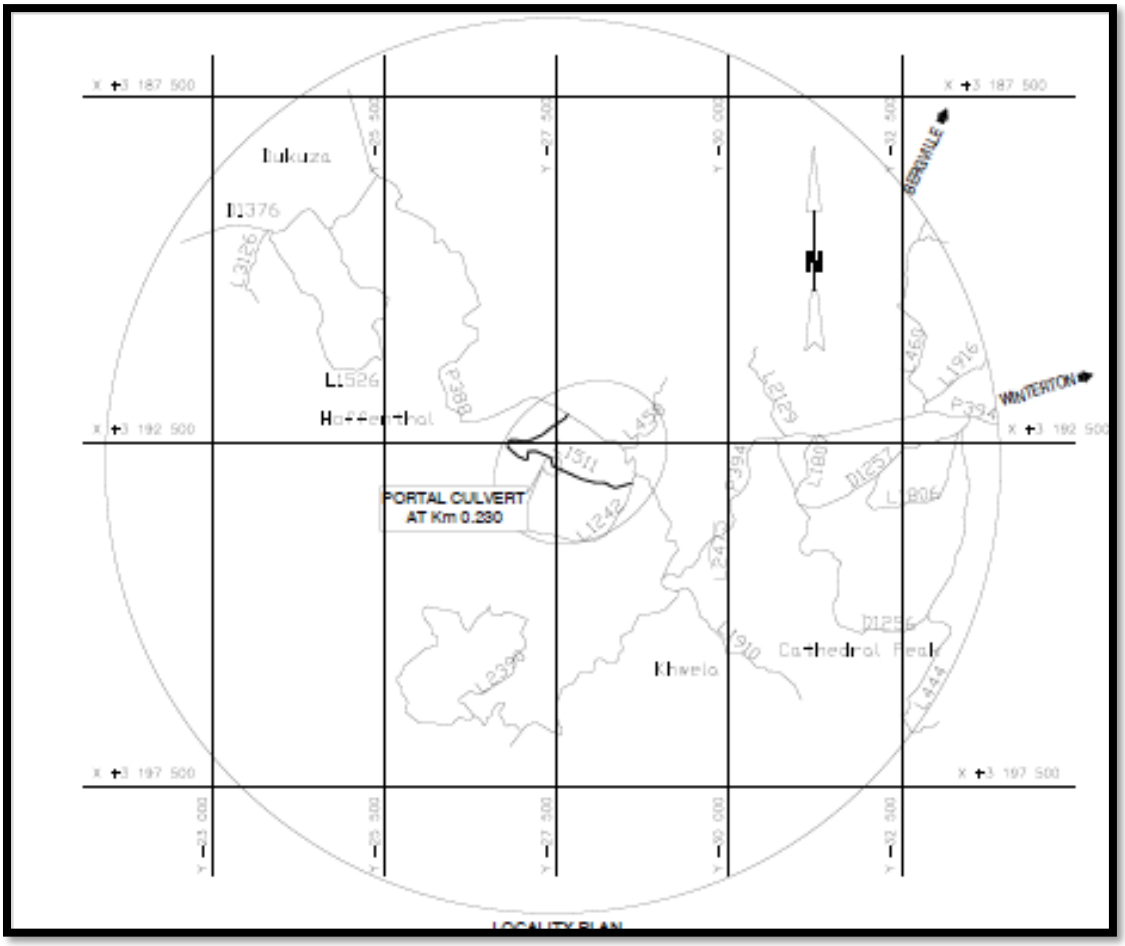



**FIGURE 2: SITE LAYOUT PLAN**

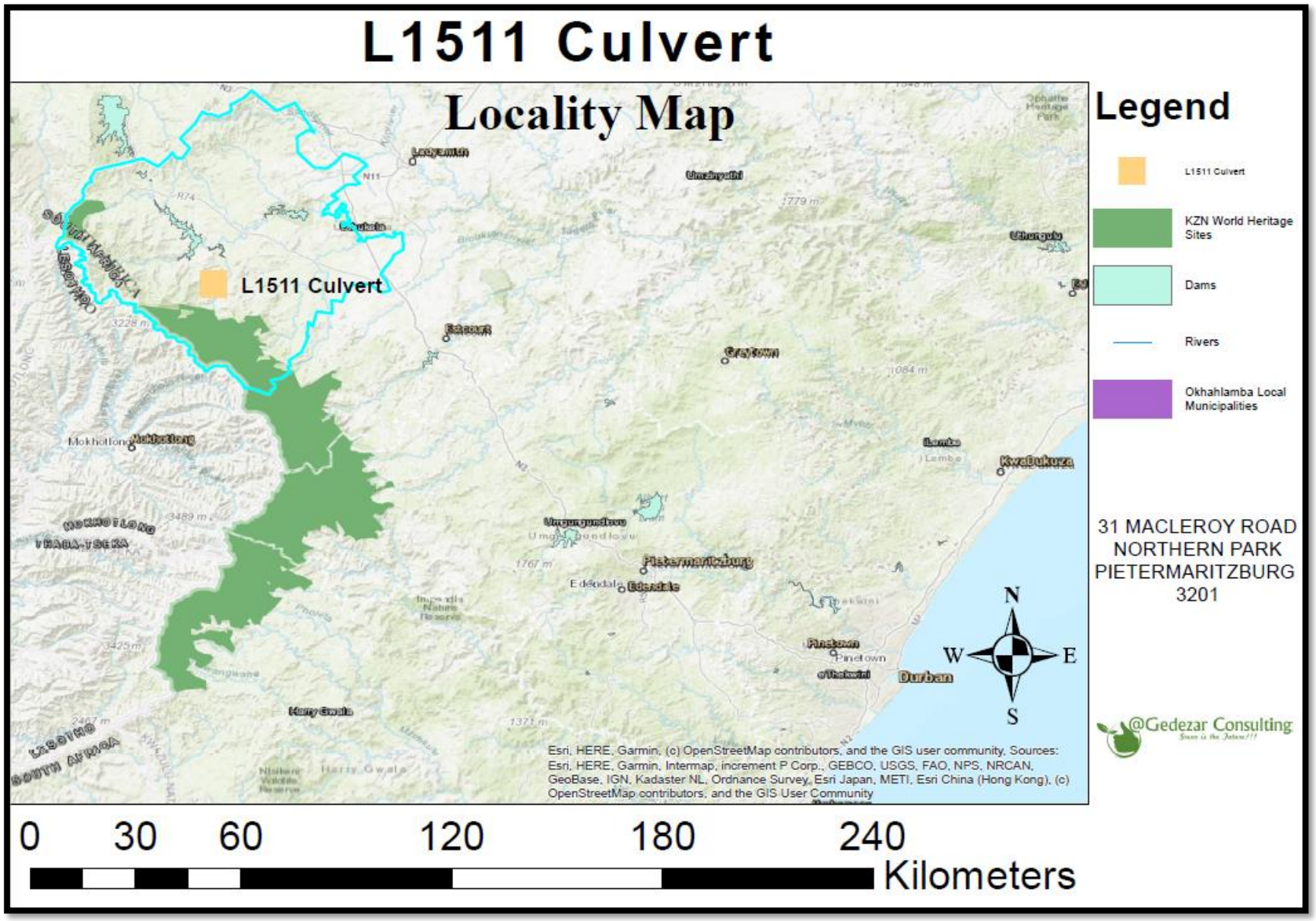



**FIGURE 3: SITE LOCALITY MAP**

# 3 PROJECT MOTIVATION AND NEED AND DESIRABILITY

**TABLE 10: PROPOSED PROJECT NEED, DESIRABILITY AND BENEFITS**

| | | | |
|---|---|---|---|
| **'Project Need** | | | |
| 1. | **Was the relevant provincial planning department involved in the application?**<br>The KwaZulu-Natal Department of Transport is responsible for the local culvert infrastructure and it also the project Applicant. | YES | |
| 2. | **Does the proposed land use fall within the relevant provincial planning framework?**<br>The proposed project is a construction of a culvert structure on an already existing road L1511 hence does not constitute a new land use and therefore it is considered to be obedient with the provincial planning framework. | YES | |
| 3. | **If the answer to questions 1 and / or 2 was NO, please provide further motivation / Explanation** – N/A. | | |
| **Desirability** | | | |
| 1. | **Does the proposed land use / development fit the surrounding area?**<br>The construction of the culvert structure on an existing road L1511and conforms to the land use of the surrounding area, there is currently no existing crossing structure in that area as the previous structure was washed away during flooding event due to poor hydraulic capacity. The development will fit to the surrounding environment. | YES | |
| 2. | **Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?**<br>The construction of the culvert structure road L1511 falls within the adopted Strategic Plans of the KwaZulu Natal Department of Transport. Which is to design, construct and monitor balanced and equitable transport network by providing infrastructure such as roads, pedestrian bridges and non-motorised infrastructure to allow for safe access to public facilities. The construction of the culvert structure keeps up with the planning vision outlined in the development strategy to provide communities with sustainable infrastructure. | YES | |
| 3. | **Will the benefits of the proposed land use / development outweigh the negative impacts of it?**<br>The proposed development will have more long-term benefits than negative impacts. Some of the positive impacts associated with development includes:<br>• Access provision<br>• Increased access to social, economic and public facilities<br>• Creating opportunities for local economic development<br>• Contributes to the long-term vision of providing sustainable infrastructure to the community members, and better access and connectivity.<br>• Improved safety of the road, and culvert<br>The negative impacts associated with development are short termed and are associated with the construction phase of development. Furthermore, the negative impact associated with the environment are limited to the construction phase of development and can be mitigated with compliance using the outlined EMPr. Moreover, the proposed development will reduce soil erosion that is currently occurring on the either sides of the drainage line entrance. The proposed development aims to improve the social, environmental and economic status quo, as it will enable improved operations and use of the road, and the culvert. | YES | |
| 4. | **If the answer to any of the questions 1-3 was NO, please provide further motivation / Explanation** – N/A. | | |
| 5. | **Will the proposed land use / development impact on the sense of place?** | | NO |
| 6. | **Will the proposed land use / development set a precedent?** | | NO |

| | | | |
|---|---|---|---|
| | The project is limited to a construction of a box culvert structure of an existing road. | | |
| 7. | **Will any person's rights be affected by the proposed land use / development?**<br>All landowners have been notified. | | NO |
| 8. | **Will the proposed land use / development compromise the "urban edge"?**<br>The area is completely rural in nature and will have no effect on the urban edge. | | NO |
| 9. | **If the answer to any of the question 5-8 was YES, please provide further motivation / explanation** – N/A. | | |
| **Benefits** | | | |
| 1. | **Will the land use / development have any benefits for society in general?** | YES | |
| 2. | Explain: The development aims to facilitate spatial transformation through the reduction of commutes between home and work, improved access to education and job opportunities for community members, and reduced levels of poverty and inequality. | | |
| 3. | **Will the land use / development have any benefits for the local communities where it will be located?** | YES | |
| 4. | Explain: The proposed development will directly improve the access and travel of the community, safety and connectivity for the communities served by L1511 road. | | |

### *3.1.1 Socio-Economic Value of the Activity*

**TABLE 11: SOCIO-ECONOMIC VALUE OF THE PROPOSED PROJECT**

| Description | Value |
|---|---|
| What is the expected capital value of the activity on completion? | R 6 147 200.00 |
| What is the expected yearly income that will be generated by or as a result of the activity? | R 5110 400.00 |
| Will the activity contribute to service infrastructure? | Yes |
| Is the activity a public amenity? | Yes |
| How many new employment opportunities will be created in the development phase of the activity? | 20 |
| What is the expected value of the employment opportunities during the development phase? | R1 764 000.00 |
| What percentage of this will accrue to previously disadvantaged individuals? | |
| How many permanent new employment opportunities will be created during the operational phase of the activity? | |
| What is the expected current value of the employment opportunities during the first 10 years? | |
| What percentage of this will accrue to previously disadvantaged individuals? | |

## 3.2 Motivation

This culvert will form an integral part of the community as it will be a safe, accessible connection point for the communities especially during peak rainfall periods. It will not hinder the children from gaining access to the schools during the rainy days and also for emergency services to access the community during this time. As such, this culvert is needed not only by the school but also by the community at large from the either side of the river, including most basic services such as health services, crime prevention etc which ultimately will increase their standard of living.

Currently there is no structure at the watercourse crossing. The proposed installation of culvert for watercourse crossing would prevent siltation and water pollution caused by vehicle trying to cross the watercourse. Proposed culvert will allow vehicles to utilise the crossing during rainfall events and make it safer for residents to cross the watercourse.

## 3.3 Climate Change Consideration

The proposed project is concerned mainly with the upgrade of a portion of a road which is widely used but does not meet the quality and safety standards required.

### *3.3.1 Emissions into the Atmosphere*

The activity itself will not contribute directly to emissions released into the atmosphere except possible short-term dust emissions during construction. However, the construction of the road will increase the capacity of vehicles that will utilize the road which in turn will cause an increase in noxious gas emissions from cars into the atmosphere.

### *3.3.2 Solid Waste Management*

Volumes of general waste collected during construction will be sorted and disposed of at Van Reenan Disposal Site in Okhahlamba Municipality.

### *3.3.3 Waste Recycling Measures*

On the construction site waste recycling bins will be provided to ensure that the waste is being separated accordingly. Waste will be separated into the recyclable and non-recyclable materials. The recyclable materials will be transported to the recycling facilities. Non-recyclable materials will be disposed of at the licensed landfill site. During the construction phase, construction waste will be used as fill material and as foundation where possible. The re-use of construction waste materials will minimize the amount of waste that will need to be disposed of at registered municipal waste facilities. Only inert, non-hazardous construction material will be re-used. Raw materials with non-recyclable packaging will be avoided.

# 4 TECHNICAL DATA

## 4.1 Design of the L1511 culvert

### *4.1.1 Rationale for Design Considered*

The construction of a double celled 2,4m x 2,4m box culvert: precast box culvert concrete and with earth side drains. Headwalls will also be constructed on either side of the culvert, with associated stormwater discharge outlets within v-drains.

The culvert was assessed on the basis of the dimensionless inlet control performance curves given in the (Natal Province Roads Department) Design Manual for Standard Box Culverts. The structure was checked for conformance with the freeboard (Existing freeboard FD) and (Shoulder breaking point freeboard FSBP) requirements in terms of Chapter 8.3 of the SANRAL Drainage Manual. The requirements are:

- The submergence limit, H/D = 1.2D, of the design flood, QT,
- The maximum allowable submergence level, smallest of 2D or Shoulder Break Point, for the Q2T flow rate.
- FD> or = 0.3 m
- FSPB< or = 0 m

In selecting alternative structural forms suitable for both culverts (river crossing), consideration has been given to the design goals applicable to new structures, these include:

- Safety (strength, robustness, etc.);
- Durability and serviceability;
- Economy and constructability, and;
- Aesthetics.

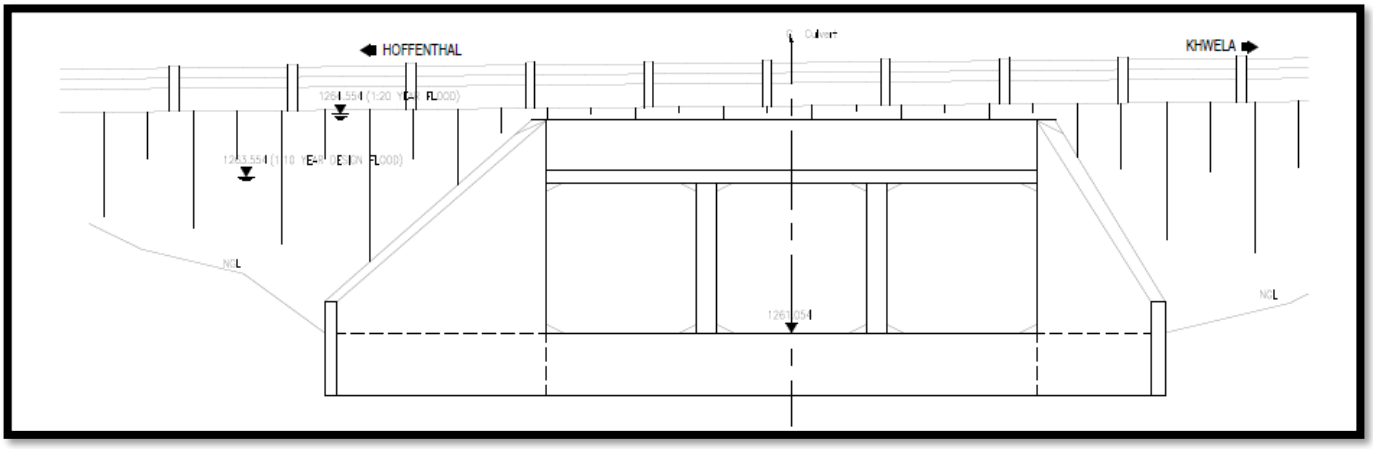



**FIGURE 4: UPSTREAM ELEVATION**

### *4.1.2 Hydrology*

Hydrologic analyses for the structure was carried out using SANRAL's Drainage Manual followed by hydraulic analyses using headwater to depth ratios to check the hydraulic capacities.

The estimated flood peaks were based on the Rational Method as the catchment area for the culvert is less than 15 km$^2$. The Standard Design Flood (SDF) method was also used in the evaluation for comparison.

**TABLE 12: CULVERT CATCHMENT PARAMETERS**

| Culvert Name | Catchment Area (Km$^2$) | Longest Collecto R (Km) | 10/85 Height Difference (M) | SDF Method Drainage Basin No. | Time Of Conc. (Hrs.) |
|---|---|---|---|---|---|
| **L1511 Structure** | 6.286 | 6.483 | 407 | 26 | 0.73 |

SANRAL Drainage Manual was used to determine the design flood frequency based on a Q20 peak flow rate. The Rational method and the SDF method - flood peak estimates as summarized below.

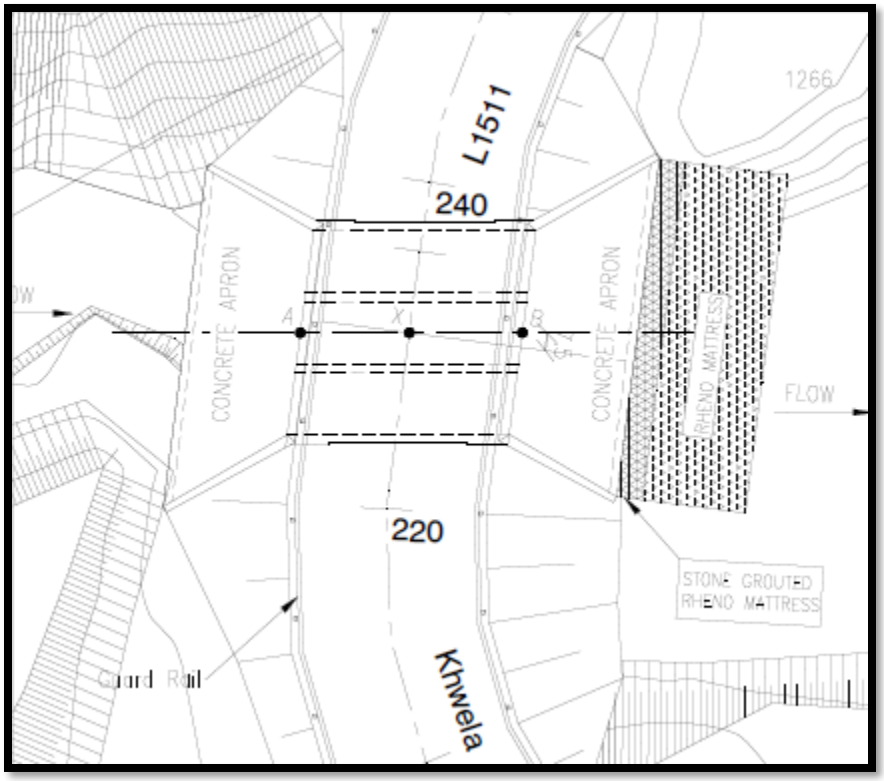



**FIGURE 5: PLAN OF VIEW OF CULVERT**

**TABLE 13: CLASS 2 FLOOD PEAK ESTIMATES (RATIONAL METHOD)**

| Culvert Name | Q20 (m$^3$/s) | Design Flood Qt | | Design Flood Q2T | |
|---|---|---|---|---|---|
| | | Return Period (Years) | Peak Flow (M3/S) | Return Period (Years) | Peak Flow (M$^3$/S) |
| **L1511 Structure** | 96.08 | 4 | 49.40 | 8 | 66.30 |

**TABLE 14: CLASS 1 FLOOD PEAK ESTIMATES (SDF METHOD)**

| Culvert Name | Q20 ($m^3/s$) | Design Flood Qt | | Design Flood Q2T | |
|---|---|---|---|---|---|
| | | Return Period (Years) | Peak Flow (M3/S) | Return Period (Years) | Peak Flow ($M^3/S$) |
| **L1511 Structure** | 66.33 | 3 | 10.87 | 6 | 28.30 |

### *4.1.3 Hydraulics Assessment*

SANRAL Drainage Manual 6th Edition will be used for most of the hydraulic calculations to analyse the culvert requirements, using headwater to depth ratios to check the hydraulic capacity. The river crossing will require improvement to provide adequate capacity, a structure with adequate capacity. The hydraulic requirements are reviewed in terms of major drainage structures.

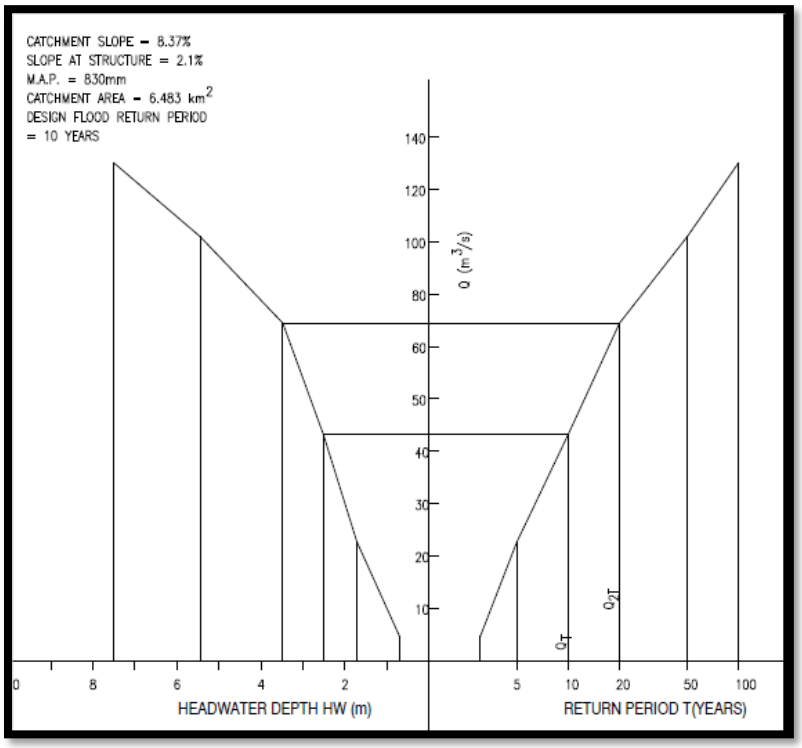



**FIGURE 6: HYDROLOGIC ANALYSIS**

### *4.1.4 Accomodation of Traffic During Construction*

Maintaining a safe flow of traffic during construction is to be carefully planned and executed. Although detours may be considered, specifically for the construction of the culvert, construction will predominantly be done by means of half width construction. The layout of construction areas and detours in the use of delineators and warning signs is to be in accordance with the latest SARTSM and comply with the latest editions of the SADC Road Traffic Signs Manual. The establishment of areas for contractor operations is necessary to minimize the impact on safety of both motorist and worker.

**PLATE 1: CURRENT STATE OF THE SITE FOR CULVERT ON ROAD L1511.**

**PLATE 2: CULVERT APPROACH**

**PLATE 3: UPSTREAM**

**PLATE 4: DOWNSTREAM**

# 5 ENVIRONMENTAL LEGISLATIVE CONTEXT

In order to protect the environment and ensure that the development is undertaken in an environmentally responsible manner, there are a number of significant pieces of environmental legislation that need to be considered during this study. These include the following items of legislation.

## 5.1 The Constitution of South Africa

Section 24 of the Constitution of South Africa [No. 108 of 1996] states that

> "*…everyone has the right – … [a] to an environment that is not harmful to their health or well-being; and … [b] to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that … [c] secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."

This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development. These principles are embraced in the NEMA and given further expression.

## 5.2 National Legislation and Regulations

This section outlines the applicable national legislation which needs to be taken cognisance of.

## 5.3 National Environmental Management Act [Act No. 107 of 1998]

The National Environmental Management Act [Act No. 107 of 1998] [as amended], or otherwise known as NEMA, is South Africa's overreaching environmental legislation and has, as its primary objective to provide 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 co-ordinating environmental functions exercised by organs of state, and to provide for matters connected therewith.

The principles of the Act are the following:

- Environmental management must place people and their needs at the forefront of its concern;
- Development must be socially, environmentally and economically sustainable;
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated;
- Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person;
- Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued;
- Responsibility for the environmental health and safety consequences of a policy, programme, project or activity exists throughout its life cycle.
- The participation of all interested and affected parties in environmental governance must be promoted;
- Decisions must take into account the interests needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge including traditional and ordinary knowledge;
- Community well-being and empowerment must be promoted through environmental education, the raising of environmental awareness;

- The social, economic and environmental impacts of activities including disadvantages and benefits, must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration and assessment;
- The right of workers to refuse work that is harmful to human health or the environment;
- Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the low;
- There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment;
- The environment is held in public trust for the people, the beneficial use of the environment resources must serve the public interest and the environment must be protected as the people's common heritage;
- The cost of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment; and
- The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.

### *5.3.1 EIA Regulations [2014] [as amended in 2017]*

On the 7th April 2017, the Minister of Environmental Affairs, Bomo Edith Edna Molewa, made amendments to the EIA Regulations, 2014, published under Government Notice No. 982 in Gazette No. 3822 of 4 December 2014, in terms of sections 24[5] and 44 of the NEMA, 1998 [Act No. 107 of 1998], as well as to Listing Notice 1 of 2014, published under Government Notice No. 983 in Gazette No. 38282 on 4 December 2014, as well as Listing Notice 2 of 2014, published under Government Notice No. 984 in Gazette No. 38282 on 4 December 2014, and Listing Notice 3 of 2014, published under Government Notice No. 985 in Gazette No. 38282 on 4 December 2014 in terms of sections 24[2], 24[5], 24D and 44, read with section 47A[1][b] of the NEMA, 1998 [Act No. 107 of 1998]. For ease of reading, the 2017 Amendments of the EIA Regulations, 2014 are published in full, inclusive of amendments made thereto. These amendments commenced on the date that these regulations were published in the Gazette, 07 April 2017.

The nature of the proposed project includes activities listed in the following Listing Notices – GNR 327 [Listing Notice 1] and GNR 324 [Listing Notice 3] of the EIA Regulations [2014 as amended in 2017] – refer to Table 13 below.

**TABLE 15: LISTED ACTIVITIES OF THE EIA REGULATIONS [2014 AS AMENDED IN 2017]**

| Relevant notice | Activity No[s] | Description [Verbatim and as per applicability to proposed development] |
|---|---|---|
| **Government Notice Regulation No. [GNR] 327 of 2014** | *Activity 19* | *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.*<br><br>The proposed development will involve infilling of more than 10m$^3$ as part of the construction activities. The material that will be excavated is 84m$^3$, material that will be deposited will be 72 m$^3$. |

| Relevant notice | Activity No[s] | Description [Verbatim and as per applicability to proposed development] |
|---|---|---|
| | *Activity 12[ii] [a]* | *The development (ii) infrastructure or structures with a physical footprint of 100 square metres or more, the development occurs (a) within a watercourse*.<br>The proposed culvert structure for road L151 has a length of 57.75 m and width of 30.50 m. The culvert structure will cross over stream along road L1511 |
| **Government Notice Regulation No. [GNR] 325 of 2014** | *No relevant activities* | |
| **Government Notice Regulation No. [GNR] 324 of 2014** | Activity 14 [a] [d] [x] and [aa]. | *The development of—*<br>*(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or*<br>*(ii) infrastructure or structures with a physical footprint of 10 square metres or more;*<br>*where such development occurs—*<br>*(a) within a watercourse;*<br>*in [d] KwaZulu-Natal*<br>x. Outside urban areas:<br>[aa] Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve<br>The project entails the construction of a culvert which exceeds 460m$^2$ in extent over the stream. The culvert has length of 57.5 m and width of 30.50 m and it exceeds 10m$^2$ over the stream. |

### 5.3.2 National Water Act [Act No. 36 of 1998] [as amended]

The National Water Act [NWA] is a legal framework for the effective and sustainable management of water resources in South Africa. Central to the NWA is recognition that water is a scarce resource in the country, which belongs to all the people of South Africa and needs to be managed in a sustainable manner to benefit all members of society. The NWA places a strong emphasis on the protection of water resources in South Africa, especially against its exploitation, and the insurance that there is water for social and economic development in the country for present and future generations.

Water use in South Africa is managed through a water use authorisation process, which requires that every water use is authorised by the Department of Water and Sanitation [DWS, previously known as the Department of Water Affairs] or an established Catchment Management Agency [CMA, if applicable for that region], once the water requirements for the Reserve have been determined.

A water use must be licenced unless it [a] is listed in Schedule 1, [b] is an existing lawful use, [c] is permissible under a general authorisation [GA], or [d] if a responsible authority waives the need for a licence. If none of these are relevant a so-called water use licence [WUL] must be applied for and obtained prior to the commencement of such listed activity. In terms of such a WUL, the Minister may choose to limit the amount of water, which a responsible authority [e.g. CMA, water board, municipality] may allocate. In making regulations and determining items such as GAs, the Minister may differentiate between different water resources, classes of water resources, and geographical areas.

The NWA defines a water resource to be a watercourse, surface water, estuary, or groundwater [aquifer]. Included under surface water are manmade water channels, estuaries and watercourses.

As the proposed development involves the abstraction of water as well as the crossing of watercourses, a WUL application will be submitted to the DWS for both consumptive and non-consumptive water uses. The NWA, as applicable to the proposed development [see comment in brackets after each item], defines the identified water uses, which are potentially applicable under Section 21 as follows:

The following water uses of Section 21 of the NWA are being applied for the WUL:

- *[c] Impeding or diverting the flow of water in a watercourse* [applicable for the culvert within the stream]; and
- *[i] Altering the bed, banks, course or characteristics of a watercourse* [applicable for the culvert within the stream].

### *5.3.3 National Environmental Management: Biodiversity Act [Act No. 10 of 2004]*

The project must comply with the National Environmental Management: Biodiversity Act [Act No. 10 of 2004] [NEM: BA] in providing the cooperative governance in biodiversity management and conservation.

NEM: BA provides for the Minister to publish a notice in the Government Gazette that issues norms and standards, and indicators for monitoring progress for the achievement of any of the objectives of the Act.

The NEMA: BA also provides for:

- The National Biodiversity Framework;
- Bioregional Plans;
- Biodiversity Management Plans;
- Biodiversity Management Agreements;
- The identification, listing and promotion of threatened or protected ecosystems; and
- Alien invasive species control and enforcement.

Ezemvelo KZN Wildlife's Terrestrial Systematic Conservation Assessment shows irreplaceable Critical Biodiversity Areas that have very high conservation value, which the study area traverses. For further detail, refer to Chapter 5 of this cBAR.

### *5.3.4 National Spatial Biodiversity Assessments [2004, 2011]*

This informs the policies, plans and day-to-day activities of a wide range of sectors both public and private. A spatial biodiversity assessment can take place at different spatial scales, from global to local.

It involves mapping information about biodiversity features such as species, habitats and ecological processes, protected areas and current and future patterns of land and resource use. It provides a national context for assessments at the sub national scale and points to broad priority areas where further investigation, planning and action are warranted.

It identifies three keys strategies for conserving South Africa's biodiversity existence from the assessment, namely:

- Pursuing opportunities to link biodiversity and socio-economic development in priority geographic areas;
- Focusing on emergency action on threaten ecosystem, to prevent further loss of ecosystem functioning; and
- Expanding of the protected area network.

### *5.3.5 National Biodiversity Strategy and Action Plans [2005]*

The National Biodiversity Strategy and Action Plans [NBSAP] aims to conserve and manage terrestrial and aquatic biodiversity to ensure sustainable and equitable benefits to the people of South Africa, now and in the future.

In South Africa, terrestrial, inland water, coastal and marine ecosystems and their associated species are widely used for commercial, semi-commercial and subsistence purposes through both formal and informal markets.

While some of this use is well managed and / or is at levels within the capacity of the resource for renewal, much is thought to be unsustainable. "Use" in this case refers to direct use, such as collecting, harvesting, hunting, fishing, etc. for human consumption and production, as well as more indirect use such as ecotourism.

### *5.3.6 National Environmental Management: Protected Areas Act [Act No. 57 of 2003]*

Protected areas are a fundamental tool for achieving biodiversity objectives and protecting essential natural heritage areas and ecosystems services, since these often provide greater security for conservation-worthy land than the agreements or land use limitations provided for in the National Environmental Management: Biodiversity Act.

The National Environmental Management: Protected Areas Act [Act No. 57 of 2003] [NEM: PAA] creates a legal framework and management system for all protected areas in South Africa as well as establishing the South African National Parks [SANParks] as a statutory board. Each conservation area will have its own set of land use restrictions or regulations that stem either from generic restrictions under NEM: PAA, or customized regulations for individual protected areas.

### *5.3.7 KZN Nature Conservation Ordinance [Ordinance No. 15 of 1974]*

Protected indigenous plants in general are controlled under the relevant provincial Ordinances or Acts dealing with nature conservation.

In KwaZulu-Natal, the relevant statute is the 1974 Provincial Nature Conservation Ordinance. In terms of this Ordinance, a permit must be obtained from Ezemvelo KZN Wildlife to remove or destroy any plants listed in the Ordinance.

If, protected plant species are to be disturbed, the Applicant must pursue the necessary permit / licencing requirements from the Department of Agriculture, Forestry and Fisheries [DAFF] and Ezemvelo KZN Wildlife [EKZNW] prior to clearing of vegetation.

### *5.3.8 National Environmental Management: Waste Act [Act No. 59 of 2008] [as amended]*

The National Environmental Management Waste Act [Act No. 59 of 2008] [NEM:WA] – the 'Waste Act' reforms the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licencing and control of waste management activities; to provide for the remediation of

contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

The objectives of this Act are:

*a) "to protect health, well-being and the environment by providing reasonable measures for –*

*i. minimising the consumption of natural resources;*

*ii. avoiding and minimising the generation of waste;*

*iii. reducing, re-using, recycling and recovering waste;*

*iv. treating and safely disposing of waste as a last resort;*

*v. preventing pollution and ecological degradation;*

*vi. securing ecologically sustainable development while promoting justifiable economic and social development;*

*vii. promoting and ensuring the effective delivery of waste services;*

*viii. remediating land where contamination presents, or may present, a significant risk of harm to health or the environment; and*

*ix. achieving integrated waste management reporting and planning;*

*b) to ensure that people are aware of the impact of waste on their health, well-being and the environment;*

*c) to provide for compliance with the measures set out in paragraph [a]; and*

*d) generally, to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being."*

The NEM: WA has been considered; however, no activities have been identified for the proposed development. Construction waste will be disposed of at a registered landfill and not dumped illegally.

### *5.3.9 National Heritage Resources Act [Act No. 25 of 1999]*

In terms of Section 38 of the National Heritage Resources Act [NHRA] [subject to the provisions of subsections [7], [8] and [9] of the Act], any person who intends to undertake a development categorised as:

- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- The construction of a bridge or similar structure exceeding 50 m in length;
- Any development or other activity which will change the character of a site:
- Exceeding 5 000 m² in extent;
- Involving three or more existing erven or subdivisions thereof; or
- Involving three or more erven or divisions thereof which have been consolidated within the past five years; or
- The costs of which will exceed a sum set in terms of regulations by the South African Heritage Resource Agency [SAHRA] or a provincial heritage resources authority;
- The re-zoning of a site exceeding 10 000 m² in extent; or
- Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

### *5.3.10 National Forests Act [Act No. 84 of 1998]*

According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that;

> *'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'.*

In essence the National Forests Act [NFA] prohibits the destruction of indigenous trees in any natural forest without a licence.

In terms of the NFA and Government Notice 1339 of 6 August 1976 [promulgated under the Forest Act, 1984 [Act No. 122 of 1984] for protected tree species], the removal, relocation or pruning of any protected plants will require a licence.

### *5.3.11 Occupational Health and Safety Act [Act No. 85 of 1993]*

The Occupational Health and Safety Act [OHSA] provides for the health and safety of persons at work and for the health and safety of persons in connection with 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 in connection with the activities of persons at work.

### *5.3.12 Sustainable Development*

The principle of Sustainable Development has been established in the Constitution of the Republic of South Africa [Act No. 108 of 1996] and given effect by NEMA. Section 1[29] of NEMA states that sustainable development means the integration of social, economic and environmental factors into the planning, implementation and decision-making process so as to ensure that development serves present and future generations.

Therefore, Sustainable Development requires that:

- The disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- The disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
- Waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
- A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
- Negative impacts on the environment and on people's environmental rights be anticipated; and, prevented and where they cannot altogether be prevented, are minimised and remedied.

### *5.3.13 National Environmental Management: Air Quality Act [Act No. 39 of 2004]*

The NEMA Air Quality Management Act [NEM: AQA] states the following as it primary objective:

> *"To reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and*

*standards regulating air quality monitoring, management and control by all spheres of government, for specific air quality measures, and for matters incidental thereto.*

*Whereas the quality of ambient air in many areas of the Republic is not conducive to a healthy environment for the people living in those areas let alone promoting their social and economic advancement and whereas the burden of health impacts associated with polluted ambient air falls most heavily on the poor, And whereas air pollution carries a high social, economic and environmental cost that is seldom borne by the polluter, And whereas atmospheric emissions of ozone-depleting substances, greenhouse gases and other substances have deleterious effects on the environment both locally and globally, and whereas everyone has the constitutional right to an environment that is not harmful to their health or well-being, and whereas everyone has the constitutional right 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.*

*And whereas minimisation of pollution through vigorous control, cleaner technologies and cleaner production practices is key to ensuring that air quality is improved, and whereas additional legislation is necessary to strengthen the Government's strategies for the protection of the environment and, more specifically, the enhancement of the quality of ambient air, in order to secure an environment that is not harmful to the health or well-being of people."*

### 5.3.14 Hazardous Substance Act [Act No. 15 of 1973] and Regulations

The object of the Act is *inter alia* to

'*provide for the control of substances which may cause injury or ill health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature or the generation of pressure thereby in certain circumstances; for the control of electronic products; for the division of such substances or products into groups in relation to the degree of danger; for the prohibition and control of such substances'*.

In terms of the Act, substances are divided into schedules, based on their relative degree of toxicity, and the Act provides for the control of importation, manufacture, sale, use, operation, application, modification, disposal and dumping of substances in each schedule.

Pollution control in South Africa is affected through numerous national statutes, provincial ordinances and local authority by-laws. Only the more significant legislation pertaining to the regulation of water, air, noise and waste pollution is dealt with in this section.

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# 6 THE STUDY

## 6.1 PROJECT ALTERNATIVES

In terms of the EIA Regulations [2014 as amended in 2017], feasible alternatives are required to be considered as part of the environmental investigations. In addition, the obligation that alternatives are investigated is also a requirement of Section 24[4] of the NEMA [Act No. 107 of 1998] [as amended].

An alternative in relation to a proposed activity refers to the different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

- The property on which or location where it is proposed to undertake the activity;
- The type of activity to be undertaken;
- The design or layout of the activity;
- The technology to be used in the activity;
- The operational aspects of the activity; and
- The option of not implementing the activity.

## 6.2 Site and Type of Activity Alternatives

Since the proposed construction will take place on the existing track road, there cannot be an alternative site and therefore there is no alternative identified for the location of this construction. Culvert will be installed as the means of the stream crossing.

The existing road and crossing are currently being utilised by both community members of the Ngoba and Mafemfethini areas. The existing location is proposed to be retained, which will create limited environmental damage given that a corridor of disturbance already exits. Further, disturbance to other areas, which potentially do not serve the needs of the receiving community, is not considered to meet best practice principles when a corridor of disturbance already exists.

Currently there is no structure at the watercourse crossing. The proposed installation of Culvert Causeway for watercourse crossing would prevent siltation and water pollution caused by vehicle trying to cross the watercourse. Proposed culvert will allow vehicles to utilise the crossing during rainfall events and make it safer for residents to cross the watercourse. As this is the only watercourse crossing on the alignment, no further site alternative has been considered.

## 6.3 Layout and Design Alternatives

For the purposes of this BA, alternatives have been considered for the design of the new culvert over the stream. These alternative designs are explained below.

### *6.3.1 Design or Layout Alternative Considerations*

In selecting alternative structural forms suitable for the new L1511 structure, the following design goals were considered:

- Safety [strength and robustness];
- Constructability;
- Durability and sustainability;
- Economy; and
- Aesthetics.

The preferred structure had to adequately meet all of the above motioned design goals. The criteria, upon which the design of the infrastructure is based, encumber numerous factors such as:

- Surrounding topography;
- Proneness of the river and structure to erosion / scour;
- Geology;
- Construction costs associated with dimensions of the infrastructure;
- Environmental sensitivities;
- Impact to watercourses;
- Impact to structure [predicted];
- Consideration of future maintenance of the structure;
- Socio-economic need; and
- Hydrology

The following structural designs alternatives were considered for the proposed development:

**TABLE 16: DESIGNS ALTERNATIVES**

| Culvert Name | No. Cells Required | Proposed Upgrade | Motivation |
|---|---|---|---|
| **Option 1** | 2 | The construction of a double celled 2,4m x 2,4m box culvert | ▪ Ease of maintenance;<br>▪ Less earthworks required than the alternate design. |
| **Option 2** | 3 | The construction of a triple celled 1,8m x 1,8m box culvert | ▪ This layout is not preferred as it would require a greater amount of earthworks operations within the watercourse and is not as favourable to maintain.<br>▪ This alternative is not within the budget of the Department of Transport. |
| **Option 3** | 3 | The construction of a causeway consisting of three of 1,8m x 1,8m precast portal culvert | ▪ This layout is not preferred as it would require a greater amount of earthworks operations within the watercourse and is not as favourable to maintain.<br>▪ This alternative is not within the budget of the Department of Transport. |

## 6.4 No-go Alternative

It is mandatory to consider the “no-go” option during the EIA process. The “no-go” alternative refers to the current status quo and the risks and impacts associated with it. Some existing activities may carry risks and may be undesirable. In the case of the current proposed development, the only “no-go” refers to the L1511 site remaining in its current condition.

If the status quo remains unchanged, socially the risk of accessing nearby town (Bergville) from Ngoba and Mafemfethini areas will remain high for community members especially during raining seasons and flooding events. Due to inaccessibility of the area during rainy days and flooding event. The area will not receive sufficient service delivery resources such as ambulances due to inaccessibility of the area in flooding events.

Environmentally the proposed culvert site is currently eroded and erosion is occurring on either side of the entrance into the river / drainage (refer to plate 2,3 and 4) of the report. This is causing further deepening of the drainage lines A formalised culvert across the drainage line will reduce erosion resulting from numerous crossing points entering and exiting the drainage line. This will also allow access across the drainage line during flood events. According to the specialist findings report the vegetation along the road site of the culvert is degraded hence would be a reason for the low avifaunal richness. A formal culvert will reduce the level of degradation of the road side vegetation.

# 7 DESCRIPTION OF THE STUDY AREA

## 7.1 TOPOGRAPHY

The Drakensberg Mountains form a ±300Km border between Lesotho and South Africa, covering an area of ±40 000Km². The altitude of the mountains ranges from ±1800m above sea level (asl) to 3482m asl at certain peaks. The site in question is situated just within the Northern Drakensberg at a mean altitude of ±1275m asl; a mere ±11Km north of the famous Cathedral Ridge and Cathedral Peak, which sits at an elevation of 3004m asl. The topography of the Northern Drakensberg is characterised as a mountainous region with steep slopes and wide valleys with the study area falling into one of these wide valleys.

## 7.2 Climate

The average annual precipitation for the study area ranges between 800 and 1 200 mm per annum, with the mean daily maximum temperatures fluctuating between 20°C to 25°C for January, and the lowest daily mean temperatures for June and July of −2°C to 0°C. The daily mean relative humidity for the most humid month, March, varies between 68% and 72%, with the daily minimum relative humidity for July and August varying between 32% and 38% (Mucina & Rutherford 2006; Schulze 1997; South African Weather Services 2007; Van Zinderen Bakker 1973).

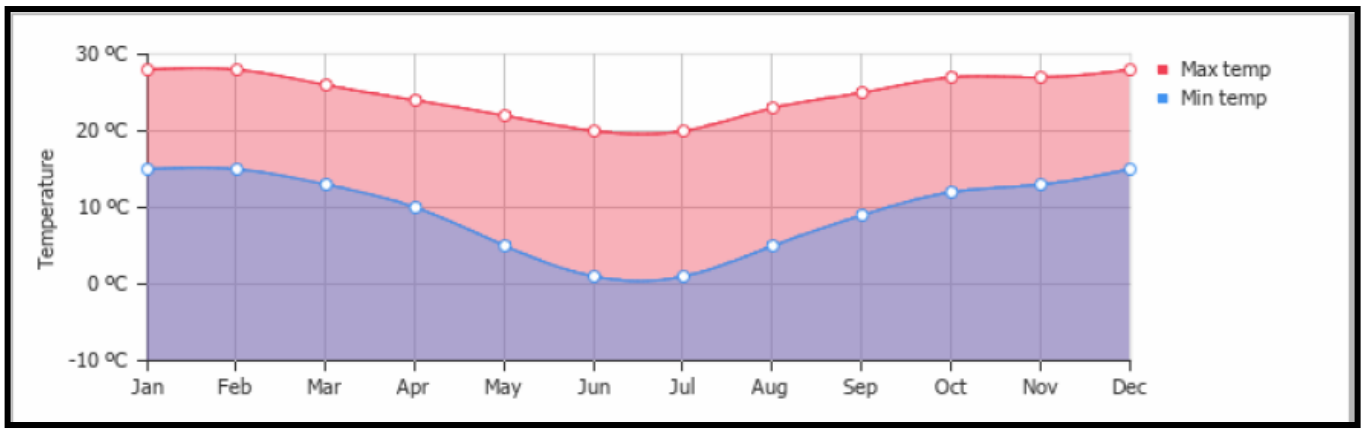



**FIGURE 7: AVERAGE MIN AND MAX TEMPERATURES IN OKHAHLAMBA LOCAL MUNICIPALITY**

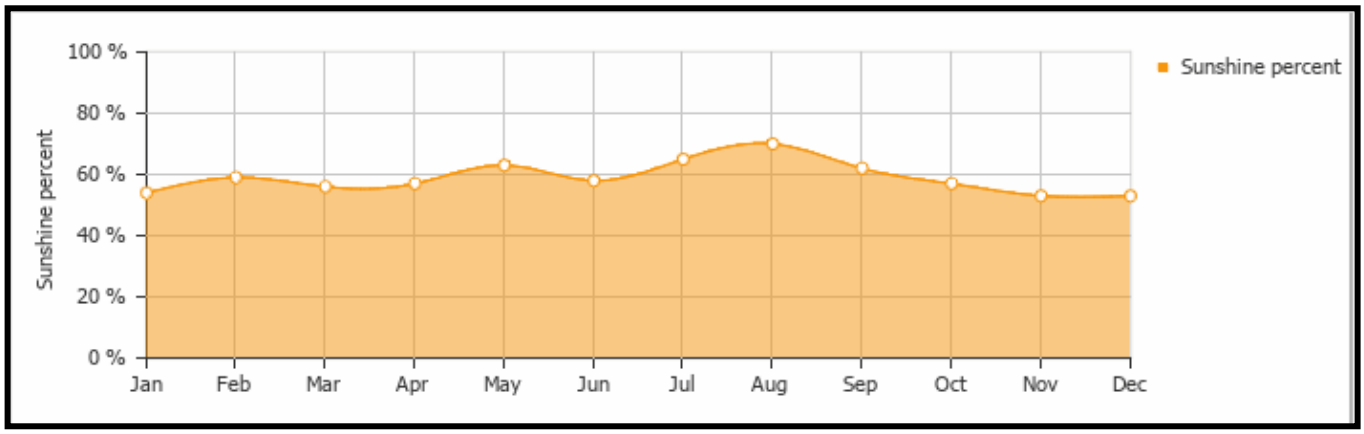



**FIGURE 8: AVERAGE PERCENT OF SUNSHINE IN OKHAHLAMBA LOCAL MUNICIPALITY**

Bergville normally receives about 601mm of rain per year, with most rainfall occurring mainly during mid-summer. Figure 9 below shows the average rainfall values for Bergville area per month. It receives the lowest rainfall (6mm) in July and the highest (128mm) in January.

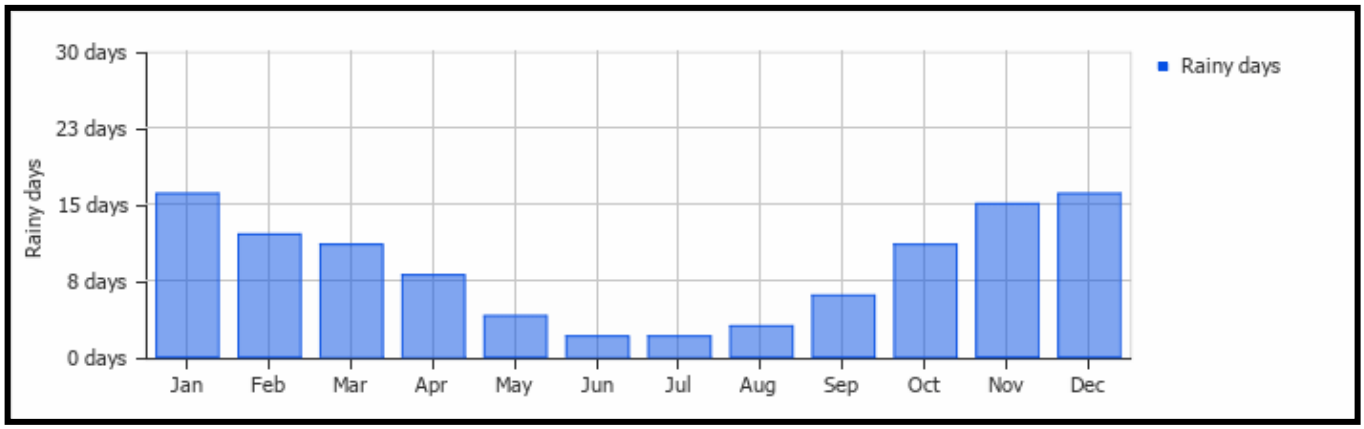



**FIGURE 9: AVERAGE RAINY DAYS (RAIN/SNOW) IN OKHAHLAMBA LOCAL MUNICIPALITY**

## 7.3 Geology

The study area, and much of the Drakensberg as a whole, is comprised of layers of the Karoo Supergroup which is the most widespread statigraphic unit in South Africa. The Karoo Supergroup is made up of mostly shales and sandstones. Below is a figure taken from the 'Central Drakensberg Information Centre' which illustrates the Drakensberg geology in a simplistic manner.

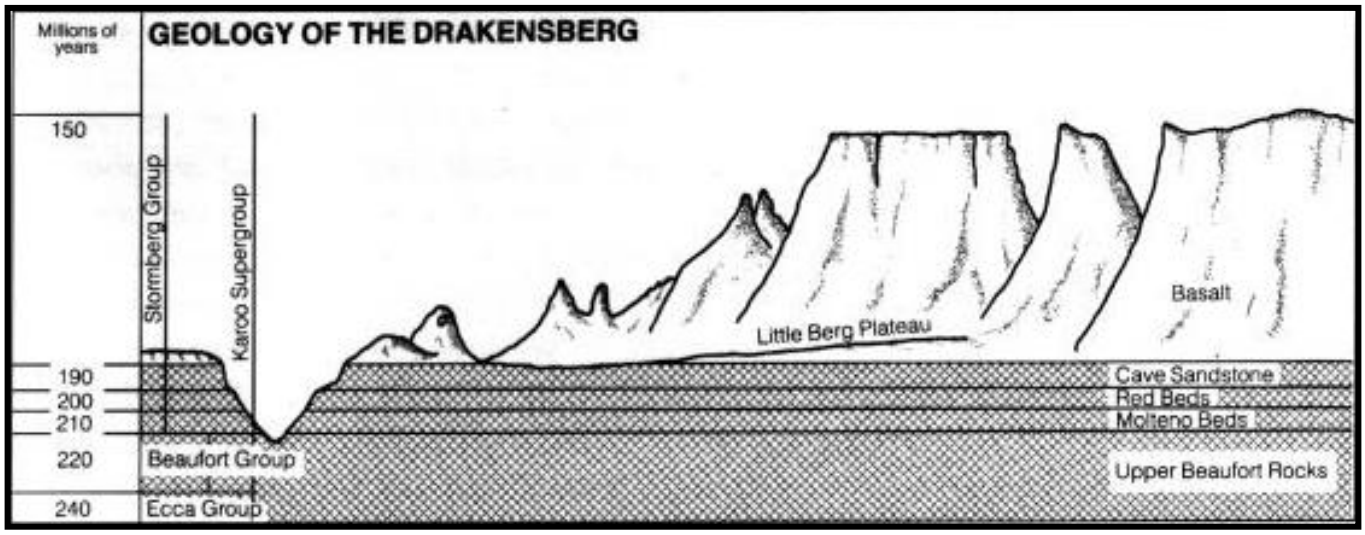



**FIGURE 10: GEOLOGY OF DRAKENSBERG (HTTP://WWW.CDIC.CO.ZA)**

## 7.4 Vegetation

The vegetation of the study area is that of a mountainous region characterised by steep slopes of broad valleys and supporting mainly short, sour grasslands, rich in forbs. So-called 'Protea savannas' - grasslands that contain widely scattered trees of Protea caffra and occasionally P. roupelliae – fall within this unit. Sandstone cliffs, a major characteristic of this landscape, create a multitude of special habitats (often fire-protected) for many special plant communities (Mucina and Rutherford, 2006: 510).

## 7.5 Hydrological

The escarpment of the Drakensberg lies between 2 800 and 3 000 meters and determines the watershed between the interior catchments of Lesotho that feed into the Orange River and the shorter and steeper catchments of rivers feeding into KwaZulu-Natal such as the Tugela, Mooi and Mkomazi Rivers that flow towards the east coast. The key river arising in the Okhahlamba area is the Tugela River. The Tugela is the largest river system in KwaZulu-Natal. The funnel shaped catchment area of the Tugela River lies predominantly in the KwaZulu-Natal. The Tugela River rises in the Drakensberg Mountains near Bergville where peaks rise to over 3 000 m. The river and its tributaries, meander through central KwaZulu-Natal, draining from the Drakensberg escarpment towards the Indian Ocean.

## 7.6 Heritage

The greater Drakensberg area is well endowed with cultural heritage, including various wilderness areas within and outside the formal protected area network. Although most literature refers to this heritage mainly in terms of San rock art, the region also contains other categories of cultural heritage features representative of various cultures and time-periods.

The cultural heritage of the Drakensberg is diverse and highly fragile. Cultural heritage, unlike natural heritage, is non-renewable and irreplaceable. Once damaged, it is gone forever. San rock paintings and associated Later Stone Age sites, as well as the palaeontology of the area, are unique and have global significance. The remaining categories, however, certainly have national, provincial, and regional significance.

The area has had several different cultural groups associated with it, from the San to the southern Sotho, the Zulu-speaking and Xhosa-speaking groups, and, more recently, the Griqua and Anglo-Boer descendants. Each of these groups has its own unique cultural expressions and has related in various ways to the others. These differences are found in the building styles of homes, their way of life as they interact with their environment, traditional dress, and so on. In addition, there are a number of living heritage values associated with all of these groups, many of which are unknown or poorly recorded. The following section is a more detailed description of the various cultural heritage features.

# 8 PUBLIC PARTICIPATION PROCESS

Public participation is a process that is designed to enable all interested and affected parties [I&APs] to voice their opinion and / or concerns which enables the practitioner to evaluate all aspects of the proposed development, with the objective of improving the project by maximising its benefits while minimising its adverse effects.

I&APs include all interested stakeholders, technical specialists, and the various relevant organs of state who work together to produce better decisions.

The primary aims of the public participation process are:

- To inform I&APs and key stakeholders of the proposed application and environmental studies;
- To initiate meaningful and timeous participation of I&APs;
- To identify issues and concerns of key stakeholders and I&APs with regards to the application for the development [i.e. focus on important issues];
- To promote transparency and an understanding of the project and its potential environmental [social and biophysical] impacts [both positive and negative];
- To provide information used for decision-making;
- To provide a structure for liaison and communication with I&APs and key stakeholders;
- To ensure inclusivity [the needs, interests and values of I&APs must be considered in the decision-making process];
- To focus on issues relevant to the project, and issues considered important by I&APs and key stakeholders, and;
- To provide responses to I&AP queries.

The public participation process must adhere to the requirements of Regulations 40 and 44 [GNR 326] under the NEMA [as amended].

The public participation process will be undertaken according to the phases outlined below.

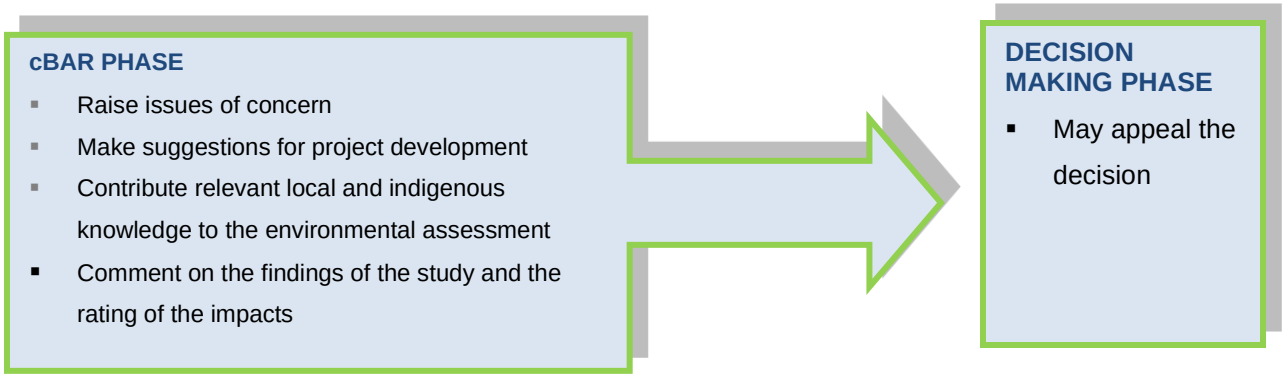



**FIGURE 11: RESPONSIBILITIES OF I&APS IN THE DIFFERENT PPP STAGES**

Figure 12 [below] depicts the approach taken by At Gedezar, where one-way information flow is avoided and information exchange is promoted, thereby enabling a higher level of engagement.

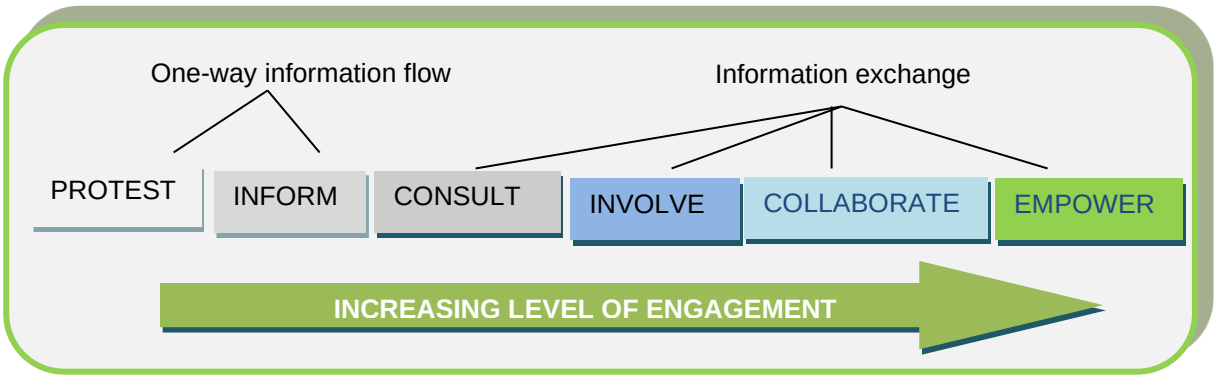



**FIGURE 12: THE STAKEHOLDER ENGAGEMENT SPECTRUM [DEAT, 2002]**

In order to achieve a higher level of engagement, a number of key activities have taken place. These included the following:

- The identification of stakeholders is a key deliverable at the onset, and it is noted that there are different categories of stakeholders that must be engaged, from the different levels and categories of government, to the communities of wards of residential dwellings which surround the proposed development;
- The development of a living and dynamic database that captures details of stakeholders from all sectors;
- The convening of focused meetings with stakeholders during the BA process; this included engaging with community leaders forming part of the AmaNgwane Traditional Council. The continued engagement of public leaders to whom the public generally turn for information, keeping such individuals well informed about process and progress;
- The fielding of queries from I&APs and others, and providing appropriate information;
- The convening of specific stakeholder groupings / forums as the need arises;
- The preparation of reports based on information gathered throughout the BA via the PPP and feeding that into the relevant decision-makers;
- The PPP includes distribution of pamphlets or Background Information Documents [BIDs] and other information packs; and
- Where appropriate site visits may be organised, as well as targeted coverage by the media.
- Specifically, the proposed upgrade of the construction of culvert BA PPP has entailed the following activities as outlined in the following Sections.

## 8.1 Authority Consultation

The competent authority which is the KZN EDTEA is required to provide an environmental authorisation [EA] [whether positive or negative] for the project. The KZN EDTEA has been consulted from the onset of this study, and has been engaged throughout the project process.

Authority consultation included / will include the following activities:

- Pre-application consultation in the form of a meeting with Ms Onwabile Ndzumo and Ms Nozipho Mthembu on the 30th June 2020.
- Submission of an application for environmental authorisation in terms of Section 26 of the EIA Regulations [2014].

## 8.2 Consultation with Other Relevant Stakeholders

Consultation with other relevant key stakeholders was undertaken through telephone calls and written email correspondence in order to actively engage these stakeholders throughout the process and to provide background information about the project during the BA process.

Relevant key stakeholders were consulted and sent pamphlets or BIDs and other information packs [where requested].

All relevant stakeholders were allowed an opportunity to comment on the cBAR.

The identified stakeholders of this project include:

**TABLE 17: KEY STAKEHOLDERS CONTACTED AS PART OF THE PUBLIC PARTICIPATION PROCESS**

| OWNERS AND OCCUPIERS OF LAND ADJACENT TO THE SITE | |
|---|---|
| Ingonyama Trust Board | |
| **LOCAL AUTHORITY** | |
| uThukela District Municipality<br>Okhahlamba Local Municipality | |
| **PROVINCIAL AUTHORITY** | |
| Mrs Bernadet Pawandiwa | Amafa KwaZulu-Natal |
| Ms Onwabile Ndzumo<br>Ms Nozipho Mthembu | KwaZulu-Natal Department of Economic Development Tourism and Environmental Affairs [uThukela] |
| Ms Judy Reddy | Department of Transport |
| Nerrisha Pillay | Ezemvelo KZN Wildlife |
| Mr Sboniso Khumalo | Okhahlamba Local Municipality |
| Ms Cindy Coetzee | uThukela District Municipality |
| **STATE DEPARTMENTS** | |
| Mrs Jabulile Mngoma Madibe | National Department of Water and Sanitation |

## 8.3 Site Notification

The EIA Regulations [2014] require that a site notice be fixed at a place conspicuous to the public at the boundary or on the fence of the site where the activity is proposed to occur. In addition, at points of access or high through traffic. The purpose of this is to notify the public of the project and to invite the public to register as stakeholders and inform them of the PP Process.

At Gedezar erected a number of notices on the 2nd November 2020 at various high traffic locations around the perimeter of the site and at the start and end of the project [refer to **Appendix E7].**

## 8.4 Identification of Interested and Affected Parties

I&APs were identified throughout the BA process primarily from responses received from the notices mentioned above. A number of stakeholders were also identified in the focus group meeting held with the AmaNgwane Traditional Council.

E-mails were sent to key stakeholders and other known I&APs, informing them of the application for the project, the availability of the cBAR for review and indicating how they may become involved in the project.

Additionally, hard copies of the cBAR will be made available at the offices of the local Councillor.

The contact details of all identified I&APs are updated on the project database, which is included in **Appendix E6.** This database was updated on an on-going basis throughout the BA process.

## 8.5 Briefing Paper

A briefing paper or BID for the proposed project was compiled in English [refer to **Appendix E8.1**] and distributed to key stakeholders on **10th February 2021**.

The aim of this document is to provide a brief outline of the application and the nature of the development. It is also aimed at providing preliminary details regarding the BA process, and explains how I&APs could become involved in the project.

The briefing paper was distributed to all identified I&APs and stakeholders, together with a registration / comment sheet inviting I&APs to submit details of any issues, concerns or inputs they might have with regards to the project. BIDs were also distributed *via* email to relevant Departments. Refer to **Appendix E8.2**.

## 8.6 Focus Group Meeting

Following consultation with KZN EDTEA, the EAP convened a Focus Group Meeting with the local as representatives of all local I&APs affected by the proposed project on the 2nd November 2021.

Refer to **Appendix E3.3** for meeting minutes and attendance register.

## 8.7 Advertising

In compliance with the EIA Regulations [2014], notification of the commencement of the BA process for the project will be advertised in a local newspaper in Zulu and English in the relevant newspaper. The CA has requested that the advertisement be placed only once a reference number is obtained.

I&APs have been requested to register their interest in the project and become involved in the BA process. The primary aim of the advertisement is to ensure that the widest group of I&APs possible is informed and invited to provide input, through questions and comments on the project.

## 8.8 Issues Trail

Issues and concerns raised in the public participation process during the BA process have been and will continue to be compiled into an Issues Trail.

The Issues Trail is attached as **Appendix E4**, in which all comments received and responses provided to date have been captured.

## 8.9 Key Issues Raised by the Public [Summarised]

- When will construction on the project begins?
- Enquired about employment opportunities during the construction period.
- Requested to see designs for the bridge
- Enquired if the bridge will allow pedestrian and vehicle crossing

## 8.10 Public Review of the draft Consultation BAR

All registered I&APs were notified of the availability of the report through the local ward councillor.

The cBAR will be made available for authority and public review for a total of 30 days from 13 May 2021 & 14 June 2021.

The report was made available at the following public locations within the study area, which are all readily accessible to I&APs:

- AmaNgwane Traditional Council offices; and
- Ward councillor

## 8.11 Final Consultation BAR

The final stage in the BA process entails the capturing of responses and comments from I&APs on the cBAR in order to refine the BAR, and ensure that all issues of significance are addressed.

The final BAR [i.e. fBAR] will be the product of all comments and studies, before being submitted to KZN EDTEA for review and decision-making.

## 8.12 PPP Summary

**TABLE 18: SUMMARY OF PUBLIC PARTICIPATION PROCESS THUS FAR**

| Activity | Description | Reference |
|---|---|---|
| **Identifying stakeholders** | Stakeholders were identified and a database of all I&APs were compiled. | Appendix E6 |
| **Publishing newspaper adverts** | Advertisements regarding inter alia the proposed project scope of works, location, and date for draft Basic Assessment Report review as well as details of EAP were placed in the Ladysmith Gazette publication. | Appendix E2 |
| **Distribution of a BID** | BIDs were distributed by hand and electronically to I&APs on 2nd November 2020 and 10 February 2021. | Appendix E8 |
| **Erection of site notices** | A number of A2 site notices were erected on the perimeter of the site on the 2nd November 2020. | Appendix E7 |
| **Preparation of an on-going Issues Trail** | Comments, issues of concern and suggestions received from stakeholders thus far have been captured in a Comment and Response Report. | Appendix E4 |
| **Release of Draft Reports** | This Consultation Basic Assessment Report [cBAR] has been advertised and made available for a period of 30 days for public review and comment.<br>This cBAR is available for review from 13 May 2021 & 14 June 2021. | Appendix E2 |
| **Public Meetings / Open Days** | A public Meeting was held with the local residents on 2nd November 2020. | Appendix E3 |
| **Release of final Reports** | The final Basic Assessment Report will be the product of all comments and studies, before being submitted to KZN EDTEA for review and decision-making. | __ |

# 9 SUMMARY OF KEY SPECIALIST FINDINGS

## 9.1 Wetland Health and Functionality Assessment

This assessment was conducted by Stephen Burton from ***Sivest SA (Pty) LTD***. For the full report, refer to **Appendix D1.**

### *9.1.1 Methodology*

The outer temporary boundaries of the wetlands onsite were delineated using the method contained within the DWAF guideline 'A practical field procedure for the identification and delineation of wetlands and riparian areas' (DWAF, 2005). The guideline uses four indicators which are required to determine the outer edge of the temporary boundary of a wetland, i.e., Terrain unit, Soil wetness, Soil form and Vegetation.

For this study the outer temporary wetland boundary was delineated using the presence of soil wetness as an indicator within the top 50 cm of the soil profile. Where the soil was too hard to sample with a hand-held auger, contour elevation, valley morphology and the presence of breaks in slopes was used to determine the outer boundary of the wetland.

Features within the study area were delineated and classified using the Classification System for Wetlands and other Aquatic Ecosystems in South Africa. WET-Health tool developed by Macfarlane et al. (2009) was used to determine the current (pre-development) and post-development health of the affected wetland systems. The current (pre-development) and post-development value of the affected wetland units was determined using the WET-EcoServices tool developed by Kotze et al. (2009).

### *9.1.2 Findings*

Four (4) wetland units, are located within the investigation area. The wetland units and their HGM category (prior to modification) are provided in Table 19 below.

**TABLE 19: WETLAND UNITS WITHIN THE DEVELOPMENT AREA AND THEIR HYDRO-GEOMORPHIC DESIGNATIONS**

| Wetland HGM Unit | Hydro-Geomorphic Type (Under natural conditions) |
|---|---|
| 1 | Channelled Valley Bottom Wetland |
| 2 | Channelled Valley Bottom Wetland |
| 3 | Unchannelled Valley Bottom Wetland |
| 4 | Channelled Valley Bottom Wetland |

#### ***9.1.2.1 Channelled Valley Bottom Wetlands***

Based on the results from the wetland delineation assessment it has been observed that the Channelled Valley Bottom Wetland systems on site are generally extensive, and historically every valley bottom within the hilly study site would have had a wetland system [**see Plate 5**]. In some cases, the valley bottoms have been purposefully drained through the creation of drainage ditches. Nevertheless, the area also has a number of systems that drain relatively large areas that would naturally have developed channels as the volumes are. As the area drains towards the lower valley systems the volume of water that the wetlands can hold is exceeded, and canalised flow develops (rivers and streams). In general, the channelled valley bottom system within the project area have been impacted upon through the hardening of surface within the catchments, and through direct impacts of subsistence and commercial farming practices. Much of the riparian vegetation that would have inhabited the systems has been

cleared for to make way for crop production, and thus the hydrological regime has been altered. Additionally, the planting of crops within the catchment, and the wetland itself, leads to increased erosion and sedimentation, as well as erosion of the channel. The surrounding grassland is used for cattle grazing where crops are not produced. Livestock generally leads to increased alien invasive species infestations through the increased manure levels that generally occur where cattle drink and cross the systems.

**PLATE 5: HGM UNIT 1 IS A NATURALLY CHANNELLED VALLEY BOTTOM WETLAND, WHICH HAS BEEN FURTHER IMPACTED BY STORMWATER FLOWS.**

#### *9.1.2.2 Unchannelled Valley Bottom Wetland*

Unchannelled valley bottom wetlands are not a common system within the area [ **see Plate 6**]. The valley bottoms are generally of a gentle gradient along their length, and thus perfect conditions exist for the creation of valley bottom wetlands. As with the channelled systems discussed above. Unchanneled valley bottom wetlands are not a common system within the study site. As with the channelled system the unchanneled valley bottom systems have also been impacted upon by the clearing of the wetlands and catchments for crop production, and through the creation of drains in order to maximise crop production.

**PLATE 6: THE UNCHANNELED SYSTEM ON SITE IS CURRENTLY OVERGRAZED BY LIVESTOCK.**

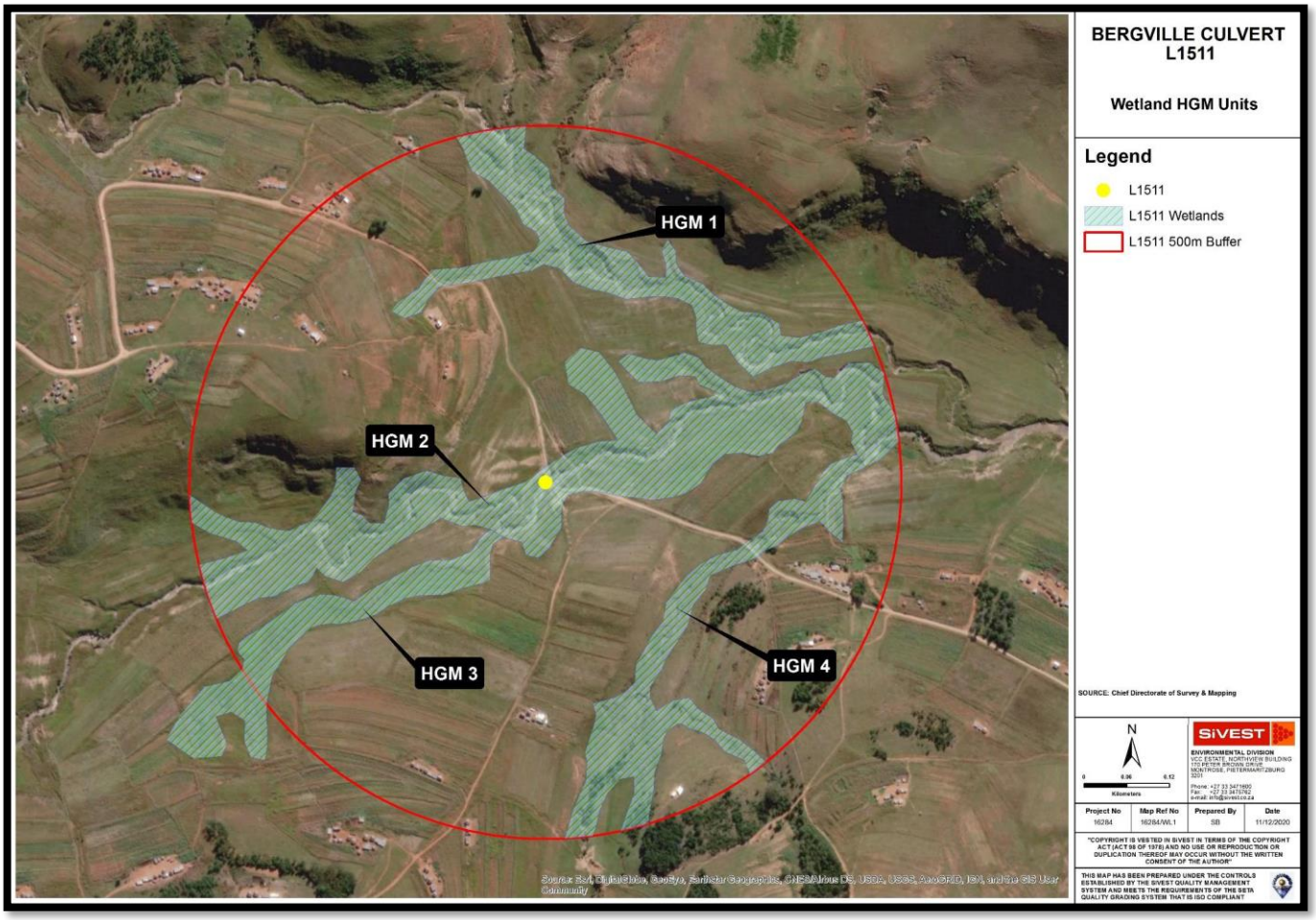



**FIGURE 13: FINAL WETLAND DELINEATION MAP OF HGM UNITS.**

### *9.1.3 Results: Wetland Health (PES)*

The formal health assessment of the wetland units indicates that most wetland units are **Largely Modified** resulting from past and current land uses and activities.

A summary of the Present Ecological Status (PES) based on results from the WET-Health Tool is provided in **Table 20** below.

**TABLE 20: WET-HEALTH SCORE**

| | MODULE | | | | |
|---|---|---|---|---|---|
| **Unit** | **Hydrology Impact Score and Class** | **Geomorphology Impact Score and Class** | **Vegetation Impact Score and Class** | **Combined Impact Score** | **PES Category** |
| 1 | 3.8 (C) | 4.6 (D) | 6.1 (E) | 4.69 | D (Largely Modified) |
| 2 | 5.7 (D) | 3.2 (C) | 4.7 (D) | 4.70 | D (Largely Modified) |
| 3 | 5.1 (D) | 3.6 (C) | 5.1 (D) | 4.67 | D (Largely Modified) |
| 4 | 4.8 (D) | 4.4 (D) | 5.9 (E) | 5.00 | D (Largely Modified) |

#### *9.1.3.1 Wetland Units Eco-services*

The wetland units were assessed as being of medium to moderately-high importance in terms of ecosystem service provision. The ability of the wetlands to trap additional sediment is of medium importance, while its tourism and cultural services are of low importance. The wetlands' ability to attenuate floods and stream flow are generally considered of medium importance. Similarly, the ability of the wetlands to store carbon, and maintain biodiversity is of medium importance. The phosphate, Nitrate and toxicant removal ability is of medium high importance.

### *9.1.4 Construction Phase Potential Impacts*

The culverts will be built across the channelled valley bottom systems that exist in the area. Direct disturbances to the wetlands associated with the construction of the road include the excavation of trenches and outfalls within the wetland and the compaction of the wetland vegetation and soils by heavy vehicles involved in the excavations and the laying of the culverts. Indirect disturbances arising from these direct impacts include erosion, sedimentation and alien plant encroachment.

During the construction phase, wetland habitat may be temporarily or permanently cleared. Clearing of habitat will mean degradation of the wetland habitat to accommodate the service infrastructure. Clearance will entail removal of indigenous vegetation resulting in loss of wetland habitat. Biota inhabiting the wetland habitat will therefore also be displaced.

Disturbance due to edge effects are also likely to take place given the proximity of the existing informal settlements as well as existing roads across the wetlands. Edge effect impacts afford opportunities for alien vegetation to colonise the wetland habitat.

Mitigation measures to the above potential negative impacts are provided in a full Wetland Health and Functionality report, refer to **Appendix D1.**

### *9.1.5 Conclusion*

An assessment of the Present Ecological State of the wetlands reveals that all HGM units are Largely Modified through changes within the catchment and the removal of wetland soils through erosion.

An assessment of the current importance of the wetland unit in terms of ecosystem service provision indicates that wetland units provide medium to moderately-high levels of wetland functioning.

All four wetlands on site have been impacted upon by subsistence crop production, livestock grazing, and changes to their hydrology (increased hardened surfaces) and geomorphology thus leading to an associated infestation by alien vegetation.

## 9.2 Terrestrial Ecological Impacts Assessment.

The study was conducted by Mark Summers and Stephen Burton from ***Sivest SA (Pty) LTD***. on the 4th December 2020. For the full report, refer to **Appendix D3**.

### *9.2.1 Methodology*

The study site was analysed using a two-phased approach (desktop study and site ground truthing). Firstly, a desktop assessment of the study site was conducted in terms of current vegetation classifications and biodiversity programmes and plans. Different databases have been examined in the process of undertaking the desktop analysis. A summary of the methodology utilised for the generation of each of the databases is available on the full Ecological Impact Assessment Report attached on this report [refer to **Appendix D3**].

Vegetation sampling and fauna sampling was undertaking during the site visit. Vegetation was sampled using the random sampling technique. The “hotspot1” assessment technique was utilised in the process. The “hotspot1 technique focuses on the sampling effort on areas with natural vegetation or where the vegetation was dominated by indigenous species (i.e., not comprising a large proportion of alien invasive plant species). Individual plant species observed during the assessment were recorded to give an indication of species diversity and the overall species assemblage.

Fuana species were sampled using the taxa specific lists that were compiled with the use of databases such as the Animal Demographic Unit (ADU) Virtual Museum. The lists were compared with species seen during site visit. Verification of fauna on site was done per faunal unit with a focus on movement, foraging, nesting and sites. Point count bird surveys, with a clear view of the surrounding vegetation, and walk-through surveys were conducted in all of the habitat types around the culvert site. Birds were identified visually or by their vocalisation. Active searches for reptiles and amphibians were conducted within habitats likely to harbour or be important for species.

### *9.2.2 Findings*

According to Mucina and Rutherford 2006, the site is classified as Northern KwaZulu-Natal Moist Grassland (GS 4) which is a Vulnerable vegetation type. Upon undertaking the groundtruthing exercise it was found that the site is transformed by erosion and communal grazing adjacent to the culvert site. This is evident in Plate 1 below, showing a heavily eroded site.

A total of 32 plant species were recorded during the field survey, of which 6 were alien. Two plant species fall under the KwaZulu-Natal Nature Conservation Management Act were noted within the development footprint (*Asparagus spp., Ledebouria revoluta*).

The vegetation found along the existing road reserve is dominated by graminiod species. The majority of the road reserve resembles [**see Plate 7**] below.

Sward height was low due to a combination of communal grazing and being relatively early in the growing season. Grass species included Buffalo Grass (*Aristida congesta subsp. congesta*), Bermuda Grass (*Cynodon dactylon*), Silky Grass (*Imperata cylindrica*), Narrow Heart Love Grass (*Eragrostis racemosa*), One-finger Grass (*Digitaria monodactyla*) and Cat’s Tail Dropseed (Sporobolus pyramidalis). These species tend to be pioneer species which grow in disturbed areas.

**PLATE 7: TYPICAL VEGETATION ALONG THE MAJORITY OF THE ROAD RESERVE**

**PLATE 8: CAT'S TAIL DROPSEED**

**PLATE 9: CATERPILLAR BEAN**

**PLATE 10: STAR-LEAVED SORREL**

#### *9.2.2.1 Biodiversity noteworthiness*

In terms of the vegetation classifications that were identified from the aerial photography and ground truthed on site, the following assessment was made in terms of the noteworthiness of the vegetation that would be immediately impacted upon by the proposed Development.

**TABLE 21: BIODIVERSITY NOTEWORTHINESS OF THE CULVERT L1511 AND ROAD RESERVE.**

| | Scores | | | | |
|---|---|---|---|---|---|
| **Biodiversity Noteworthiness** | 0 | 1 | 2 | 3 | 4 |
| Diversity | ✓ | | | | |
| Rarity | | ✓ | | | |
| Conservation Status | | | ✓ | | |
| Red Data Species | | | | | ✓ |
| Uniqueness / Special features | ✓ | | | | |
| **OVERALL VALUE** | Total Score/number of categories is 7 / 5= 1.4 | | | | |

#### *9.2.2.2 Functional Integrity and Sustainability*

The Functional Integrity and Sustainability speaks to the impact of the proposed activity on the receiving environment. It also speaks to the likelihood that it will be of significance, and whether there are significant mitigation and or amelioration measures that are required to be put in place to ensure that the impacts are manageable, and will not prove deleterious to the vegetation type as a whole.

**TABLE 22: FUTURE INTEGRITY AND VIABILITY OF THE CULVERT L1511 AND ROAD RESERVE**

| | Scores | | | | |
|---|---|---|---|---|---|
| **Integrity & Future Viability** | 0 | 1 | 2 | 3 | 4 |
| Buffer | ✓ | | | | |
| Connectivity | | | ✓ | | |
| Alteration | | ✓ | | | |
| Invasive/pioneers | | ✓ | | | |
| Size | ✓ | | | | |
| **OVERALL VALUE** | Total Score/number of categories is 4 / 5= 0.8 | | | | |

- The average score of the culvert L1511 and road reserve is 1.4, which indicates that this area is functioning at a moderately low level.
- The average score of the culvert L1511 and road reserve is 0.8, which indicates that integrity and future viability is at a low level.

### *9.2.3 Faunal Findings*

#### *9.2.3.1 Avifauna*

A total of 38 bird species were seen during the sampling period. Of the 38 species seen, 36 birds were identified in flight. This assumes that these birds were using the sample site as a viable home range and movement corridor, which is understandable as the sample site is surrounded by wetland and grassland habitat, surrounded by hillsides. Additionally, the suite of birds seen tend to inhabit the above-mentioned vegetation types. Twenty (20) birds were seen foraging, with the majority of these species feeding on wing (such as the swallows and swifts). The degraded state of the roadside vegetation associated with the culvert and drainage line is a likely reason as to why the avifaunal richness is low. No species of conservation concern were identified during the assessment, however a kettle of Cape Vultures were seen in the general area. The Cape Vultures will range over a large area and are likely to feed on carcases and vulture restaurants provided by the farmers in the greater area. There is potential for Lanner Falcon (Vulnerable) to forage through the area, with cliff sides from the foothills of the Drakensberg Mountain Range providing nesting and roosting habitat. Bearded Vulture (Critically Endangered) are expected to range over the

general area, while Black Stork (Vulnerable) and Southern Bald Ibis (Vulnerable) are likely to forage within the fields and drainage lines in the general area. It is unexpected that the proposed development will result in loss of habitat for these species of conservation concern. Some avifaunal species seen can be found from Plate 11 to Plate 12.

**PLATE 11: CAPE VULTURE (GYPS COPROTHERES)**

**PLATE 12: BANDED MARTIN (RIPARIA CINCTA)**

#### *9.2.3.2 Herpetofauna*

Herpetofauna include both reptiles and amphibians. No amphibians were seen during the assessment, however drainage lines and a wetland in close proximity to site are available habitats for amphibians. Amphibians are indicators of ecosystem health due to their sensitivity to polluted aquatic environments. Amphibians reduce in abundance when there are elevated pollution levels in the ecosystem. It is likely that the area is host to Raucus Toads (*Sclerophrys capensis*), Delalande's River Frog (*Amietia delalandii*) and Natal Sand Frog (*Tomopterna natalensis*).

No reptile species were seen during the assessment. Habitat for grassland and wetland reptile species is present, however the disturbed nature of the site reduces the chance of reptiles being present on site. No species of conservation concern were noted in site. The ReptileMAP predicts the presence of the Near Threatened Drakensberg Dwarf Chameleon (*Bradypodion dracomontanum*), which is found in grasslands and small forest patches above 1500m. This species is unlikely to occur on site due to the dirturbed nature of the study area.

#### *9.2.3.3 Mammals*

No mammal species were seen during the site assessment. Grassland habitat is available for Oribi (Endangered - *Ourebia ourebi*) and Leopard (Vulnerable – *Panthera pardus*) on the hills in close proximity to site, however these species are very sensitive to communal hunting, therefore it is unlikely that these species will occur on the application site. The Near Threatened Southern African Vlei Rat (*Otomys auratus*) could potentially occur in the wetlands in close proximity to site. The Vulnerable Tsessebe (*Damaliscus lunatus lunatus*) inhabits floodplains and grasslands, which are present in the area, although the communal nature of the site will limit this species to protected areas. No further species of conservation concern are likely to occur on site.

#### *9.2.3.4 Butterflies*

No butterfly species were seen during the assessment and no species of conservation concern are predicted to occur on site. Species predicted to occur within the study area according to LepiMAP.

### 9.2.4 Impact Assessment

The potential impacts of the proposed development mainly related to loss of aquatic species as well as general species which are utilizing the site during construction. However, a formal culvert or bridge across this section of river will reduce the aquatic disturbance currently occurring from vehicles driving through the river. Additionally, this will reduce erosion which is currently occurring due to numerous tracks over the same river.

Hard transformation of proposed culvert will result in a marginal reduction in flora. The routing being a linear activity will result in the disturbance of the soil surface, and this often leads to the establishment of alien invasive plant species.

#### 9.2.4.1 Erosion related impacts

Vegetation binds and protects the soil surface, and when removed, increases erosion potential. This may lead to water and wind removing vital topsoil and blocking up drains and eventually clogging roadsides and drainage lines.

#### 9.2.4.2 Erosion related impacts for operation phase

Erosion potential is increased in areas where vegetation has been removed. Hard transformation may increase water velocity in steeper areas and may result in a loss of topsoil and the erosion of drainage lines. This will aid in alien and invasive plant establishment and vegetation rehabilitation will be compromised as the loss of topsoil will delay rehabilitation efforts. However, the eroded nature of the site around the culvert due to numerous roads will be reduced with a formalised culvert crossing.

### 9.2.5 Conclusions

The proposed culvert crossing will have a low impact on the biodiversity, and all impacts can be mitigated to an acceptable low level. Therefore, it is the opinion of the Specialist that a Compliance Statement be compiled instead of a Biodiversity Impact Assessment.

## 9.3 Heritage Impact Assessment

The study was conducted by Frans Prins from **Active Heritage cc** in **March 2021**. For the full report, refer to **Appendix D3.**

### 9.3.1 Methodology

A desktop study was conducted of the archaeological databases contained in the KwaZulu-Natal Museum. The available archaeological and heritage literature covering the greater Bergville area was consulted. The SAHRIS website was consulted for previous heritage surveys and heritage site data covering the project area. Ground survey of the site footprint was conducted on 10th January 2021. The survey was conducted by following acceptable archaeological survey methods. An area of 50m was also surveyed beyond the actual footprint.

### 9.3.2 Findings

Desktop study indicates that Stone Age Sites of all periods and traditions may occur in the greater Bergville area. Middle Stone Age tools have been found in dongas and erosion gullies at various locales in the greater Drakensberg area including areas close to the study area. These sites are usually out of context and of little research value. Middle Stone Age deposits often occur in deep cave deposits throughout KwaZulu-Natal (including the Eastern Cape Drakensberg area and adjacent parts of Lesotho). Later Stone Age sites are more prolific in the Drakensberg. These include rock art sites. Almost 1000 rock art sites occur on the greater Drakensberg area. Approximately 300 rock art sites have been located my members of the Mnweni Cultural and Rock Art Group in near vicinity of the

project area. The abundance of sandstone shelters and outcrops in the project area do point to the potential occurrence of these sites on the footprint.

Early Iron Age Sites typically occur along major river valleys below the 700 m contour in KwaZulu-Natal. It is very unusual to find sites above the 1000m contour. The project area is situated above the 700m contour far removed from a major river valley setting. It is therefore most unlikely to expect Early Iron Age sites at the project area. Later Iron Age sites may occur in the project area. These sites were occupied by the ancestors of the first Nguni-speaking agriculturists as well as their descendants who settled in KwaZulu-Natal. Later Iron Age sites are known from areas closer to Bergville and further to the east. Often sites are only located with reference to historical or oral data. Historical buildings, structures and farmsteads do occur scattered throughout the greater Bergville area. Historical era buildings and structures could occur at or near the project area. 'Living heritage sites' has previously been recorded in the nearby Mnweni Valley to the west of the project area. These are mostly rock art sites that are still being used by sheep herders and other community members as well as pools with religious values.

Although the study area surrounds the footprint is extremely rich in rock art, however none were located during the ground survey. In fact, there are no sandy outcrops suitable for rock art occurrence, within 50 m from any of the proposed culverts. The ground survey did not locate any heritage sites (including archaeological, historical, graves, and living heritage sites) on the footprint.

In terms of active stakeholder consultation, the consultant spoke to local residents whom he encountered adjacent to the L1511 during the survey. None of them had knowledge of any heritage sites and/or graves that may occur in the immediate vicinity of the proposed culverts.

## 9.4 Palaeontological Impact Assessment

The study was conducted by Prof Marion Bamford. For the full report, refer to Appendix D4.

### *9.4.1 Methodology*

The palaeontological impact assessment was conducted using consultation of geological maps, literature, palaeontological databases, published and unpublished records. The resources were used to determine the probability of fossils occurring within the study area and surrounding areas as well. Data sources included records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases. Site visit by a qualified palaeontologist to locate fossil and assess their importance was not be applicable to this assessment.

### *9.4.2 Findings*

The Karoo Basin and the basal strata of the Karoo Supergroup are mainly exposed in the study area. The Karoo Basin is filled with the Karoo Supergroup rocks. The basin is bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks. The palaeontological sensitivity of the project area is demonstrated in figure 14 below. The proposed development site lies tis on the Adelaide Subgroup and close to Jurassic dolerite. The dolerite is of volcanic origin hence does not preserve any fossils, and so has low sensitivity (refer to blue in the SAHRIS palaeosensitivity map).

However, it is possible that the sediments making up the Quaternary alluvium are derived from the Karoo Supergroup rocks, they are composed of weathered sands and soils. It is possible that in wetlands, abandoned oxbows and channels "newer" fossils could have been trapped and preserved, such as mammal bones, charcoal and plant fragments. Along a flowing river, however, where the bridge or culvert will be constructed, no such fossil traps are present. The geological structures on study site show that the rocks are either the wrong type to preserve fossils (dolerite) or represent transported and weathered alluvium and sands. Flowing rivers would not trap and

preserve fossils. The surface is already very disturbed by the present paths and tracks. Since there is a very small chance that fossils from the Quaternary period may nearby and may be disturbed, a Fossil Chance Find Protocol has been added to the palaeontological Impact assessment report which is attached to this cBar report. The results show that the potential impact to fossil heritage resources is low.

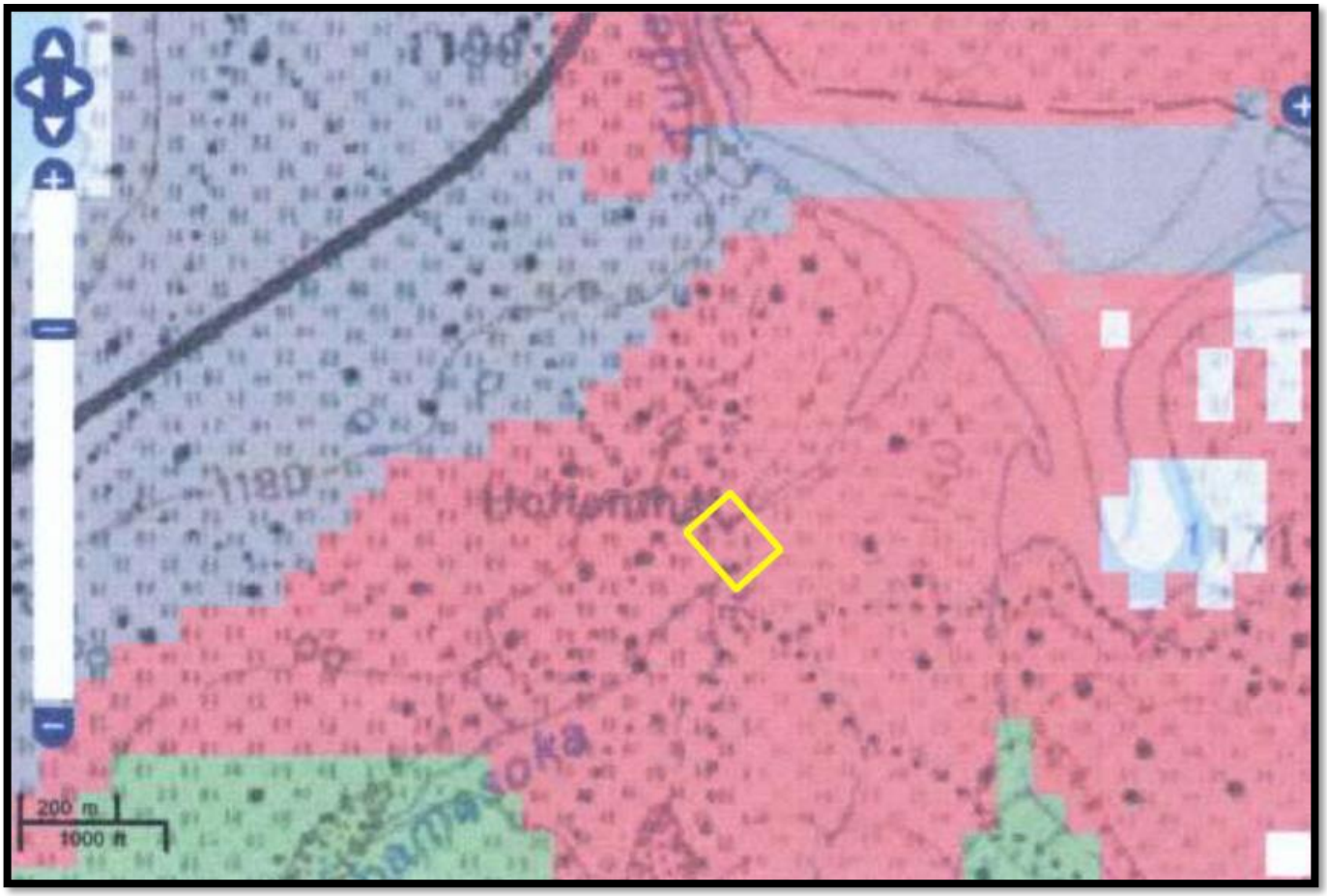



**FIGURE 14: SAHRIS PALAEOSENSITIVITY MAP FOR THE SITE FOR THE PROPOSED CULVERT ON ROAD L1511 INDICATED ON THE YELLOW TRIANGLE ON THE MAP.**

### *9.4.3 Assumptions and uncertainties*

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the sandstones, shales and sands are typical for the country and could contain fossil plants, insects, or invertebrate material. The chances however are extremely low of finding fossils in a flowing river channel because these are very disturbed sites, and even if fossils were originally present, the water flow would have removed them. Furthermore, the route is already highly disturbed by foot traffic, and this is confirmed in the heritage report of Frans Prins (refer to **Appendix D3, figures 11 and 12 of Haritage Impact Assessment report**).

### *9.4.4 Conclusion*

Based on experience and the lack of any previously recorded fossils from the area, it is unlikely that any fossils would be preserved in the Quaternary alluvium and sands that have been transported by the river. The approach to the river crossing is also highly disturbed by foot traffic. There is a very small chance that fossils may occur in wetlands and abandoned oxbow or channels, if they occur in the vicinity, so a Fossil Chance Find Protocol should

be added to the EMPr: if fossils are found once excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.

## 9.5 Geotechnical Investigation

The study was conducted by Shrivar Hiralal of **Geosure (Pty) Ltd** in July 2020, For the full report, refer to **Appendix D6.**

### *9.5.1 Methodology*

The fieldwork for the investigation was carried out according to codes and guidelines relevant to geotechnical investigations of this nature.

The formation and weathering of geological materials are discontinuous processes and unexpected variations in soil, rock and groundwater regimes may occur even on sites where the conditions seem to be uniform or consistent. Variations in what is reported here may become evident during construction and it is thus imperative that an appropriately qualified and experienced Competent Person inspects all critical stages of development including, but not limited to, excavations to assess the conditions encountered and to assist in the interpretation of observations at variance with the information supplied in this report.

Twenty (20 No.) inspection pits, designated IP1 through IP20, were excavated using hand tools at the proposed culvert sites at the approximate positions.

### *9.5.2 Findings*

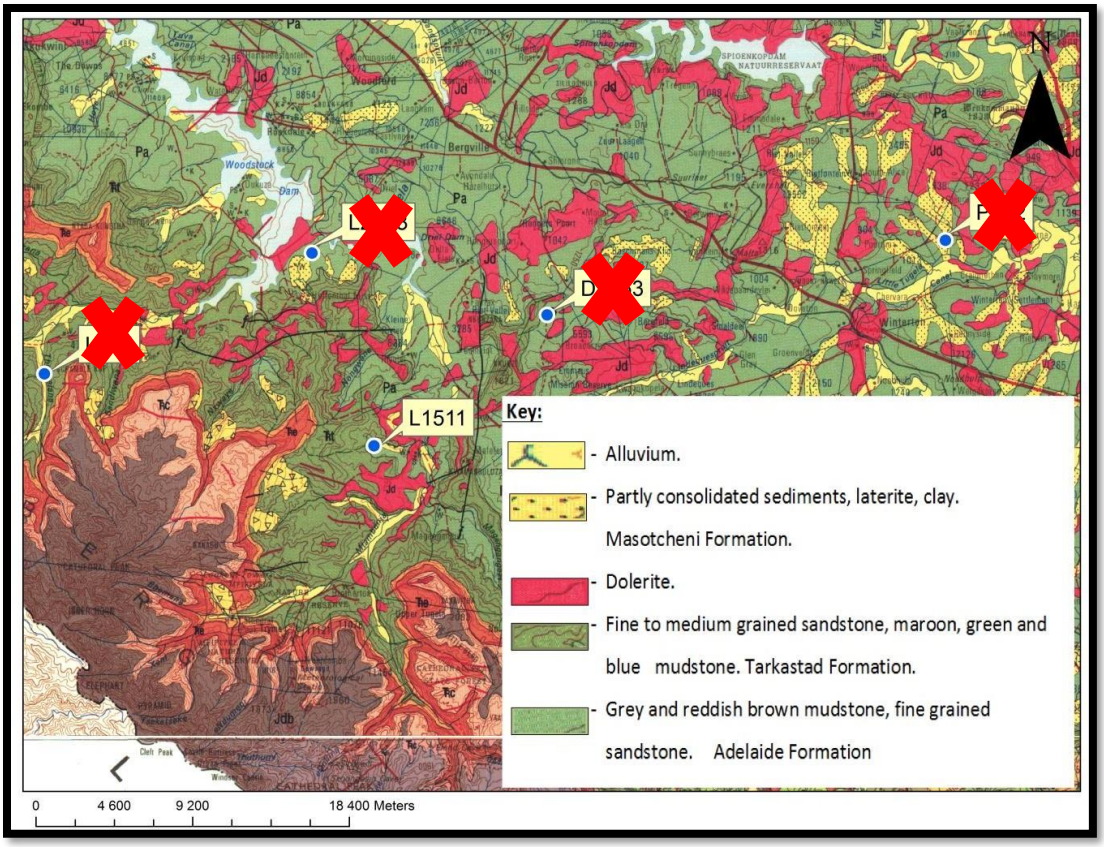



**FIGURE 15: EXTRACT OF REGIONAL GEOLOGICAL MAP SHEET WITH YELLOW PIN FOR POSITION OF L1511 SITE**

Reference to regional geological map sheet titled “2828 Harrismith”, prepared by the Council for Geoscience to a scale of 1:250 000 (1988), indicates that the general areas of the sites are underlain by alluvium and sediments of the Tarkastad and Adelaide Formations and Jurassic Age dolerite.

The sites, at the positions profiled, were observed to be underlain by fill, colluvium (fine hillwash), alluvium, residual soils derived from in situ weathering of the underlying sandstone, mudrock and rocks, and weathered sandstone, dolerite and mudrock.

#### *9.5.2.1 Inferred Founding Condition*

The founding condition identified at the site can be summarised as follows:

- The topsoil, fill, colluvium, alluvium and residual soils are compressible under foundation loads with low bearing capacities and are considered poor founding horizons for the proposed culvert foundations.
- The presence of shallow groundwater occurrences near the existing stream / river.
- Shallow weathered sandstone and mudrock are considered good founding horizons for the placement of culvert foundation.
- Trench / excavation sidewalls excavated into the loosely consolidated soils are likely to be unstable and require shoring / battering back to engineer’s detail.

#### *9.5.2.2 Groundwater*

Groundwater seepage was encountered, a summary of the groundwater occurrences with inferred intensity of groundwater seepage is given below:

**TABLE 23: SUMMARY OF GROUNDWATER OCCURRENCES**

| Culvert | IP No. | Depth of Observed Groundwater Seepage (m below EGL) | Relative Intensity of Seepage |
|---|---|---|---|
| L1511 | IP3 | 1.40m | Slight Seepage |
| | IP4 | 1.00m | Slight Seepage) |

A perched water table may develop both during and after periods of rainfall and/or during the high rainfall season. It is expected that the groundwater condition is depressed during the drier months and elevated during the wetter periods.

Speckling, staining, blotching and streaking which are synonymous with intermittent cycles of groundwater seepage activity were observed in the soil profiles investigated at all sites.

The probability of groundwater seepage activity is assessed to increase with depth and/or near any weakly drained slopes. The groundwater levels are likely to fluctuate with the river water levels.

The necessity for implementation of subsoil drainage measures or suitable foundation controls should be assessed during the construction phase of the project in consultation with the geotechnical professional.

#### *9.5.2.3 Suitability of the Sites*

Based on the results of the fieldwork undertaken during this investigation, it is considered that the proposed site is generally stable and suitable for the proposed additional development, provided that the recommendations given in this report are adhered to. Such precautionary measures amount to no more than sound development practices appropriate to the site condition anticipated and the nature of the proposed development confirmed.

#### *9.5.2.4 Excavation Characteristics*

Below the final / refusal depths of the inspection pits and DPL tests, and where boulder deposits or weathered rock was encountered, excavation classes are expected to grade to **INTERMEDIATE** to **HARD**. Localised areas of **INTERMEDIATE** and HARD excavation may also be encountered at shallower depths due to geological variations.

Although not encountered in the inspection pits, hard to extremely hard sandstone, mudrock or dolerite boulders may be present. Accordingly, allowance is to be made for **BOULDER CLASS B** to address this risk.

The type of excavation plant utilised during construction will also determine the actual excavatability depths. Slow excavation rates below the water table are considered likely.

### *9.5.3 Recommendations and Conclusion*

One of the critical factors in the stable development of the site is the control and removal of both surface and groundwater from the site.

All cut slopes and fill embankments within the floodplains of the streams, including those adjacent to the proposed culverts, will need to be protected against damage due to hydraulic erosion/scour from the streams and rivers, to engineer's detail

The design of the above should consider the geotechnical information contained in this report as well as the results of a hydrological investigation of the river catchment to establish the relevant floodlines, scour depths and hydraulic loads on the proposed causeways and any proposed revetment.

Earthworks and drainage measures to be designed in such a way as to prevent ponding of, or high concentrations of, stormwater or groundwater anywhere on the site, both during and after the development.

Terraces should be shaped to a gradient to prevent water ponding on the surface and should be graded to direct water away from the fill edges and towards the culvert inlet and conversely graded away from the culvert exits, with allowance for routine maintenance to remove vegetation and any accumulation of sediment at these positions.

# 10 IMPACTS AND RESIDUAL RISKS ASSESSMENT

### *10.1.1 Introduction*

Impact assessment must take into account the nature, scale and duration of effects on the environment, whether such effects are positive [beneficial] or negative [detrimental].

It is also imperative that each issue / impact is also assessed according to the project stages from planning, through construction and operation to the decommissioning phase.

Where necessary, the proposal for mitigation or optimisation of an impact is noted.

The environmental impact assessment is focused on the following phases of the project namely: **Pre-Construction, Construction**, **and Operational Phases** only. The impacts associated with decommissioning phase are not applicable to this project, however, responsible methods of post-construction clean-up are provided in the EMPr.

As the project entails rehabilitation of existing infrastructure which will be permanent, decommissioning is not applicable to this project, however, impacts associated with post construction clean-up are considered.

### *10.1.2 Methodology*

The potential environmental impacts associated with the project are evaluated according to it nature, extent, duration, intensity, probability and significance of the impacts, whereby:

***Nature***
This is a brief written statement of the environmental aspect being impacted upon by a particular action or activity.

***2. Extent [E]***
Extent refers to the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact.

- Site [1] – Within the construction site.
- Local [2] – Within a radius of 2 km of the construction site.
- Regional [3] – the scale applies to impacts on a provincial level and parts of neighbouring provinces.
- National [4] – the scale applies to impacts that will affect the whole South Africa.

***3. Duration [D]***
Duration indicates what the lifetime of the impact will be.

- Short-term [1] – less than 5 years.
- Medium-term [2] – between 5 and 15 years.
- Long-term [3] – between 15 and 30 years.
- Permanent [4] – over 30 years and resulting in a permanent and lasting change that will always be there.

***4. Intensity [I]***
Intensity describes whether an impact is destructive or benign.

- Very High [4] - Natural, cultural and social functions and processes are altered to extent that they permanently cease.
- High [3] - Natural, cultural and social functions and processes are altered to extent that they temporarily cease.
- Moderate [2] - Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way.
- Low [1] - Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected.

***5. Probability [P]***
Probability describes the likelihood of an impact actually occurring.

- Improbable [1] - Likelihood of the impact materialising is very low.
- Possible [2] - The impact may occur.
- Highly Probable [3] - Most likely that the impact will occur.
- Definite [4] - Impact will certainly occur.

***6. Cumulative [C]***
In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

***7. Significance [S]***
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

### *10.1.3 Rating of Potential Impacts*

The potential impacts identified are explained per phase of the project and mitigation measures are provided. The impacts are explained per pre-construction, construction and operational phases.

**TABLE 24: SIGNIFICANCE RATINGS**

| Score | | Elaboration |
|---|---|---|
| **- [13 - 16 points]** | NEGATIVE VERY HIGH | Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and / or operational phases. Any activity which results in a "very high impact" is likely to be a fatal flaw. |
| **- [10 - 12 points]** | NEGATIVE HIGH | These are impacts which individually or combined pose a significantly high negative risk to the environment. These impacts pose a high risk to the quality of the receiving environment. The design of the site may be affected. Mitigation and possible remediation are needed during the construction and / or operational phases. The effects of the impact may affect the broader environment. |
| **- [7 - 9 points]** | NEGATIVE MODERATE | These are impacts which individually or combined pose a moderate negative risk to the quality of health of the receiving environment. These systems would not generally require immediate action but the deficiencies should be rectified to avoid future problems and associated cost to rectify once in HIGH risk. Aesthetically and / or physically non-compliance can be expected over a medium term. In this case the impact is medium term, moderate in extent, mildly intense in its effect and probable. Mitigation is possible with additional design and construction inputs. |
| **- [4 - 6 points]** | NEGATIVE LOW | These are impacts which individually or combined pose a deleterious or adverse impact and low negative risk to the quality of the receiving environment, and may lead to potential health, safety and environmental concerns. Aesthetically and / or physical non-compliance can be expected for short periods. In this case the impact is 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. |
| **0** | NEUTRAL | Impact is neither beneficial nor adverse. These are impacts which cannot be classified as either positive or negative or classified and null and void in the case of a negative impact being adequately mitigated to a state where it no longer renders a risk. |
| **+[4 - 6 points]** | POSITIVE LOW | These are impacts which individually or combined pose a low positive impact to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is 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. |
| **+[7 - 9 points]** | POSITIVE MODERATE | These are impacts which individually or combined pose a moderate positive effect to the quality of health of the receiving environment. In this case the impact is medium term, moderate in extent, mildly intense in its effect and probable. |
| **+[10 - 12 points]** | POSITIVE HIGH | These are impacts which individually or combined pose a significantly high positive impact on the environment. These impacts pose a high benefit to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is longer term, greater in extent, intense in its effect and highly likely to occur. The effects of the impact may affect the broader environment. |

| Score | | Elaboration |
|---|---|---|
| + [13 - 16 points] | POSITIVE VERY HIGH | These are permanent and important beneficial impacts which may arise. Individually or combined, these pose a significantly high positive impact on the environment. These impacts pose a very high benefit to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is long term, greater in extent, intense in its effect and highly likely or definite to occur. The effects of the impact may affect the broader environment. |

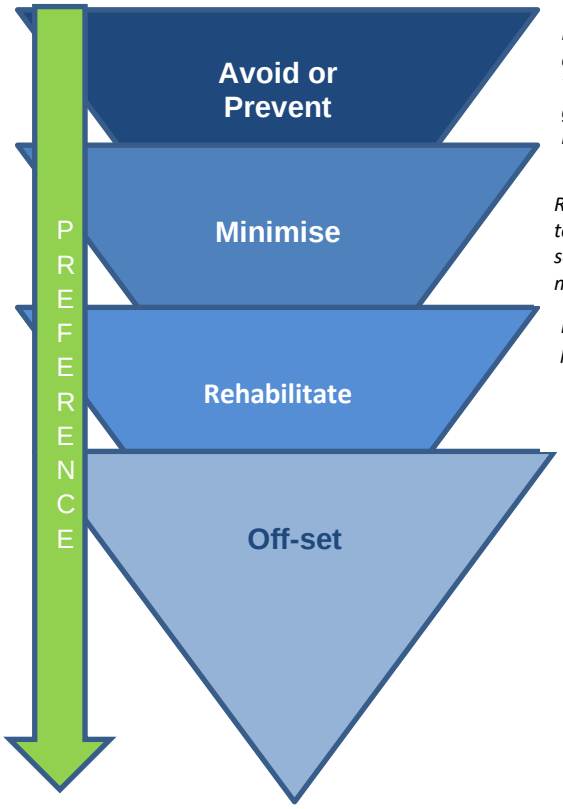
### *10.1.4 The Mitigation Hierarchy*

The suitability and feasibility of all proposed mitigation measures will be included in the assessment of significant impacts. This will be achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented. Mitigation measures identified as necessary will be included in an EMPr.

An important aspect of impact assessment is the identification and application of methods which mitigate against the impacts. In order to aid selection of mitigation measures, the mitigation hierarchy is used [Figure 16]. The mitigation hierarchy is a tool that guides users toward limiting as far as possible the negative impacts on biodiversity from development projects. It emphasises best practice of avoiding and minimising any negative impacts, and then restoring [rehabilitating] sites no longer used by a project, before lastly considering off-setting residual impacts. The mitigation hierarchy is crucial for all development projects aiming to achieve no overall negative impact on biodiversity or on balance a net gain [also referred to a No Net Loss and the Net Positive Approach]. It is based on a series of essential, sequential steps that must be taken throughout the project's life cycle in order to limit any negative impacts on biodiversity.

A recent cross-sector guide for implementing the Mitigation Hierarchy provides practical guidance, innovative approaches and examples to Mitigation Hierarchy support operationalizing the mitigation hierarchy effectively. The publication is aimed at environmental professionals working in, or with, extractive industries and financial institutions, who are responsible for overseeing the application of the mitigation hierarchy to biodiversity conservation, while balancing conservation needs with development priorities.

The sequential steps of the mitigation hierarchy are annotated on the diagram below [Figure 16].




*Refers to considering options in project location, sitting, scale, layout, technology and phasing **to avoid impacts** on biodiversity, associated ecosystem services, and people. This is the best option, but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts the activity should not take place. In such cases it is unlikely to be possible or appropriate to rely on the latter steps in the mitigation.*

*Refers to considering alternatives in the project location, siting, scale, layout, technology and phasing that would minimise impacts on biodiversity and ecosystem services. In cases where there are environmental and social constraints every effort must be made to minimise impacts.*

*Refers to rehabilitation of areas where impacts are unavoidable and measures are provided to return impacted areas to near-natural state or an agreed land use. Although rehabilitation may fall short of replicating the diversity and complexity of a natural system.*

*Refers to measures over and above rehabilitation to compensate for the residual negative effects on biodiversity, after every effort has been made to minimise and then rehabilitate impacts. **Offsets** can provide a mechanism to compensate for significant residual impacts.*

**FIGURE 16: THE MITIGATION HIERARCHY**

This section presents the impact assessment according the methodology in the preceding sections, in a tabular form.

**TABLE 25: PLANNING PHASE IMPACT ASSESSMENT – CULVERT**

| No. | Impact | Alternative | Mitigation | Extent | Duration | Intensity | Probability | Significance = E+D+I+P | Interpretation |
|---|---|---|---|---|---|---|---|---|---|
| **Phase: Planning and Design – Culvert** | | | | | | | | | |
| **Sub-phase: Direct Impacts** | | | | | | | | | |
| 2 | Design of the culvert could have an impact on the environment and the watercourse | | Without | -2 | -2 | -2 | -1 | -7 | Negative Moderate |
| | | | With | -1 | -1 | -1 | -1 | -4 | Negative low |
| | **Mitigation**: (a) Selection of culvert shape should be based on water depth, hydraulic performance, and allowing for species movement. (b)Culverts must ideally be sized to transport not only water, but the other materials that might be mobilized, as well as provide passage of aquatic species. | | | | | | | | |
| 3 | Consideration for national, provincial and local plans in the planning for the development | | Without | -1 | -1 | -3 | -3 | -8 | Negative Moderate |
| | | | With | 2 | 4 | 3 | 4 | 13 | Positive very high |
| | Mitigation: All relevant plans for the area must be considered and adequate consultation with the relevant planning officials in the area. | | | | | | | | |
| 4 | Development in sensitive habitats could lead to the diminishing of the socio-economic benefits. | | Without | -1 | -1 | -3 | -3 | -8 | Negative Moderate |
| | | | With | -1 | -1 | -1 | -1 | -4 | Negative low |
| | **Mitigation**: All measures and considerations for the design of the culvert must consider the triple bottom line and ensure optimisation of social, economic, environmental and practical benefits. | | | | | | | | |
| 6 | Possible lack of consideration of what the environment can accommodate. | | Without | -1 | -1 | -3 | -3 | -8 | Negative Moderate |
| | | | With | -1 | -1 | -1 | -1 | -4 | Negative low |
| | **Mitigation**: All measures and considerations for the design of the culvert must consider the triple bottom line and ensure optimisation of social, economic, environmental and practical benefits. | | | | | | | | |
| 7 | Unsound design which will require maintenance in the near future | | Without | -1 | -1 | -2 | -2 | -6 | Negative low |
| | | | With | -1 | -1 | -1 | -1 | -4 | Negative low |
| | **Mitigation**: Ensure that the best practicable design is used and that the professionalism and integrity of the bridge design is maintained. | | | | | | | | |
| **Sub-phase: Indirect Impacts** | | | | | | | | | |
| **Sub-phase: Cumulative Impacts** | | | | | | | | | |
| 9 | The provision of the culvert may lead to increased / mushroomed development | | Without | 2 | 2 | 2 | 2 | 8 | Positive moderate |
| | | | With | 3 | 4 | 3 | 3 | 13 | Positive very high |

| | | | |
|---|---|---|---|
| | **Mitigation**: The development will promote accessibility which can only have a positive impact in terms of socio-economic opportunities as well as safety. | | |
| | Average for Culvert without mitigation | -6.2 | Negative Moderate |
| | Average for Culvert with mitigation | -0.3 | Negative Low |

| No. | Impact | Alternative | Mitigation | Extent | Duration | Intensity | Probability | Significance = E+D+I+P | Interpretation |
|---|---|---|---|---|---|---|---|---|---|
| **Phase: Planning and Design - No-Go** | | | | | | | | | |
| **Sub-phase: Direct Impacts** | | | | | | | | | |
| 1 | All the impacts outlined above will not apply to the No-Go alternative as the status quo will apply and the environment will remain as it is currently. However, it is important to note that the benefits associated with the development will also not materialise, and it must be noted that the majority of the impacts identified for the development were mitigated to a negative low or positive impact once the measures for mitigation were applied, indicating that maintaining the status quo is to lose the opportunity of a beneficial development with negligible environmental impacts. | | | | | | | 0 | Neutral |

**TABLE 26: CONSTRUCTION PHASE IMPACTS –CULVERT**

| No. | Impact | Alternative | Mitigation | Extent | Duration | Intensity | Probability | Significance = E+D+I+P | Interpretation |
|---|---|---|---|---|---|---|---|---|---|
| **Phase: Construction - Culvert** | | | | | | | | | |
| **Sub-phase: Direct Impacts** | | | | | | | | | |
| 1 | **Impact:** Change flow rate<br><br>**Activity**: Clearance of Vegetation and Levelling in the Local Catchment, Operation and Maintenance Buildings | | Without | -1 | -2 | -2 | -2 | -7 | Negative high |
| | | | With | -1 | -1 | -1 | -1 | --4 | Negative low |
| | **Mitigation:** (a) Adequate structures must be put into place (temporary or permanent where necessary in extreme cases) to deal with increased/accelerated run-off and sediment volumes. The use of silt fencing and potentially sandbags or hessian "sausage" nets or other appropriate measures can be used where necessary to prevent run-off containing sediment entering the watercourses as well as potential erosion in susceptible areas near to the watercourses and the associated buffer zones. | | | | | | | | |
| 2 | **Impacts**: Potential increased run-off, erosion and sedimentation impacts knock-on effects.<br>**Activity:** The levelling, compaction and excavation of wetland soils. | | Without | -1 | -4 | -3 | -3 | -11 | Negative high |
| | | | With | -1 | -1 | -2 | -1 | -5 | Negative low |
| | **Mitigation:** (a) Construction and operation phase storm water management plan must accompany the culvert design. Importantly, the storm water management plan must account for increased run-off and sedimentation. As such, attenuation facilities are to be implemented if and where required. (b) Appropriate drainage structures at the storm water outlet points are to be implemented with energy dissipating structures as well as sediment trapping devices to prevent sedimentation exiting the site during construction. This can be in the form of silt net. | | | | | | | | |
| 3 | **Impact:** Sedimentation during construction.<br>**Activity:** Clearance of Vegetation and Levelling in the Local Catchment for Construction | | Without | -2 | -2 | -2 | -3 | -9 | Negative Moderate |
| | | | With | -2 | -2 | -1 | -2 | -7 | Negative Moderate |
| | **Mitigation**: (a) Vegetation clearing must take place in a phased manner, only clearing areas where construction will take place and not additional areas where construction will only take place in the future. (b) Adequate structures must be put into place (temporary or permanent where necessary in extreme cases) to deal with increased/accelerated run-off and sediment volumes. The use of silt fencing and potentially sandbags or hessian "sausage" nets or other appropriate measures along the boundaries of the culvert construction areas are to be used where necessary to prevent run-off containing sediment entering the watercourse as well as potential erosion in susceptible areas near to the watercourse and the | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | associated buffer zone. (c) An appropriate construction storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with increased run-off in the designated construction areas. | | | | | | | | |
| 4 | **Impact:** Vehicles and machinery may leak oil. **Activity:** Vehicles and machinery may leak oil which can accumulate in storm water run-off generated on the construction site and enter the watercourse downstream. Additionally, stored fuels, oils and other hazardous substances may leak from storage areas and enter the downstream watercourse via storm water run-off. | | Without | -2 | -2 | -3 | -4 | -11 | Negative high |
| | | | With | -2 | -2 | -1 | -2 | -7 | Negative Moderate |
| | **Mitigation:** (a) All oils, fuels and hazardous substances or liquids must not be stored within 100m from the full extent of the watercourses and the associated buffer zones, unless such storage is unavoidable and approved by the ECO. Where these items are stored within 100m from the full extent of the watercourse, the storage area must be adequately bunded to contain any spillage from containers. Emergency spill kits must be available to clean up and remove spills. (b) All vehicles and machinery operating on the study site are to be checked for oil, fuel or any other fluid leaks before entering the construction areas. All vehicles and machinery must be regularly serviced and maintained before being allowed to enter the construction areas. No fuelling, re-fuelling, vehicle and machinery servicing or maintenance is to take place within 100m of the watercourses and the associated buffer zones. (c) The study site is to contain sufficient safety measures throughout the construction process. Safety measures include (but are not limited to) oil spill kits and the availability of fire extinguishers. Additionally, fuel, oil or hazardous substances storage areas must be bunded to 110% capacity to prevent oil or fuel contamination of the ground and / or nearby watercourses and the associated buffer zones. (d) No cement mixing is to take place in the watercourse or the associated buffer zones. In general, any cement mixing should take place over a bin lined (impermeable) surface or alternatively in the load bin of a vehicle to prevent the mixing of cement with the ground. Cement / concrete can also be trucked in ready-mix vehicles. Importantly, no mixing of cement or concrete directly within the watercourse and associated buffer zone. | | | | | | | | |
| 5 | Loss, degradation or fragmentation of vegetation through direct clearing. | | Without | -1 | -2 | -2 | -2 | -7 | Negative moderate |
| | | | With | -1 | -2 | -2 | -2 | -7 | Negative Moderate |
| | **Mitigation:** (a) Footprint of the activity needs to be strictly adhered to. (b) A site-specific Environmental Management Programme needs to be developed for the construction and operation phases. (c) An Environmental Control Officer (ECO) needs to be appointed for the duration of construction. (d) Permits for plants collection/removal need to be obtained prior to search and rescue operations. (e) Vegetation clearance in the Construction phase is to be remove in a phased approach, as and when it becomes necessary as vegetation harbours fauna. (f) Sensitive areas need to be demarcated clearly before construction commences (i) Areas outside of the construction zone is to be designated as “no-go areas. | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6 | **Impact:** Transformation of habitat for flora. **Activity:** Hard transformation of proposed routing will result in a marginal reduction in flora. The routing being a linear activity will result in the disturbance of the soil surface, and this often leads to the establishment of alien invasive plant species. | 1 | Without | -1 | -2 | -2 | -2 | -7 | Negative Moderate |
| | | | With | -1 | -2 | -2 | -2 | -7 | Negative Low |
| | **Mitigation:** (a)Servitude widths need to be a strictly adhered to. (b)Where possible, indigenous vegetation needs to be retained. (c)Clearance for construction should be done in a phased approach, and rehabilitation should be done as soon as work has ceased along the section of routing. (d) Where possible, construction should occur in the dry season to prevent soil loss through stormwater. (e) Where possible, manual clearance of the vegetation. should be done so as to prevent the unnecessary movement of machinery in no go areas. (f) The contractor should implement an alien invasive control programme, particularly in areas where soil disturbance occurs. (g) Soil stockpiles need to be grassed with an indigenous mix or covered with shade cloth to prevent soil loss through wind and water erosion. (h) Strictly no trapping or hunting of fauna is allowed. (i) All open excavations need to be checked on a daily basis and any fauna that may be stranded will have to be caught and released by a qualified person. (j) Rehabilitation should take place as soon as construction of the section of line is complete. (k) Strictly no littering. The contractor should highlight this at daily toolbox talks and site clean-ups should occur on a daily occasion. (l)A mix of indigenous grass species, should be used for rehabilitation. | | | | | | | | |
| 7 | **Impact**: Erosion related impacts. **Activity**: Vegetation binds and protects the soil surface, and when removed, increases erosion potential. This may lead to water and wind removing vital topsoil and blocking up drains and eventually clogging roadsides and drainage lines. | 1 | Without | -1 | -2 | -2 | -3 | -8 | Negative Moderate |
| | | | With | -1 | -1 | -2 | -2 | --6 | Negative low |
| | **Mitigation**: (a) An approved Stormwater Management Plan should be implemented before construction occurs. (b) Where possible, Indigenous vegetation needs to be retained. (c) Vegetation should be cleared only when construction occurs in that section of the routing. (d) Soil stockpiles need to be grassed with an indigenous mix or covered with shade cloth to prevent soil loss through wind and water erosion. (e) Rehabilitation should take place as soon as construction is complete. (f) In areas of higher gradient, access roads should have erosion berms to prevent soil loss. (g) Construction activities should be limited to the winter months to prevent loss of soil to water runoff. (h) Spraying of the soil surface should occur when working industry conditions | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | **Impact:** Habitat transformation and fragmentation for fauna. **Activity:** Continued transformation of vegetation in the area will result in a marginal reduction in flora and fauna for the area | 1 | Without | -1 | -1 | -2 | -2 | -6 | Negative low |
| | | | With | -1 | -1 | -1 | -2 | -5 | Negative low |
| | **Mitigation**: (a) Construction footprint needs to be a strictly adhered to. (b) Clearance of land and vegetation is not allowed, unless clearance occurs within the authorised project area. (c) Areas outside of the construction zone must be demarcated as "no-go" areas. (d) Where possible, indigenous vegetation needs to be retained. (e) Manual clearance of alien and invasive vegetation should be done so as to prevent the unnecessary movement of machinery in no go areas. (f) An alien and invasive control programme should implement, particularly in areas where soil disturbance has occurred. (I) Soil stockpiles need to be returned to the excavations, with the subsoil being placed first, followed by the topsoil. (j) Monthly ECO auditing should occur during rehabilitation of the site. Once rehabilitation is complete, one three month, and one six months follow up audit should be conducted to assess the state of rehabilitation. | | | | | | | | |
| 9 | **Impact:** Terrestrial Fauna. **Activity**: Displacement of individuals. | 1 | Without | -1 | -1 | -1 | -1 | -4 | Negative low |
| | | | With | -1 | -1 | -1 | -1 | -4 | Negative low |
| | **Mitigation**: (a) The ECO should do a site walk through prior to construction commencing, to identify breeding or nesting fauna. Should these species be identified, permits for the capture and relocation must be applied for and a search and rescue must take place by a qualified Ecologist/ Zoologist. | | | | | | | | |
| | **Impact:** All free roaming livestock are at risk during the construction phase due to exposure to heavy duty vehicles and increased traffic | 1 | Without | -1 | -1 | -3 | -3 | -8 | Negative Moderate |
| | | | With | -1 | -1 | -2 | -1 | -5 | Negative low |
| | **Mitigation:** Due care must be taken to protect animals from construction hazards. No animals are to be harmed, snared, or caught and killed. | | | | | | | | |
| | Local labour will be recruited to perform short term, unskilled labour on the project. | 1 | Without | 1 | 2 | 3 | 3 | 9 | Positive moderate |
| | | | With | 1 | 2 | 3 | 3 | 9 | Positive moderate |
| | Enhancement: Wherever possible and to the greatest extent, labourers must be sourced from the neighbouring local communities | | | | | | | | |
| | **Impact:** Noise pollution caused by construction activities and machinery | 1 | Without | -1 | -1 | -2 | -1 | -5 | Negative Low |
| | | | With | 1 | 1 | 2 | 1 | 5 | Positive low |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Mitigation**: (a) Surrounding communities and adjacent landowners are to be notified upfront of noisy construction activities. (b) Provide all equipment with standard silencers. (c) Maintain silencer units on vehicles and equipment in good working order. (d) Construction staff working in areas where the 8-hour ambient noise levels exceed 60 dBA should wear ear protection equipment. | | | | | | | | |
| | Potential for fires | 1 | Without | -1 | -3 | -3 | -3 | -10 | Negative high |
| | | | With | -1 | -3 | -2 | -1 | -7 | Negative Moderate |
| | **Mitigation**: No open fires to be permitted within the construction footprint. Ensure that no refuse waste is burnt on the site or on surrounding premises.<br>Ensure that all workers on site are aware of the proper procedure in case of a fire occurring on-site. Ensure adequate fire-fighting equipment is available and train workers on how to use it. | | | | | | | | |
| **Sub-phase: Indirect Impacts** | | | | | | | | | |
| 19 | Due to an increased workforce in the local area (at the construction camp), there would be increased need for health services. | 1 | Without | -2 | -1 | -2 | -1 | -6 | Negative low |
| | | | With | 2 | 4 | 3 | 2 | 11 | Positive high |
| | **Mitigation**: Development of rural areas often begins with accessibility, therefore, in effect providing accessibility will lead to development of other much needed services and infrastructure | | | | | | | | |
| 20 | Due to an increased worker population and potentially non-locals in the area, there may be incidents of increased crime, violence (domestic), and security incidents. | 1 | Without | -2 | -1 | -2 | -1 | -6 | Negative low |
| | | | With | -1 | -1 | -1 | -1 | -4 | Negative low |
| | **Mitigation**: To as great an extent as possible, local labour must be sourced. The CLO must be regularly engaged and the community must be encouraged to work together to limit any possible crime. | | | | | | | | |
| **Sub-phase: Cumulative Impacts** | | | | | | | | | |
| 24 | Possible long-term geomorphological impacts to channelled watercourses (such as streams) as a result of road development is also linked to the operational hydrological risks | 1 | Without | -1 | -3 | -4 | -4 | -12 | Negative high |
| | | | With | -1 | -2 | -2 | -3 | -8 | Negative Moderate |

| | |
|---|---|
| | **Mitigation**: The extent of infilling within instream aquatic and riparian habitat must be minimised as far as possible. Structures must not degrade water quality, cause erosion, sedimentation or instability in the watercourse, significantly alter the physical structure of the watercourse, induce flooding of adjacent areas or be structurally unstable. Structures must be designed to adequately allow for the natural movement of water from the upstream to the downstream sides of the structure without inhibiting the natural movement of water and may not result in changes to flow volumes and velocities. Structures that cater for through flows (e.g., box/pipe culverts) should not only allow for the maximum volume of flows but should distribute flows naturally so not to concentrate flows downstream, which could induce erosion/scouring. Structures located within streams/rivers must be designed so as not to significantly restrict the movement of aquatic biota (such as fish species) along rivers and streams. Appropriate measures to dissipate flow velocity below structures must be considered and designed for pre-construction |

| | | |
|---|---|---|
| Average for Culvert without mitigation | | |
| Average for Culvert with mitigation | | |

**TABLE 27: OPERATION PHASE IMPACT ASSESSMENT –CULVERT**

| No. | Impact | Alternative | Mitigation | Extent | Duration | Intensity | Probability | Significance = E+D+I+P | Interpretation |
|---|---|---|---|---|---|---|---|---|---|
| **Phase: Operational - Culvert** | | | | | | | | | |
| **Sub-phase: Direct Impacts** | | | | | | | | | |
| 1 | **Impact: Erosion** related impacts for operation phase.<br>**Activity:** Erosion is currently occurring due to numerous road crossings in the river. A formalised culvert will reduce erosion provided it is protected with gabion baskets and reno mattresses, which will reduce erosion potential even further. | 1 | Without | 2 | 3 | 2 | 2 | 9 | Positive moderate |
| | | | With | 2 | 3 | 2 | 2 | 9 | Positive moderate |
| | **Mitigation**: (a) An approved Stormwater Management Plan should be implemented before operation occurs. (b) Where possible, Indigenous vegetation needs to be returned as soon as construction ceases. (b) Soil stockpiles need to be grassed with an indigenous mix and rehabilitated to prevent soil loss through wind and water erosion before operation phase begins. (c)Rehabilitation should take place as soon as construction is complete. (c) Operation phase should only begin once the ECO has deemed rehabilitation successful and mitigation measures have been implemented. (d) A Six-month check of the area should take place for the emergence erosion gulley's, and if gulley's emerge, will need to be rehabilitated immediately. | | | | | | | | |
| 2 | **Impact:** Biodiversity loss due to operation phase.<br>**Activity:** Biodiversity could be lost if rehabilitation measures are not implemented. This can be partly mitigated if rehabilitation is successful. | 1 | Without | -2 | -3 | -2 | -2 | -9 | Negative moderate |
| | | | With | 1 | 2 | 3 | 2 | 8 | Positive moderate |
| | **Mitigation:** (a) A post construction monitoring programme to ensure that rehabilitation efforts are successful and that edge effects are reduced. (b) Monthly monitoring of these sensitive areas should take place during the first year after construction to ensure that rehabilitation is successful. (c)Six monthly checks of the area should take place for the emergence of invader species. | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Impact**: Vegetation.<br>**Activity:** Establishment and spread of alien invasive plant species due disturbance vectors | 1 | Without | -1 | -3 | -2 | -3 | -9 | Negative low |
| | | | With | 1 | 3 | 1 | 2 | 7 | Positive moderate |
| | **Mitigation: (**a) Compile and implement Alien Invasive Management Plan. (b) Rehabilitate disturbed areas | | | | | | | | |
| | **Impact:** Increased Hardened Surfaces in the local catchment.<br>**Activity:** Sedimentation during operation**.** | 1 | Without | -1 | -2 | -1 | -2 | -6 | Negative low |
| | | | With | 1 | 3 | 2 | 3 | 9 | Positive moderate |
| | **Mitigation:** (a) Adequate structures, where required, must be put into place to deal with increased/accelerated run-off and associated sediment volumes. The use of energy dissipating structures where required to prevent increased run-off and sediments contained in the run-off entering the watercourse can be used.(b) An appropriate operational storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with sedimentation and increased run-off on site. | | | | | | | | |
| | **Impact:** Change in flow rate during operation.<br>**Activity:** Increased Hardened Surfaces in the Local Catchment due to culvert construction. | 1 | Without | -1 | -3 | -2 | -2 | -8 | Negative low |
| | | | With | 1 | 2 | 3 | 3 | 9 | Positive moderate |
| | **Mitigation:** (a) Adequate structures, where required, must be put into place to deal with increased/accelerated run-off and associated sediment volumes. The use of energy dissipating structures where required to prevent increased run-off and sediments contained in the run-off entering the watercourse can be used. (b)An appropriate operational storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with sedimentation and increased run-off on site. (c) An appropriate operational storm water management plan formulated by a suitably qualified professional must accompany the proposed development to deal with sedimentation and increased run-off on site. | | | | | | | | |
| | | | | | | | Average for Culvert without mitigation | | |
| | | | | | | | Average for Culvert with mitigation | | |

**TABLE 28: OPERATIONAL PHASE IMPACT ASSESSMENT – NO-GO**

| No. | Impact | Alternative | Mitigation | Extent | Duration | Intensity | Probability | Significance = E+D+I+P | Interpretation |
|---|---|---|---|---|---|---|---|---|---|
| **Phase: Operation - No-Go** | | | | | | | | | |
| **Sub-phase: Direct Impacts** | | | | | | | | | |
| 1 | All the impacts outlined above will not apply to the No-Go alternative as the status quo will apply and the environment will remain as it is currently. However, it is important to note that the benefits associated with the development will also not materialise, and it must be noted that the majority of the impacts identified for the development were mitigated to a negative low or positive impact once the measures for mitigation were applied, indicating that maintaining the status quo is to lose the opportunity of a beneficial development with negligible environmental impacts. | | | | | | | 0 | Neutral |

**TABLE 29: DECOMISSIONING PHASE IMPACT ASSESSMENT – ALL ASPECTS**

| No. | Impact | Alternative | Mitigation | Extent | Duration | Intensity | Probability | Significance = E+D+I+P | Interpretation |
|---|---|---|---|---|---|---|---|---|---|
| **Phase: Decommissioning - Culvert Design Alternatives** | | | | | | | | | |
| Not Applicable | | | | | | | | | |

# 11 STUDY FINDINGS AND CONCLUSIONS

## 11.1 ENVIRONMENTAL IMPACT STATEMENT

### *11.1.1 Introduction*

Potential environmental impacts [biophysical and social] associated with the construction of culvert structure on road L1511, in KwaZulu-Natal, have been identified herein.

This BA assesses and addresses all potentially significant environmental issues in order to provide the KZN EDTEA with sufficient information to make an informed decision regarding the proposed project.

#### *11.1.1.1 Comparative Analysis of Alternatives*

An analysis of bridge design alternatives are provided in **TABLE 30** below. The alternatives assessed were discussed in Sections 6.

**TABLE 30: COMPARATIVE ANALYSIS OF BD ALTERNATIVES BY IMPACT RATING SCORES**

| | | |
|---|---|---|
| **Planning Phase** | | |
| Average for Bridge Design Alternative 1 without mitigation | -7.2 | Negative Moderate |
| Average for Bridge Design Alternative 1 with mitigation | -0.7 | Negative Low |
| Average for Bridge Design Alternative 2 without mitigation | -7.1 | Negative Moderate |
| Average for Bridge Design Alternative 2 with mitigation | -2.1 | Negative Low |
| Average for Bridge Design Alternative 3 without mitigation | -7.2 | Negative Moderate |
| Average for Bridge Design Alternative 3 with mitigation | -2.8 | Negative Low |
| **Construction Phase** | | |
| Average for Bridge Design Alternative 1 without mitigation | -9.4 | Negative high |
| Average for Bridge Design Alternative 1 with mitigation | -4.3 | Negative low |
| Average for Bridge Design Alternative 2 without mitigation | -9.7 | Negative high |
| Average for Bridge Design Alternative 2 with mitigation | -5.0 | Negative low |
| Average for Bridge Design Alternative 3 without mitigation | -9.6 | Negative high |
| Average for Bridge Design Alternative 3 with mitigation | -5.0 | Negative low |
| **Operation Phase** | | |
| Average for Bridge Design Alternative 1 without mitigation | -5.1 | Negative low |
| Average for Bridge Design Alternative 1 with mitigation | 0.3 | Positive Low |
| Average for Bridge Design Alternative 2 without mitigation | -5.2 | Negative Low |
| Average for Bridge Design Alternative 2 with mitigation | -1.5 | Negative low |
| Average for Bridge Design Alternative 3 without mitigation | -5.2 | Negative low |
| Average for Bridge Design Alternative 3 with mitigation | -1.5 | Negative low |
| **Decommissioning Phase** | | |
| N/A | | |

An analysis of the impact assessment scores, post application of mitigation methods, show that Alternatives option 2 and 3 have a marginally higher negative impact across all three phases of planning, construction and operation, which were assessed in this BA. It is therefore the recommendation of the EAP that Alternative option1 be authorised.

The reasons for Alternative option 1 emerging as having less of an impact when compared with option 2 and option 3 are primarily [a] Ease of maintenance [b] Less earthworks required than the alternate design.

#### *11.1.1.2 Significance*

Based on the outcome of the significance scoring noted in Tables 25 - 30, the overall significance impact without mitigation of the proposed culvert upgrade, is considered to be Low. With mitigation, the overall significance impact is considered to be Very Low. The overall significance impact without mitigation of the proposed culvert [alternative 1], is considered to be Medium. With mitigation, the overall significance impact is considered to be Very Low. The higher impact is attributed to a greater amount of work within the watercourse should a triple celled 1,8m x 1,8m box culvert be placed as part of the upgrade. The greater amount of work within the watercourse therefore increases the risk of contamination of water resources during construction. The greatest impact of significance is considered to be the potential for water resource and soil impacts. However, with the correct mitigation measures employed as noted in the EMPr [**Appendix F]**, these impacts can be significantly reduced.

### *11.1.2 Recommendations of the EAP*

The proposed development should not result in impacts on the natural or social environment that are highly detrimental, nor result in undue risks to the natural environment. The nature and types of negative impacts do not outweigh the potential benefits of this project, provided that the short-term localised impacts of the construction phase are adequately mitigated. In this regard, an EMPr has been compiled and is attached to this report [see **Appendix F**]. It is recommended that external monthly EMPr monitoring takes place by an independent Environmental Control Officer (ECO) to ensure that the requirements of the EMPr are being correctly implemented, thus ensuring the protection of the surrounding environment during construction.

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

- Prior to the start of operations, the contractor must produce a method statement indicating how the construction process will be undertaken. Most important in this statement will be consideration of the impacts on the watercourse crossings and the associated mitigation measures;
- The ECO must approve the location of the site camp;
- Ideally, the construction work should be done in the dry season when plants are senescent and stream flows are at their lowest;
- All conditions and requirements of the project Environmental Management Programme [EMPr] [**Appendix F**] must be adhered to; and
- All recommendations noted in the Wetland and Vegetation Assessment (**Appendix D2 & D1**) must be adopted and followed by the contractor.

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

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

### *11.1.3 Conclusion*

This study provided a quantified analysis of the impacts associated with the proposed development. The EAP is of the opinion that the project should be positively authorised, outlining the key findings of the study.

The BA process and report complies with the EIA Regulations of 2014 [as amended in 2017], under which this project has applied and therefore meets all relevant requirements.

The project is envisaged to have a "***negative low***" significance rating post application of mitigations proposed by the relevant specialists.

## 11.2 DECLARATIONS BY THE EAP

The following is hereby affirmed by the EAP to be included in this report:

- the correctness of the information provided in the reports;
- the inclusion of all comments and inputs from stakeholders and I&APs;
- the inclusion of all inputs and recommendations from the specialist reports where relevant; and
- any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by interested and affected parties.

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Andile Mnyandu [EAP]