

NEAS: KZN/EIA/

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**MBEUKA VEHICULAR BRIDGE AND MCADOLO TO  
THUNDEZA PEDESTRAIN BRIDGE UNDER RAY NKONYENI  
LOCAL MUNICIPALITY, IN THE UGU DISTRICT (DC21) OF THE  
PROVINCE OF KWAZULU-NATAL**

# **Draft Basic Assessment Report**

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**Reference Document as:**

Draft Basic Assessment Report for the MBECUKA VEHICULAR BRIDGE AND MCADOLO TO THUNDEZA PEDESTRIAN BRIDGE UNDER RAY NKONYENI LOCAL MUNICIPALITY, IN THE UGU DISTRICT (DC25) OF THE PROVINCE OF KWAZULU-NATAL

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**Competent Authority:**

Department of Economic Development, Tourism and Environmental Affairs  
[KZN EDTEA]

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# NOTICE

The Basic Assessment Report [BAR] sets out environmental outcomes, impacts and residual risks of the proposed activity and is a public document that is made available to Competent Authority [CA], commenting authorities, stakeholders, Interested and Affected Parties [I&APs] and the general public. The BAR is available for public review and commenting period lasting thirty (30) days from the day of accessibility and it can be obtainable from Indaloenhle Environmental Consultants company website. The finalised BAR will be submitted to the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, UGU District [KZN EDTEA] for decision-making.

Copies of this BAR are available at strategic public places in the project area [see below] and upon request from Indaloenhle Environmental Consultants.

## **OPPORTUNITIES FOR PUBLIC REVIEW**

The EAP conducting the Public Participation Process ensured that information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties and participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application through:

- Fixing notice board at a place conspicuous to and accessible by the public
- Giving written notice
- Distribution of Background Information Document (BID) with registration form for Interested and Affected Parties. The BID was circulated on the 15<sup>th</sup> of June 2020 and can be obtainable from Indaloenhle Environmental Consultants website ([www.indaloenhle.co.za](http://www.indaloenhle.co.za)) or through means of communication stipulated hereunder.

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## Disclaimer

The opinions expressed in this cBAR are based on the information supplied to Indaloenhle Environmental Consultants. Indaloenhle Environmental Consultants has exercised all due care in reviewing the supplied information. Whilst Indaloenhle Environmental Consultants 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. Indaloenhle Environmental Consultants 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 Indaloenhle Environmental Consultants' investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this dBAR, about which Indaloenhle Environmental Consultants 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 EMP 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.

**Fatal Flaw** – issue or conflict [real or perceived] that could result in developments being rejected or stopped.

**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 of 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
CDO	Community Development Officer
CLO	Community Liaison Officer
CMA	Catchment Management Agency
C-PLAN	Conservation Plan
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
DBAR	Draft Basic Assessment Report
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]
EIA	Early Industrial Age [refers to historical era]
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
LLO	Local Liaison Officer
LSA	Later Stone Age
MAB	Modular Ablution Blocks
MSA	Middle Stone Age
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: AQU	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
SAPS	South African Police Services
SARTSM	South African Road Traffic Signs Manual
SDF	Standard Design Flood
SWL	Static Water Level
SWMP	Storm water Management Plan
VEGRAI	[Riparian] Vegetation Response Assessment Index
WMA	Water Management Agency
WUL	Water Use Licence

# EXECUTIVE SUMMARY

## Project Background and Introduction

Vumesa (Pty) Ltd acting on behalf of the Applicant (Ray Nkonyeni Local Municipality) appointed Indaloenhle Environmental Consultants to undertake the legally required application process for Environmental Authorisation and Water Use Licence for the proposed construction of Mbecuka Vehicular Bridge and Mcadolo to Thundeza Pedestrian Bridge. The applications and supporting documentation will be submitted to the DEDTEA and DWS respectively, for consideration and decision-making.

The applicant is intending to undertake developments of similar types at different locations within the area of jurisdiction of the competent authority. Request for combination of applications in terms of provisions of sub-regulation 11(1) of the EIA Regulations, 2014 (as amended) was forwarded to the Department and was found acceptable.

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) a Basic Assessment (BA) Process is required for a development that constitutes activities identified in Section 24 of the act. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these activities must be considered, investigated, assessed and reported on to the competent authority that has been charged by NEMA with the responsibility of granting Environmental Authorisations. The nature and extent of the proposed project is explored in more detail in this BA Report. This report has been compiled in accordance with the requirements of the EIA Regulations of December 2014, and includes details of the activity description; the site, area and property description; the public participation process; the impact assessment; and the recommendations of the Environmental Assessment Practitioner (EAP).

An Environmental Management Programme report (EMPr) has been compiled according to Appendix 4 of the GNR 982 of the EIA Regulations (2014) for the construction and operational phases of the project. The EMPr has been compiled as a stand-alone document from the BAR and will be submitted to the DEDTEA along with the BAR. The EMPr provides the actions for the management of identified environmental impacts emanating from the project and a detailed outline of the implementation programme to minimise and/or eliminate any anticipated negative environmental impacts and to enhance positive impacts. The EMPr provides strategies to be used to address the roles and responsibilities of environmental management personnel on site, and a framework for environmental compliance and monitoring.

Indaloenhle was assisted by specialists in order to comprehensively identify potentially positive and negative environmental impacts associated with the project, and where possible to provide mitigation to reduce the potentially negative impacts and to enhance the positive impacts. Specialist input ensures the scientific vigour and a robust assessment of impacts. The specialist study that has been conducted is a Wetland and Aquatic Impact Study and Vegetation Impact Assessment.

## ENVIRONMENTAL IMPACT ASSESSMENT

The proponent is required to undertake a Basic Assessment (BA) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended; the Environmental Impact Assessment Regulations (2014) as published in the Government Gazette 38282, Notice No. GNR 982 amended by GNR 326. This Basic Assessment Report (BAR) has been compiled to satisfy these requirements.

Listed activity	Description of a listed item	Triggering aspect of the project
R 983. Listing Notice 1: 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	Excavation, removal or moving of soil or rock of more than 10 cubic meters from a watercourse

## WATER USE LICENSING

The construction of Mcadolo to Thundeza Pedestrian Bridge and Mbecuka Vehicular bridge within watercourses trigger Section 21 (c) and (i) of the National Water Act, 1998 [Act No. 36 of 1998] [NWA] and will require Water Use Licensing (WUL) from the Department of Water and Sanitation [DWS]. However in terms of GN509 OF 26 August 2016 published by DWS on 26th August 2016 for Section 21 (c) and (i) water uses; all maintenance of bridges over rivers, streams and wetlands and new construction of bridges done according to the SANRAL Drainage Manual or similar norms and standards are generally authorizable for municipalities subject only to the conditions of the notice.

## MOTIVATION

### *Mcadolo to Thundeza pedestrian bridge*

The community of Thundeza in Ray Nkonyeni currently do not have a pedestrian bridge to allow them to cross the perennial stream that separates them from the area of Mcadolo. The proposed connection between the two areas is required as the learning institution in the area is only available on the Mcadolo side of the stream. RNM being a coastal region is experiencing extremely high rainfall during the summer months which floods the area making it a very dangerous exercise to cross the stream.

### *Mbecuka vehicular bridge*

There exists a bridge structure at Mbecuka project site, dimensions of which are as follows:

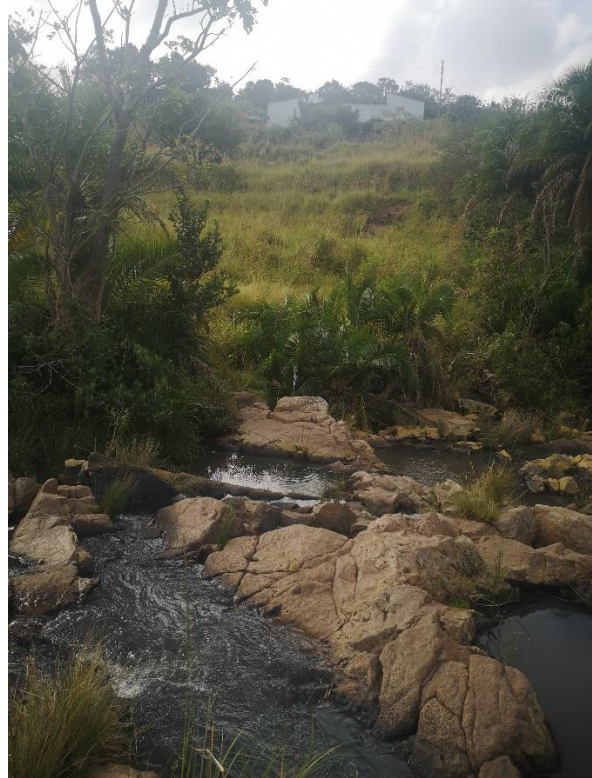
**TABLE 1: DIMENSIONS OF THE EXISTING BRIDGE STRUCTURE AT MBECUKA PROPOSED SITE**

Existing structure at Mbecuka proposed site		
Length (m)	Breadth (m)	Area (LXB)
12	5	60m <sup>2</sup>

The existing conditions at Mbecuka are risky especially during rainy seasons and pose a health hazard to road users. The current structure erected is not high enough to survive storms. The municipality has embarked on a process to construct bridges around the municipality to increase the safety of its citizens during floods. These bridges are to be designed utilising the standards that have been established by the municipality, the bridge should be he high enough to survive minor storm conditions.



**FIGURE 1: STATUS QUO OF THE MBECUKA BRIDGE**



**FIGURE 2: STATUS QUO OF THE PERRENIAL STREAM BETWEEN MCADOLO AND THUNDEZA**

Social benefits associated with the construction of vehicular and pedestrian bridge

- Short term employment opportunities
- Improved safety for motorists, passengers, and pedestrians
- Reduction in road inconveniences (slowing down due to rutting and slippery conditions during wet weather) and delays
- Convenient access to school in Mcadolo area

Environmental benefits associated with the construction of vehicular and pedestrian bridge

- Decreased soil erosion
- Decreased sedimentation

## ALTERNATIVES

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;

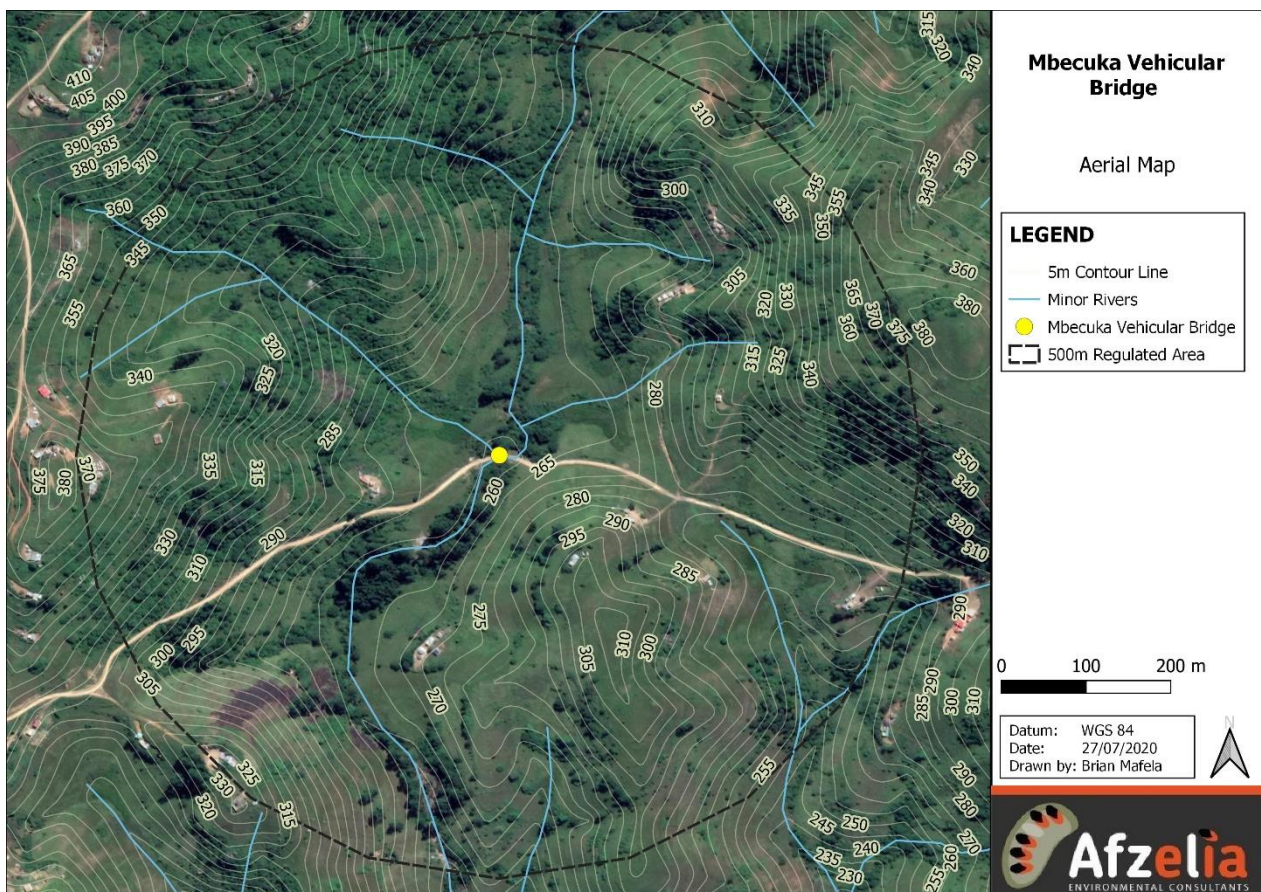


- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity

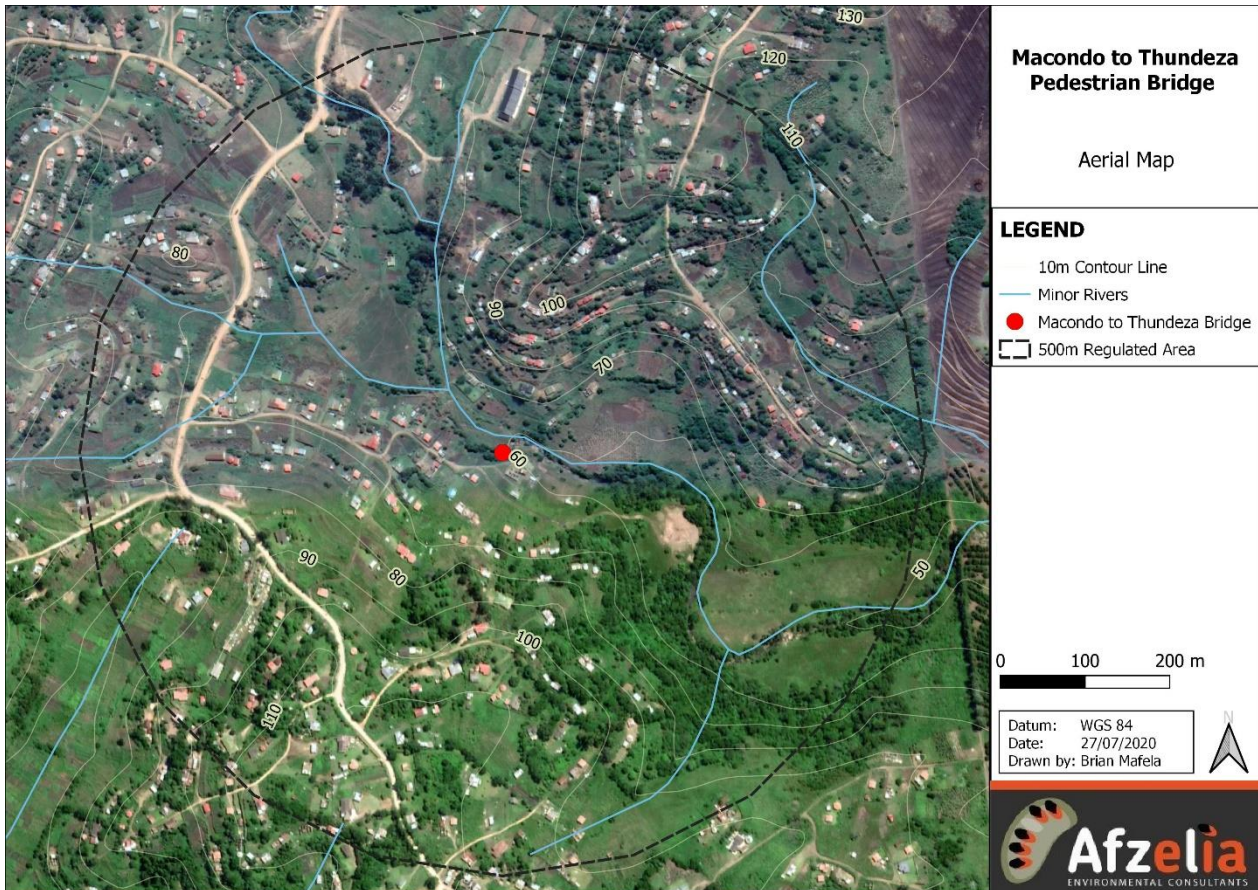
In this section, Indaloenhle describes alternatives that are considered in this application. Alternatives include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

**Site alternatives**

The proposed development entails the construction of vehicular and pedestrian bridges. The municipality has embarked on a process to construct bridges in its area of jurisdiction to increase the safety of its citizens during floods. Mcadolo to Thundeza and Mbecuka were identified as areas of concern due to the health hazard the road users are prone to. The site alternatives were not considered as the proposed developments are site specific.



**FIGURE 3: LOCALITY MAP FOR THE PROPOSED CONSTRUCTION OF MBEKUKA VEHICULAR BRIDGE**



**FIGURE 4: LOCALITY MAP FOR THE PROPOSED CONSTRUCTION OF MCADOLO TO THUNDEZA PEDESTRAIN BRIDGE**

### Layout considerations

During the planning stage, the layout options were influenced by the following:

- Methods of crossing watercourses and sensitive areas.
- Prevailing slopes and topography.
- Land use and zoning.
- Suitability of soils and the underlying geology

### Technology alternatives

In terms of technology alternatives, the following considerations influenced the selection of the chosen specifications:

- Health, safety and environmental considerations.
- The footprint sizes of the proposed infrastructure.
- Financial availability.

### SPECIALIST STUDIES

Section B of this report highlights the findings of the specialist reports carried out for this project. These investigations were carried out as part of the Basic Environmental Impact Assessment, and include:

- Wetland and Aquatic Impact Assessment

- Vegetation impact assessment

Key findings from the specialists' investigations are discussed below.

### Wetland and Aquatic Impact Assessment

The existing Mbecuka vehicular bridge is situated in Mbecuka rural settlement located 12km west of the town of Margate. The Macondo to Thundeza pedestrian bridge will be constructed within the Thundeza rural settlement located 9km north of Port Edward. Both bridges are located within the Ray Nkonyeni Local Municipality (previously Hibiscus Coast Local Municipality) within the province of KwaZulu-Natal.

The desktop and infield watercourse delineation exercise confirmed the presence of numerous watercourses within the 500m regulated area. However, only 4 watercourses were confirmed as likely to be adversely impacted by the construction and operation of the Mbecuka vehicular bridge and the Macondo to Thundeza pedestrian bridge. These include 2 wetland habitats and 2 riparian habitats. A list of the 4 watercourses discussed in this report is provided below:

#### Wetland Habitats

- i. W3 – Seep Wetland (0.41 Ha)
- ii. W4 – Seep Wetland (1.24 Ha)

#### Riparian Habitats

- iii. R1 – Riparian Habitat (Transitional River) (3.14 Ha)
- iv. R2 – Riparian Habitat (Upper Foothills River) (2.58 Ha)

This study confirmed that both bridges will be constructed within riparian habitats (i.e. Units R1 and R2). Furthermore, construction of the Mbecuka vehicular bridge will potentially impact two wetland habitats (i.e. Units W3 and W4) located upstream of the development site.

All riparian habitats and wetland habitats were found to be moderately modified (C PES Class) in terms of their present ecological state and also of low ecological importance and sensitivity. In terms of functionality, the most notable services provided by both wetland habitats include flood attenuation, water quality enhancing services and biodiversity maintenance.

Impacts likely to result from the construction and operation of both the Mbecuka and Macondo to Thundeza bridges were grouped into the following broad categories for ease of assessment in terms of impact significance: (a) loss of aquatic habitat and biota, (b) degradation of aquatic habitat and (c) water & soil pollution. Under a poor management scenario, the construction and operation of both bridges will result in environmental impacts of **medium impact significance**. Implementation of best practice mitigation measures will reduce construction impacts to a **low impact significance** and also reduce operational impacts to a **negligible to low impact significance**.

Summarised results of the impact significance assessments are provided in Table 2 and 3 below:

**TABLE 2: SUMMARISED IMPACT SIGNIFICANCE RESULTS FOR THE MBECUKA VEHICULAR BRIDGE.**

Impact	Construction Phase		Operation phase	
	Without mitigation	With mitigation	Without Mitigation	With Mitigation
Loss of freshwater habitat and biota	50 Medium	18 Low	N/A	N/A
Degradation of freshwater biota	40 Medium	18 Low	24 Medium	12 Low
Soil and water pollution	40 Medium	15 Low	15 Low	10 Negligible

**TABLE 3: SUMMARISED IMPACT SIGNIFICANCE RESULTS FOR THE MACONDO TO THUNDEZA PEDESTRIAN BRIDGE.**

Impact	Construction Phase		Operation phase	
	Without mitigation	With mitigation	Without Mitigation	With Mitigation
Loss of freshwater habitat and biota	18 Low	8 Negligible	N/A	N/A
Degradation of freshwater biota	24 Medium	15 Low	12 Low	6 Negligible
Soil and water pollution	15 Low	8 Negligible	N/A	N/A

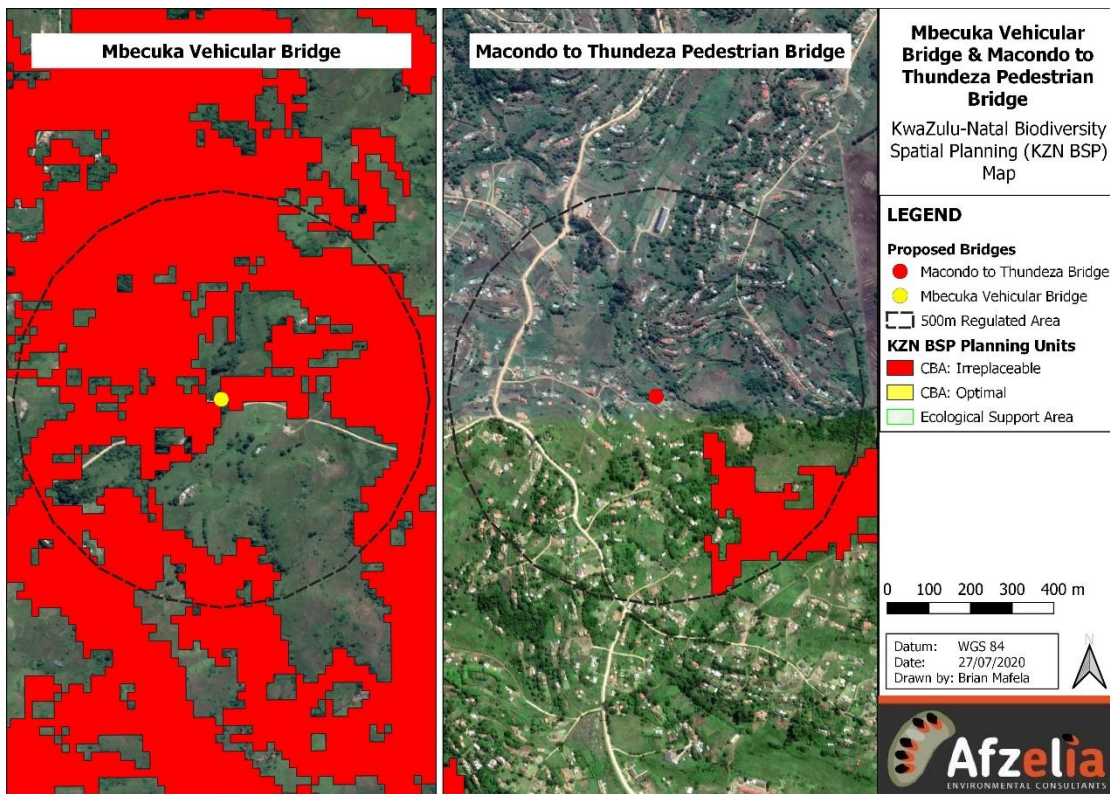
A rehabilitation plan as well as a monitoring and auditing programme have been developed and included in the wetland impact assessment report to address construction impacts that will result from working within watercourses.

The results of the Department of Water and Sanitation (DWS) Risk Matrix indicated that both bridges were of **Moderate Risk** owing to construction impacts such as the diversion of the river and construction the bridge structures within riparian habitats. These impacts, however, can be mitigated sufficiently to reduce the risk rating to **Low**. Recommended mitigation measures to reduce the risk rating include (i) decommissioning the existing Mbecuka bridge and rehabilitating the site, (ii) undertaking construction within the instream habitat in winter, (iii) minimising water pollution from cement slurry, hydrocarbons and sediment; (iv) minimising habitat clearing outside the construction footprint, and (iv) minimising the impact of river diversion by shortening the duration of the river diversion. The low risk rating qualifies both developments for authorisation under the provisions of the General Authorisation (GA), provided recommended mitigation measures and special conditions stipulated in the wetland impact assessment report.

## Vegetation Impact Assessment

The assessment of impacts that the proposed development might have on the natural vegetation present at the proposed site were identified and assessed concurrently with the aquatic impacts and are presented on the Wetland Impact Assessment Report. Findings are presented below:

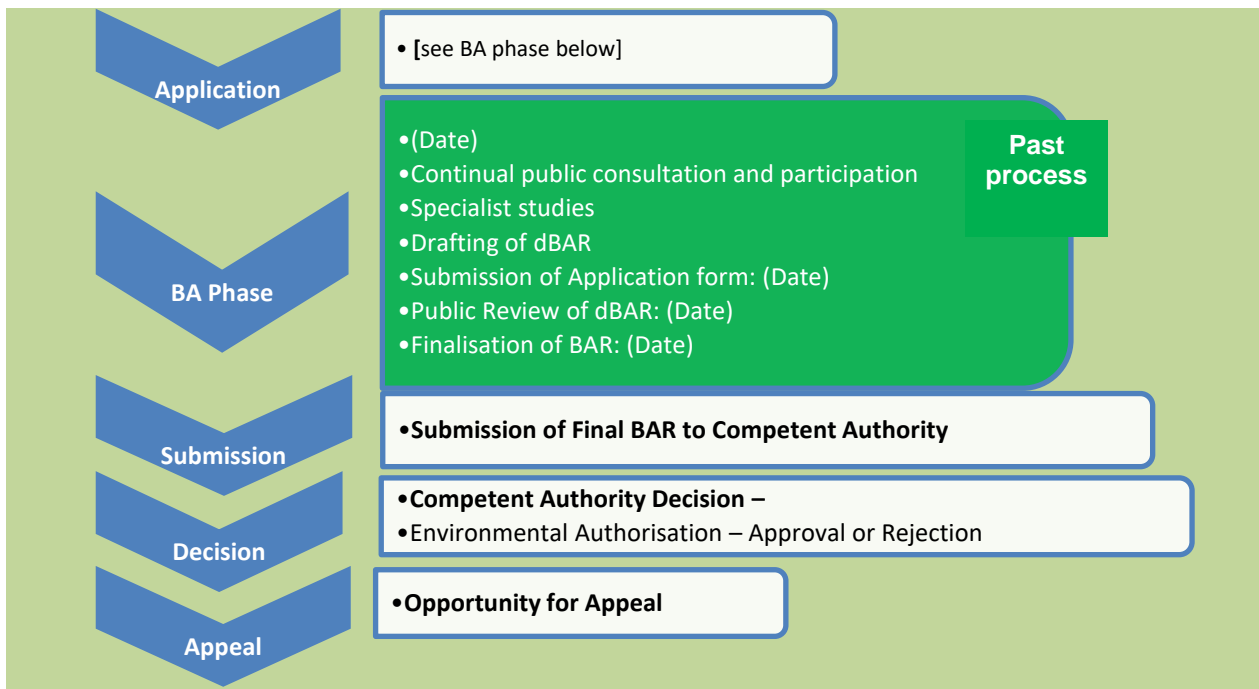
The study area around the Mbecuka vehicular bridge was identified as a CBA: Irreplaceable area. This classification suggests that proposed development area critical for the conservation of biodiversity. The presence of a provincially Critically Endangered vegetation type (KwaZulu-Natal Coastal Belt Grassland) is the reason for the classification of the study area as a CBA: Irreplaceable. conservation important vegetation type. Given the small footprint of the proposed bridge upgrade, the proposed development is unlikely to compromise provincial conservation targets. The study area around the Macondo to Thundeza pedestrian bridge was identified as a non-prioritised area owing to high urbanisation within the catchment. This implies that the proposed development is unlikely to compromise provincial conservation targets.



**FIGURE 5: KZN BIODIVERSITY SPATIAL PLANNING MAP FOR THE STUDY AREA**

## The Basic Assessment

This Basic Assessment [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 dBAR, 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, 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.

## Regulatory Environmental Requirements

The KZN EDTEA – Ugu region is the lead / competent authority for this BA process and the development needs to be authorised by this Department in accordance with the NEMA. The EIA Regulations under the

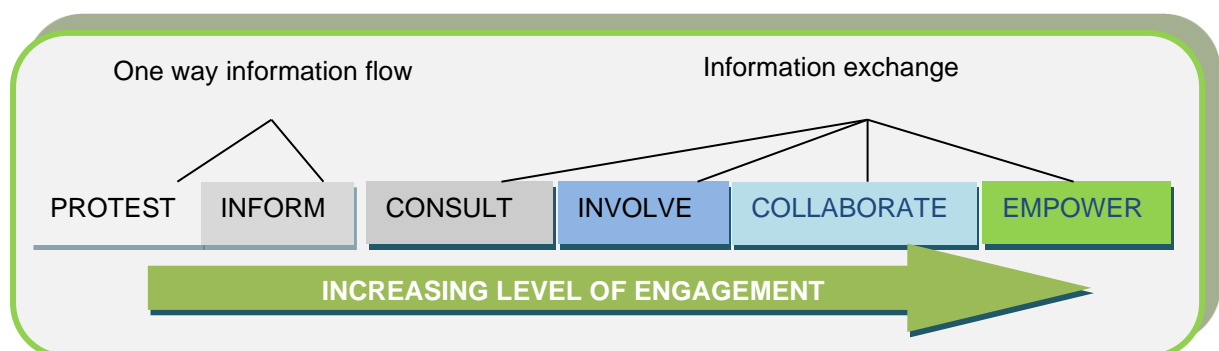
NEMA consist of three [3] categories of activities<sup>1</sup> namely: Listing Notice 1 Activities [GNR 327 of 2017] which require a BA Process, Listing Notice 2 Activities [GNR 325 of 2017] which require S&EIR process, and Listing Notice 3 Activities [GNR 324 of 2017] which requires a BA process for 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]

Indaloenhle Environmental Consultants 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 Indaloenhle Environmental Consultants, where one-way information flow is avoided and information exchange is promoted, thereby enabling a higher level of engagement.



### 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:

#### Assumptions, gaps, and limitations of the study

The BA process followed the legislated process required and as governed and specified by the EIA Regulations [2014 as amended in 2017]. Inevitably, when undertaking scientific studies, challenges and limitations are encountered. For this specific BA, the following challenges were encountered:

<sup>1</sup> Note that a fourth listing notice has been drafted but not yet promulgated and hence not considered in the application of this BA.

The information and recommendations contained herein are based upon information provided by the client and the assumption that all relevant information has been provided by all relevant sources consulted for requisition of such information. Furthermore, field investigation work has been restricted to a level of detail that satisfies the objectives of the study.

The document has been developed with due reference to the following:

- Site visits and assessments – Indaloenhle Environmental Consultants and Vumesa (Pty) Ltd
- Information on biophysical environment - Indaloenhle Environmental Consultants
- Information on the proposed works – Vumesa (Pty) Ltd
- Recommendations from the Authorities – Department of Economic Development, Tourism and Environmental Affairs – UGU District

Assumptions and limitations of the wetland impact study:

- Desktop delineation was undertaken using 5m and 10m contours, latest aerial imagery and the latest Google Earth Imagery. Any vegetation changes may have influenced the accuracy of the delineation.
- The slope gradient was calculated using 5m and 10m contour lines which might not be very accurate.
- The handheld GPS device used has an accuracy of 3m.
- All literature and datasets used were accurate at the time of compiling this report.
- No technical specifications for the Mbecuka vehicular bridge were provided to the specialist at the time of compiling this report.

## **EAP Opinion and Recommendation to CA**

This BAR provides an assessment of anticipated positive and negative impacts attributed to the proposed construction of vehicular and pedestrian bridges. Having duly considered the proposal, there is unlikely to be any significant negative environmental impacts, and the socio-economic benefits are evident.

Based on the findings of environmental impact assessment, there is unlikely to be any significant negative environmental impacts and the socio-economic benefits are evident. Mitigation measures contained herein have been informed by the extent, nature, duration and probability of impacts identified. Implementation of mitigation measures and conditions of the Environmental Management Programme appended to this document which is intended for the management of the impacts of construction of the proposed project and operation thereof, will result to minimal impacts attributed to the proposed project. Assessment findings, therefore, present no fatal flaws; the development will have long term positive impacts than negative impacts, the latter of which are short termed.

It is therefore the recommendation of the EAP that the environmental authorisation is granted for the proposed construction of Mcadolo to Thundeza pedestrian bridge and Mbecuka vehicular bridge.



# 1 BASIC ASSESSMENT DATA

## 1.1 Approach to the Study

This Draft 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 proposed vehicular bridge and pedestrian bridge construction fall within Ward 29 and 11 respectively and are within the jurisdiction of Ray Nkonyeni Municipality in the Ugu District (DC21) of the Province of KwaZulu-Natal, therefore the Competent Authority [CA] is the Department of Economic Development, Tourism and Environmental Affairs [EDTEA], UGU Region.

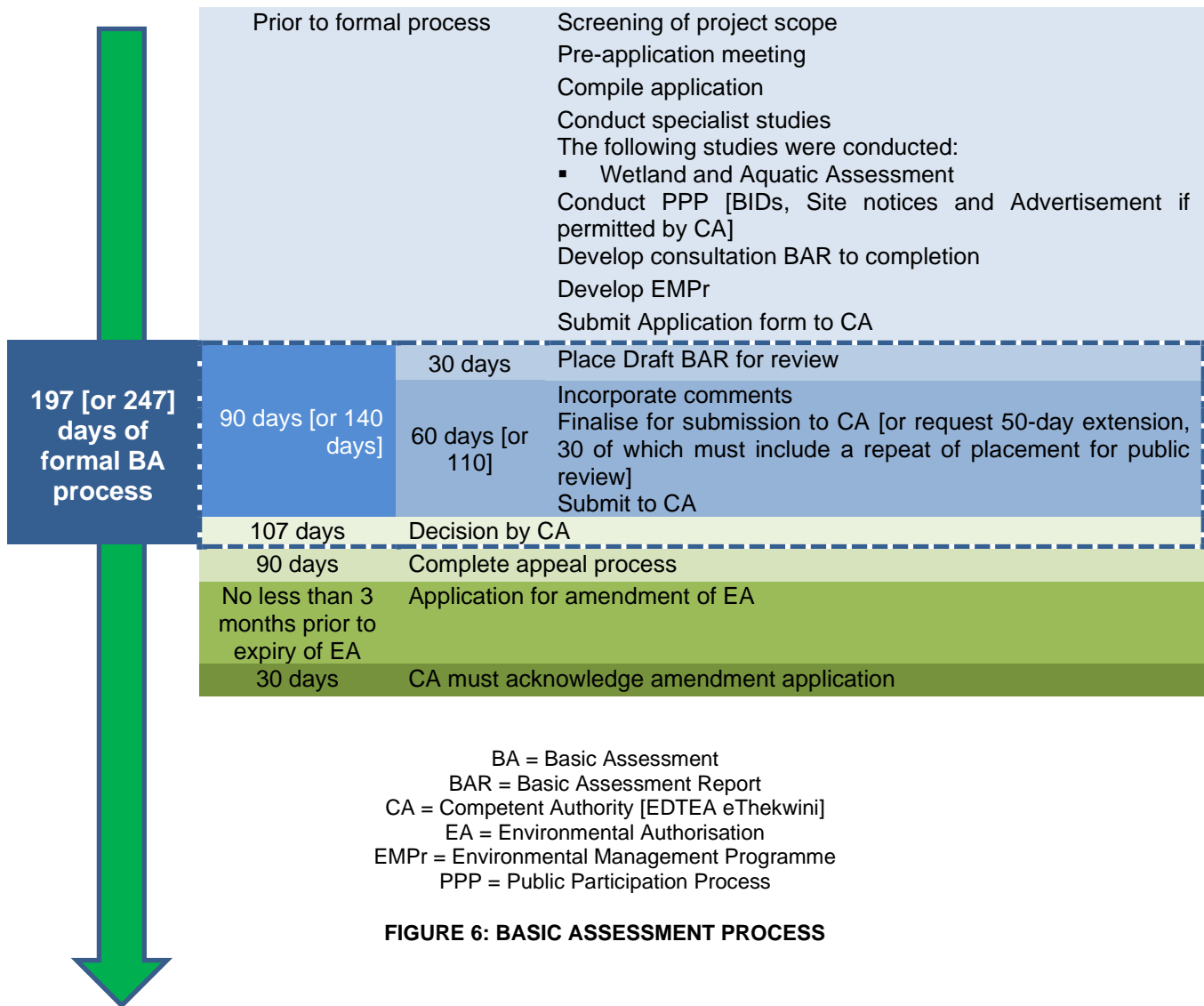
## 1.2 Objectives of the Study

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 to determine 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
    - may cause irreplaceable loss of resources; and
    - can be avoided, managed or mitigated
- Through a 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.

**Figure 6** below illustrates the approach / methodology employed.

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



### 1.2.1 Details of the Project Proponent

The Applicant for the proposed project is Ray Nkonyeni Local Municipality . The details of the Applicant are as follows:

**TABLE 4: APPLICANT DETAILS**

Applicant	Ray Nkonyeni Local Municipality	
<b>Representative</b>	Khulekani Basil Msomi	
<b>Postal Address</b>	1 Protea Road Port Marburg KwaZulu Natal 4240	
<b>Telephone</b>	039 688 2000	
<b>E-mail</b>	Khulekani.msomi@rnm.gov.za	

### 1.2.2 Details of the Environmental Assessment Practitioner

The environmental team of Indaloenhle Environmental Consultants [hereafter referred to as Indaloenhle Consulting] are appointed as the Environmental Assessment Practitioner [EAP]. Indaloenhle Environmental Consultants is therefore undertaking the appropriate environmental studies for this proposed project.

Indaloenhle Environmental Consultants 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 5: EAP DETAILS<sup>2</sup>**

	Detail	Indaloenhle Environmental Consultants
<b>Picture of EAP</b>	<b>Contact Persons</b>	Londeka Jilimane
	<b>Address</b>	62 Old Main Road, Kloof, 3610
	<b>Telephone</b>	031 003 4241
	<b>Facsimile</b>	N/A
	<b>E-mail</b>	Ljilimane@indaloenhle.co.za
	<b>Qualification</b>	MSc. Geography and Environmental Science
	<b>Experience</b>	4 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:

<sup>2</sup> Full curriculum vitae of the above practitioners can be found in Appendix G of this report.

TABLE 6: REPORT STRUCTURE

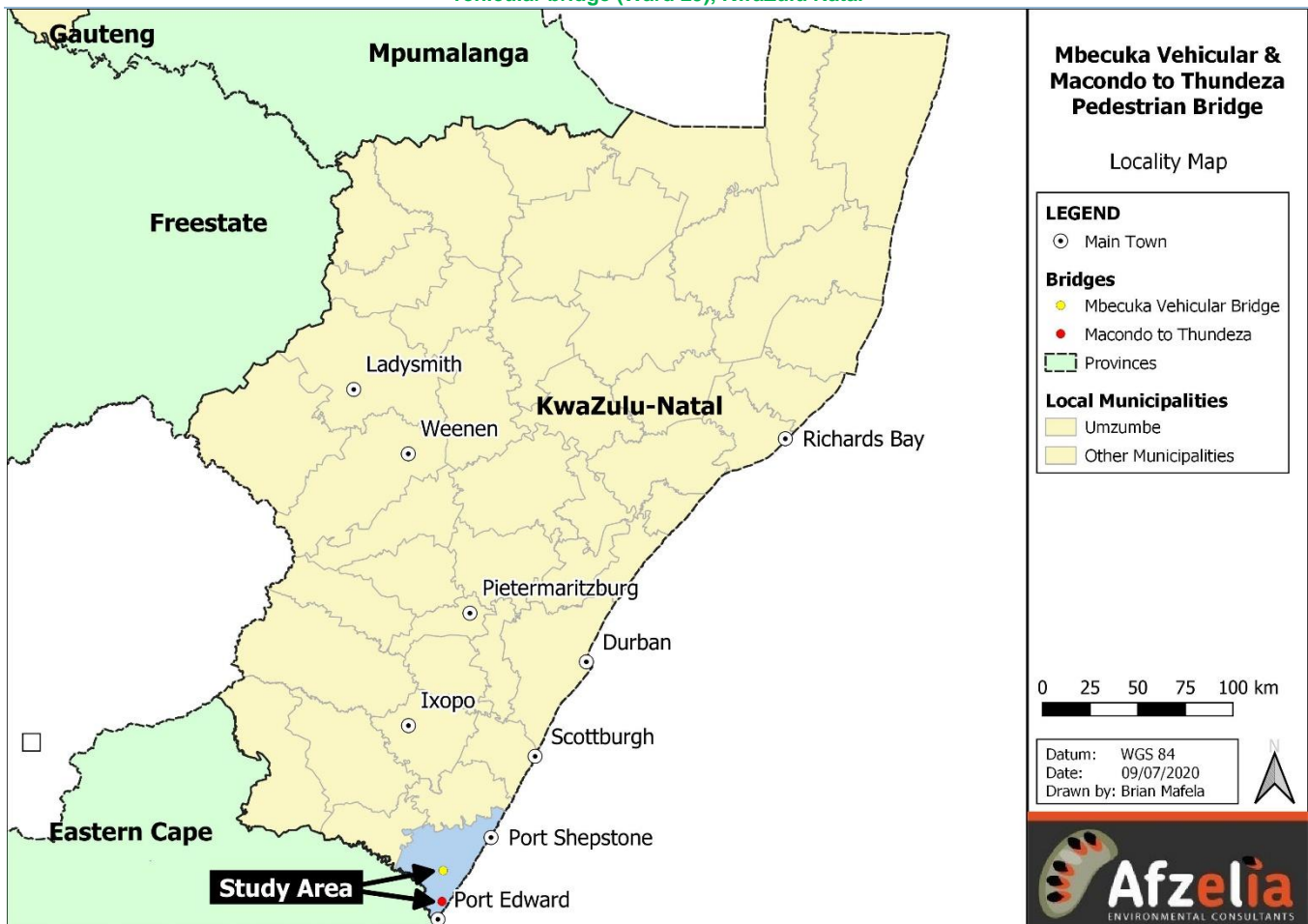
Chapter	Content
<b>Chapter 1 Basic Assessment Data</b>	This chapter includes the approach to the study and details of the project proponent and EAP.
<b>Chapter 2 Project Context and Motivation</b>	Contextualises the study area and provides a motivation and need for the proposed development.
<b>Chapter 3 Technical Data</b>	Includes a detailed description of the proposed activities.
<b>Chapter 4 Environmental Legislative Context</b>	Includes an explanation on all applicable legislation and the relevant listed activities applied for.
<b>Chapter 5 The Study</b>	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.
<b>Chapter 6 Study Findings &amp; Conclusions</b>	Conclusions and recommendations of the Environmental Impact Assessment. Declaration of independence by the EAP.

## 2 PROJECT CONTEXT AND MOTIVATION

### 2.1 Background

Indaloenhle Environmental Consultants (Pty) Ltd were appointed by Vumesa (Pty) Ltd on behalf of the Ray Nkonyeni Local Municipality, KwaZulu-Natal to undertake a Basic Assessment in order to comply with the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended and the Environmental Impact Assessment Regulations (2014) as published in the Government Gazette 38282, Notice No. GNR 982 as amended.

The applicant is intending to undertake development of similar types at different locations within the area of jurisdiction of the competent authority. Request for combination of applications in terms of provisions of sub-regulation 11(1) of the EIA Regulations, 2014 (as amended) was forwarded to the Department and was found acceptable.



**FIGURE 7: LOCALITY MAP FOR THE PROPOSED PROJECT SITES**

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) a Basic Assessment (BA) Process is required for a development that constitutes activities identified in Section 24 of the act. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these activities must be considered, investigated, assessed and reported on to the competent authority that has been charged by NEMA with the responsibility of granting Environmental Authorisations. The nature and extent of the proposed project is explored in more detail in this BA Report. This report has been compiled in accordance with the requirements of the EIA Regulations of December 2014, and includes details of the activity description; the site, area and property description; the public participation process; the impact assessment; and the recommendations of the Environmental Assessment Practitioner (EAP).

***Mbecuka vehicular bridge***

The applicant is proposing the construction of the Mbecuka vehicular bridge. The bridge will have abutments constructed on either side of the existing valley with any other required structural support structures. The following are the dimensions of the bridge: Height: 2,4 m, Width: 7,5 m and Length: 8,52 m.

***Mcadolo to Thundeza Pedestrian Bridge***

The bridge comprises framed structural steel trusses supporting a concrete walkway on permanent steel shuttering supported on reinforced concrete abutments founded on granite bedrock. The following are dimensions of the proposed bridge: Length: 50,1 m, Width: 1,46 m, Height: 5,16 m.

Gabion baskets will be used to prevent erosion. The bridge supports will be dowelled into the bedrock to minimise the risk caused by scour and erosion. The bridge deck will rest on bearings and handrails erected on both sides of the bridge for safety of the public. Walkways will be constructed of reinforced concrete on both sides of the bridge approaches. The length of the approaching walkways be 50,1 meters long.

## 2.2 Surveyor General Numbers / Property Descriptions:

The proposed activity is situated on the following properties which are both state land. The 21 digit surveyor-general codes are provided in Table 7 below.

**TABLE 7: SURVEYOR-GENERAL 21 DIGIT SITE [ERF / FARM / PORTION] REFERENCE NUMBERS**

Structures	21 Digit Reference Number & Erf, Farm and Portion Number
	N/A

### 2.2.1 Land Use Zoning

**TABLE 8: LAND USE ZONING**

The site is zoned	Vehicular and pedestrian bridge
Is a change of land use or a consent use application required?	No
Must a building plan be submitted to the local authority?	Yes

### 2.2.2 Coordinates

The following coordinates are provided for the project:

**TABLE 9: GEOGRAPHIC COORDINATES OF THE PROPOSED SITES**

Area	Geographic coordinates
Mbecuka	30°50'18.60" S
	30°14'40.40" E
	30°59'4.38" S

Mcadolo Thundeza	to	30°14'13.29" E
---------------------	----	----------------

### 2.2.3 Access / Directions

#### Mbecuka

Access to the proposed site for the construction of a vehicular bridge is through an existing unpaved road. Currently the road is being used by motorists and pedestrians. The road may be slippery during wet seasons. Mbecuka is a rural area, therefore the streets or roads are unnamed. The geographic coordinates provided are accurate and lead to the proposed project site.

#### Mcadolo to Thundeza

There is unpaved road that leads to site; however, the road does not take one straight to the area intended for development. The road leading to site seems to be barely used by motorists and appears to be a foot path big enough to accommodate one vehicle. The road reaches a point where one can no longer drive and may have to walk on a foot path in finding their way to the proposed project site. The road passes through rural dwelling to the stream where the bridge will be constructed. Currently there is no structure erected that connects the Mcadolo and Thundeza areas; therefore, one may have to carefully walk on rocks within the watercourse to find their way to the other side of the stream. Mcadolo and Thundeza are rural areas, therefore streets or roads are unnamed. However, the geographic coordinates are accurate and lead to the proposed project site.

### 2.2.4 Dimensions of the Activity

**TABLE 10: DIMENSIONS OF THE PROPOSED BRIDGE STRUCTURES**

Area	Dimensions			
Mbecuka	Height	Width	Length	
	2,4	7,5	8,52	
Mcadolo Thundeza	to	5,16	1,45	50,1

### 2.2.5 Surrounding Land Uses

**TABLE 11: SURROUNDING LAND USES IN PROXIMITY TO THE PROPOSED PROJECT SITE**

Natural area	N	Light industrial	N
Low density residential	Y	Medium industrial	N
Medium density residential	Y	Heavy industrial	N
High density residential	Y	Power station	N
Informal residential	N	Military or police base/station/compound	N

Consultation Basic Assessment Report for the construction of Mcadolo to Thundeza pedestrian Bridge (Ward 11) and Mbecuka vehicular bridge (Ward 29), KwaZulu Natal

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	N	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	N
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	N
Graveyard	N	Archaeological site	N
Airport	N	Other:	N

Key: Y = Yes P = Possibly N = No

## 2.3 Project Motivation and Need and Desirability

TABLE 12: PROPOSED PROJECT NEED, DESIRABILITY AND BENEFITS

Project Need			
1.	<b>Was the relevant provincial planning department involved in the application?</b> Ray Nkonyeni Municipality is responsible for local infrastructure and planning and is also the project Applicant.	YES	
2.	<b>Does the proposed land use fall within the relevant provincial planning framework?</b> This is an infrastructure project thus it can be considered to be part of the PSDF, by virtue of increasing commutability, safety and improving road access in this area.	YES	
3.	<b>If the answer to questions 1 and / or 2 was NO, please provide further motivation / Explanation – N/A.</b>		
Desirability			
1.	The proposed projects will improve access while serving as a connection between two areas namely Mcadolo and Thundeza and will provide safe walkways and driveways for Mbecuka road users.	YES	
2.	<b>Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?</b>  The approval of this application will not compromise the IDP or the SDF but will serve as key enabling support to these plans. Threat to the infrastructure capacity in residential areas by increasing population density has been identified; thus, the pedestrian and	YES	



Consultation Basic Assessment Report for the construction of Mcadolo to Thundeza pedestrian Bridge (Ward 11) and Mbecuka vehicular bridge (Ward 29), KwaZulu Natal

	vehicular bridges will remove some of the impending capacity problems foreseen in future.		
3.	<p><b>Will the benefits of the proposed land use / development outweigh the negative impacts of it?</b></p> <p>The positive benefits will outweigh the negative impacts in the socio-economic sense in that it will improve safety of motorists and pedestrians and could lead to increased development or mushroomed development due to improved accessibility.</p> <p>Therefore, benefits far outweigh the negative impacts, which are limited to the construction phase without mitigation measures being implemented. The construction of bridges will lead to an improvement to the social, environmental, and economic status quo.</p>	YES	
4.	<b>If the answer to any of the questions 1-3 was NO, please provide further motivation / Explanation – N/A.</b>		
5.	<b>Will the proposed land use / development impact on the sense of place?</b>		NO
6.	<p><b>Will the proposed land use / development set a precedent?</b></p> <p>There are unsafe walkways and driveways at the proposed sites, the proposed development will set a precedent in that further development may result due to improved accessibility to areas.</p>	YES	
7.	<p><b>Will any person’s rights be affected by the proposed land use / development?</b></p> <p>The proposed project will enhance community rights once constructed. However, during construction continuous engagement with the community is vital to ensure that no agreements are infringed, and discontentment of community members is avoided.</p>		NO
8.	<b>Will the proposed land use / development compromise the “urban edge”?</b>		NO
9.	<b>If the answer to any of the question 5-8 was YES, please provide further motivation / explanation – N/A.</b>		
<b>Benefits</b>			
1.	<b>Will the land use / development have any benefits for society in general?</b>	YES	
2.	<p><b>Explain:</b> The pedestrian bridge will connect Mcadolo and Thundeza areas and will provide safe walkways for road users. The learning institution in the area is found on the Mcadolo side of the stream, the current condition or mode of crossing is unsafe; the development will therefore improve accessibility to the areas and other facilities.</p> <p>The current bridge structure in Mbecuka is not high enough to withstand storms, construction of a vehicular bridge will benefit the society in that the development will ensure safety of road users and improve accessibility and potentially lead to increased development.</p>		
3.	<b>Will the land use / development have any benefits for the local communities where it will be located?</b>	YES	
4.	<p><b>Explain:</b> The development will directly benefit the local communities as it is intended for use by the communities to ensure their safety. There is a perennial stream that separates two local communities, the bridge will adjoin the two communities and ensure that Thundeza residents’ benefit from the schooling facility in Mcadolo.</p>		

2.3.1 Socio-Economic Value of the Activity

TABLE 13: SOCIO-ECONOMIC VALUE OF THE PROPOSED PROJECT

Description	Value
-------------	-------

What is the expected capital value of the activity on completion?	<b>R9 924 480. 15</b>	
What is the expected yearly income that will be generated by or as a result of the activity?	N/A	
Will the activity contribute to service infrastructure?	X YES	NO
Is the activity a public amenity?	YES X	NO
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	40	
What is the expected value of the employment opportunities during the development and construction phase?		
What percentage of this will accrue to previously disadvantaged individuals?	90%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	0	
What is the expected current value of the employment opportunities during the first 10 years?	N/A	
What percentage of this will accrue to previously disadvantaged individuals?	N/A	

### 3 TECHNICAL DATA

#### 3.1 Geometric Design

##### 3.1.1. Mcadolo to Thundeza Pedestrian Bridge

###### 3.1.1.1. Design

- Design method – limit state
- Design code – SANS 10162-1: 2005 for structural steel, SABS 0100-1: 2008 PART 1 FOR CONCRETE AND SANS 10160-2:2011 PART 2 FOR LOADINGS

###### 3.1.1.2. Loading

- Live load - 5 kN/m<sup>2</sup>
- Dead load - concrete 24.5 kN/m<sup>3</sup>, Steel 77 kN/m<sup>3</sup>
- Earth pressure - 18 kN/m<sup>3</sup> with friction angle OF 30°
- Temperature - from - 1 TO 45°C effective bridge temperature

###### 3.1.1.3. Material

- Concrete classes
  - Mass Concrete 15/19
  - Building and approach slab 15/19
  - Footings 30/19
  - Abutments 30/19
  - Deck slabs 30/19

- Reinforcement shall not be hot-rolled and shall comply with the standard specification for steel bars for concrete reinforcement SANS 920:2011 as follows:
  - MILD-STEEL -PLAIN- ROUND – MIN. CHARACTERISTIC STRENGTH 250MPa
  - Structural steel will be grade S355JR in accordance with SABS 1431

#### 3.1.1.4. *Substructure*

- Type of founding material – weathered soft rock granite
- Maximum permissible bearing pressure – 250kPa (Stress distribution assumed linear)
- Concrete finishes:
  - Hidden faces - F1
  - Deck sides - F2
  - Top of deck and walkways - U2
- Bearings: glacier line rocker or similar approved
- Minimum concrete cover – 50mm
- Visible corners to be chamfered 25mm unless shown otherwise

#### 3.1.1.5. *Superstructure*

- Method of analysis – frame
- Concrete finishes:
  - Hidden faces – F1
  - Deck sides – F2
  - Top of deck and walkways – U2
- Minimum concrete cover – 50mm
- Visible corners to be chamfered 25mm unless shown otherwise
- A method statement for the erection shall be submitted to the engineer for record and comment 10 days before erection commences. Stability during erection remains the contractor's responsibility.

#### 3.1.1.6. *Structural steel*

- Structural steelwork shall comply with the requirements of SABS 1200H and project specifications.
- Structural steelwork shop details shall be prepared by the contractor and submitted to the engineer for record and comment 5 days before fabrication commences.
- Structural steelwork trusses shall be fabricated in easily transportable lengths. They shall be shop welded and site bolted.
- No flame cutting or site welding shall be carried out without the prior written approval of the engineer.
- C 120x55 bottom members and 60x60x8 L diagonals to have tension connections. C 160x65 top members to have full strength connection for compression and bending.
- Welds shall conform to SABS 0167-1984 AND 044 specifications. All welds shall be 6mm continuous fillet welds unless otherwise shown.

- Where temporary bracing or propping is necessary, the contractor shall be responsible for design, erection, maintenance and removal (where necessary) of such supports. If splices in trusses are required because of transport, proposal of this shall be submitted to the engineer at an early stage for written approval.
- All connection bolts shall be grade 8.8 unless shown otherwise.
- All steelwork and bolts including any holding down bolts shall be hot dip galvanised to SABS ISO 1461:2000

### 3.1.2. Mbecuka Vehicular bridge

#### 3.1.2.1. Loading

The loading is in accordance with TMH 7: Parts 1 and 2 1981 (Revised 1988). The following loading and design variables have been used:

- Live load NA, NB 36 TRAFFIC LOADING
- Dead load REINFORCED CONCRETE - 24.5 kN/m<sup>3</sup>
- Earth pressure behind earwing and barrel walls based on “Coulomb” theory:
  - Density of soil 1885kg/m<sup>3</sup>
  - Angle of internal friction 30°
- Saturation of the fill for a depth of 1.0m above the culvert can be tolerated.
- Design fill height 2.0m
- Assumed settlement condition  $r_{sd} \quad p = 0.5$
- Barrel checked for geostatic loads.

#### 3.1.2.2. Design parameters

- Young modulus of elasticity
  - Concrete (Short term) in accordance with table 3 of BS 5400: 1984
  - Reinforcement steel 210GPa
- Co-efficient of thermal expansion for concrete  $12 \times 10^{-6} \quad /^{\circ}\text{C}$

#### 3.1.2.3. Characteristic strength of material

- Concrete (fcu)
  - Binding 15MPa
  - Cantilever wingwalls 25MPa
  - Barrels and earwalls 25MPa
- Steel bar reinforcement (fy) (in accordance with S.A.B.S. 920) hot rolled high-yield-stress
  - Deformed bars – Y Bars 450 MPa
  - Hot rolled mild steel bars of round cross section 250 MPa

#### 3.1.2.4. General notes

- Surface finishes-

- Formed surfaces: All concealed surfaces Class F1  
All exposed surfaces Class F2
- Unformed surfaces Top of barrel Class U1  
Top of walls, invert of barrel and top of apron slab Class U2
- All external corners shall be chamfered to 25mm x 25mm.
- Concrete cover to reinforcement shall be 40mm.
- Founding material:
  - Type of founding material - Weathered Tilitite
  - Permissible bearing pressure - 350 kPa
  - Design bearing pressure - 150 kPa
  - Anticipated settlement less than 5mm
- All levels to be verified by engineer on site before construction commences

## 4. 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. This section outlines the applicable national legislations which needs to be taken cognisance of.

### 4.1. 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.

### 4.2. 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, as per its primary objective, provides for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for 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 law;
- 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.

#### 4.2.1. EIA Regulations [2014] [as amended in 2017]

On April 7<sup>th</sup> of 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] of the EIA Regulations [2014 as amended in 2017] – refer to Table 14 below.

**TABLE 14: 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]
<b>Government Notice Regulation No. [GNR] 327 of 2017</b>	<i>Activity 19</i>	<i>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.</i> <b>Construction of the bridges within watercourses will result in the movement or deposition of 10m<sup>3</sup> or more of material into or out of a watercourse.</b>

### 4.3. 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 construction of infrastructures (bridges) within 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; and*
- *[i] Altering the bed, banks, course or characteristics of a watercourse.*

### 4.4. 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 NEM: 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.

The screening report generated using the Department of Environmental Affairs web-based screening tool indicates that the terrestrial biodiversity theme is of very high sensitivity with the following features:

*Mcadolo to Thundeza:*

- Critically endangered ecosystems
- Critical Biodiversity Area
- Focus areas for land based protected areas expansions

*Mbecuka proposed site:*

- Critically endangered ecosystem
- Critical Biodiversity Area
- Forest
- Ecological Support Area
- Focus areas for land based protected areas expansions
- Freshwater ecosystem priority area

## **4.5. 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.

#### **4.6. 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.

#### **4.7. 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.

#### **4.8. 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.

No red data species were identified to be impacted by the proposed development. There have been a number of protected species identified.

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.

#### **4.9. 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.

#### **4.10. 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 m<sup>2</sup> 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 m<sup>2</sup> 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.

#### **4.11. 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.

#### **4.12. 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.

#### **4.13. 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.

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

The NEMA Air Quality Management Act [NEM: AQA] states the following as its 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.”*

#### **4.15. 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.

## **4.16. Climate Change Consideration**

The proposed project is unlikely to contribute to climate change as it is concerned mainly with the construction of infrastructure within watercourses. The impacts that are likely to result from planning, construction and operation of the proposed project will not result to climate change. It should be noted however that, climate-related hazards can have serious impacts on the safety and functionality of infrastructure systems. Numerous examples of previous climate related events which seriously affected the infrastructure exist. It is therefore important for the municipality to develop possible adaptation strategies to counteract these impacts.

# **5. THE STUDY**

## **5.1. 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.

## **5.2. Site and Type of Activity Alternatives**

The project involves the construction of Mcadolo to Thundeza pedestrian bridge and Mbecuka vehicular bridge. The municipality has embarked on a process to construct bridges within its areas of jurisdiction to increase the safety of its citizens during floods; the proposed sites, therefore, have been identified as areas requiring intervention

in terms of infrastructure that will provide safe walkways and drive ways for the residents. No off-site or other site-specific alternatives have been investigated since the proposed development is site specific.

### 5.3. Layout and Design Alternatives

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

#### 5.3.1. Design Alternative Considerations

In selecting alternative structural forms, 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
- 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 / Aquatics.

When selecting an appropriate design for infrastructure required, several factors need to be considered. To begin with, the need for such a structure must be demonstrated from a socio-economic perspective, notwithstanding the considerations given to the guidelines for assessing and demonstrating the needs and desirability of the project and development as a whole [General Notice 891 [DEA, 2014]]. The location must ensure that the proposed structure adds value by creating key linkages for as many communities as possible, and specifically, for the target communities. In this way, the aspect of safety is also addressed, as the structures are designed taking into consideration safety design requirements. Once a location is identified that is suitable to address the needs of the target communities, structural and environmental factors must be considered. These factors include: [i] the use of existing structures and infrastructure; [ii] identifying hydrological, geological and ecological constraints and ensuring the design is according to engineering best practice guidelines and principles; [iii] carrying out an assessment of various options to ensure a cost-effective solution is obtained; and [iv] implementing best practice procedures during detailed design and construction.

Engineering requirements can be addressed in a number of ways. It is a basic principle of best practice to consider a range of options to address any river engineering problem or need and to carry out an options appraisal. Without

considering a range of options it is not possible to determine if the chosen approach represents the most suitable option [i.e. the option that minimises ecological harm at a cost that is not disproportionately expensive].

With the above taken into consideration, the following design alternatives were considered.

#### *5.3.1.1. Preferred Alternative*

The proposed alternatives are preferred alternatives.

#### *5.3.1.2 No-Go Alternative*

This alternative entails that the condition of Mcadolo to Thundeza where in there is no connection between the Mcadolo area and Thundeza area remain as is. This would mean that residents, especially school children, crossing over to Mcadolo area on their way to school will remain at risk of slippery and consequently injury thus triggering their safety. The alternative also entails that the condition of Mbecuka area envisaged for the construction of vehicular bridge will remain unchanged negatively impacting road users especially during flooding.

## **5.4. DESCRIPTION OF THE STUDY AREA**

### *5.4.1. Biophysical Environment*

#### *5.4.1.1. Climate*

The climate of Ray Nkonyeni Local Municipality is humid to tropical all year round. Climate change is likely to cause a number of challenges for this municipality, linked to global impacts such as increased temperatures, extreme weather events (e.g. flooding and drought), sea level rise and climate variability. As such, climate change runs the risk of undoing all of the development gains of the last one and a half decades; climate change adaptation in all sectors will have to become one of the municipal top development priorities.

Temperatures in Ray Nkonyeni are likely to increase by 1.5°C and 2.5°C by 2065 and by 3.0°C and 5.0°C by 2100. Projected (Ray Nkonyeni Draft SDF, 2020) annual rainfall changes are likely to include an increase in aggregated rainfall by 2065 with an increase of up to 500 mm by 2100. This increase is likely to be manifested as an increase in extreme rainfall events and stream flow intensity across the municipal area with prolonged dry spells between rainfall events. Sea level rise along municipal coastline is already occurring at 2.7 cm per decade and may accelerate into the future.

#### *5.4.1.2. Topography and Geology*

The soil geology of the municipality is covered by seven geological formations, with the predominant being the Margate gneiss, followed by Msikaba Arenites, Gneiss, Tillete, Shale, Marble and Natal Group Arenite. Margate gneiss originates from a high-grade metamorphic rock which implies that it has been subjected to higher temperatures and pressures. It is formed by the metamorphosis of granite or sedimentary rock. Gneiss displays

distinct foliation, representing alternating layers composed of different minerals. Below is the illustration of the geology of the municipality.

Both study sites are underlain by metamorphic rocks, namely gneiss and granulite. available geological gis information covering the study area did not indicate any structural features such as faults or fractures within the 500m regulated area. the study area has a soil erodibility score (k-factor) of 0.20 – 0.21 which means it is low (schulze, 2007).

#### 5.4.1.3. Vegetation

Ray Nkonyeni Local Municipality is under the Ugu District Municipality; a range of vegetation types extend across the UDM and are grouped within three biomes, namely the Indian Ocean Coastal belt, Savannah biome inland of the coastal belt, and a small section of the grassland biome west of Harding and extending north towards Kokstad. Transformation has significantly impacted in the extent of remaining natural habitat, particularly along the coast and in higher lying inland regions. High levels of transformation in Ugu District have contributed to five vegetation types being classified as critically endangered while 24% of vegetation types are vulnerable and only 17% are classified as least threatened.

Interrogation of the 2018 National Vegetation Type map revealed that both study areas and their 500m regulated areas are characterised by KwaZulu-Natal Coastal Belt Grassland, a terrestrial vegetation type with a national threat status of **Endangered** (Skowno *et al.* 2019) and a provincial threat status of **Critically Endangered** (Jewitt, 2018) (Figure 3.5). No azonal vegetation type was recorded.

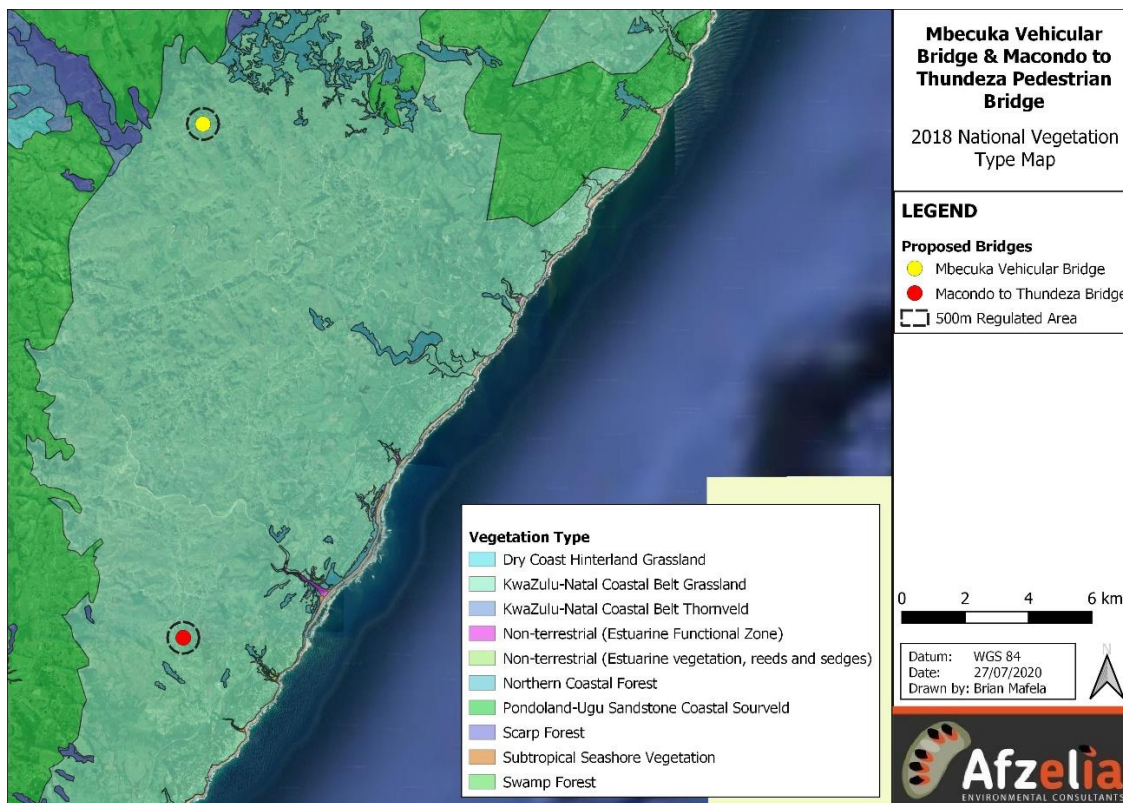


FIGURE 8: NATIONAL VEGETATION TYPE MAP



5.4.1.4. Air quality

Ray Nkonyeni Municipality has a high number of industrial and manufacturing activities which produce toxic emissions in comparison to the other municipalities in the District. This is mainly due to the fact there is relatively much industrial activities within the municipal jurisdiction, with the location of two major industrial basins in Uvongo and Marburg and limited activity in the areas of Hibberden and Margate.

5.4.1.5. National Ecosystem Priority Area

In terms of the National Freshwater Ecosystem Priority Areas (NFEPA) conservation tool, both sites are located within non-prioritised areas. Furthermore, the dataset indicated that there are no prioritised wetlands within the 500m regulated area of both sites.

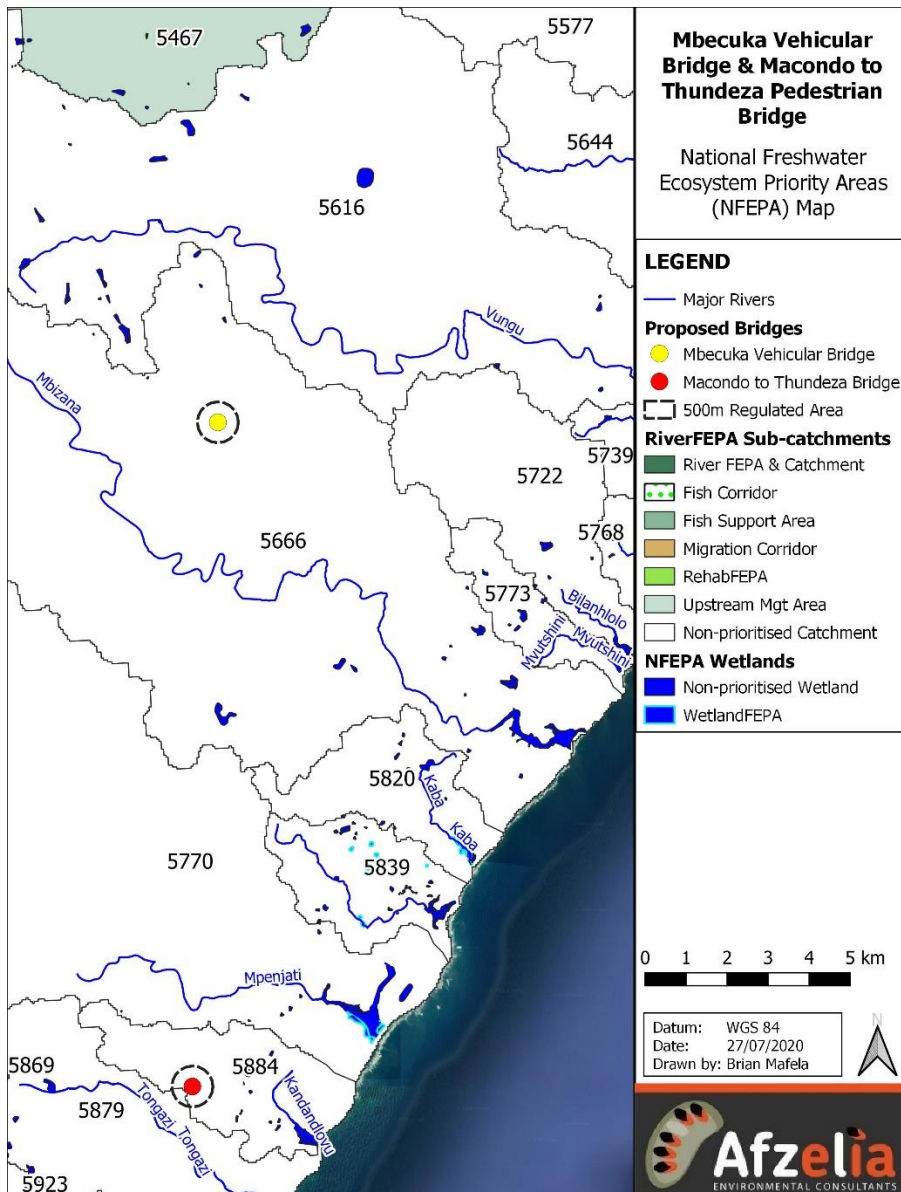


FIGURE 9: NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREAS MAP

#### 5.4.2. Socio-economic Environment

##### 5.4.2.1. Unemployment

The youth within Ray Nkonyeni Local Municipality is highly unemployed, and this remains a huge problem. According to the Ray Nkonyeni Municipal IDP, 2019, there are several projects currently being implemented in rural areas where unemployment is rife. Also, such initiatives are aimed at establishing a conducive environment to attract and grow businesses and cooperatives as per the municipality's Local Economic Development's strategy.

##### 5.4.2.2. Heritage

The screening tool generated using the DEA web-based screening tool indicates that the proposed site occurs with 500m radius of a heritage site. The heritage site identified on site is a wetland; this has been assessed and reported on in the wetland impact assessment report.

## 5.5. PUBLIC PARTICIPATION PROCESS

Public participation is a process that is designed to enable all interested and affected parties [I&APs] to make known 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 41 and 42 [GNR 982] under the NEMA [as amended]. It should be noted however that there are directions regarding measures to address, prevent and combat the spread of COVID -19 relating to National Environmental Management Permits and Licences that were issued by the Department of Environment, Forestry and Fisheries. The purpose of the directions was to curtail the threat posed by the COVID-19 pandemic, contain and minimise the effects of the national state of disaster and

in particular to provide directions to ensure safe licensing processes and public participation processes as required by law.

As required by the Directions, Indaloenhle developed a Public Participation Process Plan which was submitted to the Competent Authority for approval. The Public Participation Process has been undertaken in accordance with the measures stipulated on such plan. Where possible, the requirements of Regulations 41 and 42 (GNR 982, where adhered to, deviation are stated on the Public Participation Process Plan.

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

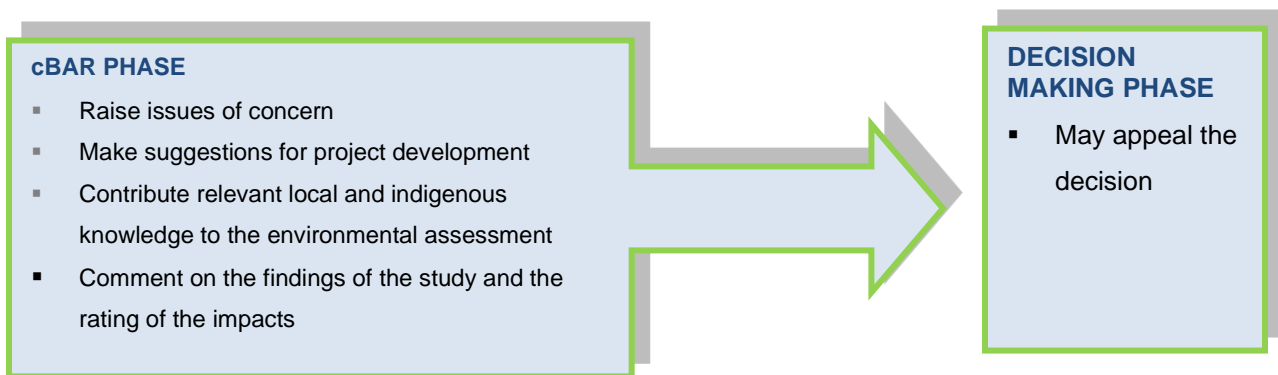


FIGURE 10: RESPONSIBILITIES OF I&APS IN THE DIFFERENT PPP STAGES

Figure 11 [below] depicts the approach taken by Indaloenhle Environmental Consultants, where one-way information flow is avoided and information exchange is promoted, thereby enabling a higher level of engagement.

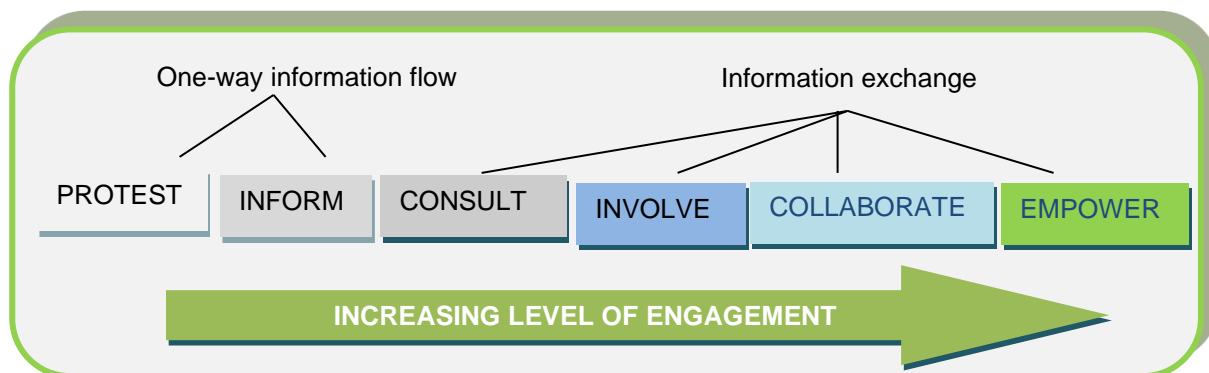


FIGURE 11: THE STAKEHOLDER ENGAGEMENT SPECTRUM [DEAT, 2002]

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 members. 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.

#### 5.5.1. Authority Consultation

A Pre-Application Meeting was held with Ntoyonke Dlamini, Nzuzo Ndokweni and Snethemba Mbambo of the Department of Economic Development, Tourism and Environmental Affairs the 14<sup>th</sup> of July 2020. The minutes thereof are included in Appendix 4. The purpose of the Pre-Application Meeting was to introduce the proposed project to the EDTEA, present and confirm the relevant Listed Activities and Specialist Studies pertinent to the proposed development and that, the department, as per its guidelines and regulations can make known the recommendations pertaining the proposed project.

It was noted the proposed development constitutes an activity identified in terms of Section 24 of the National Environmental Management Act, Act No. 107 of 1998 and therefore triggers a Basic Assessment as Activity 19 of Listing Notice 1 is associated with the project.

It was also noted that in addition to the wetland and aquatic impact study, the EAP has to undertake a Vegetation Impact Assessment study as the proposed sites are characterised by indigenous vegetation. The Public Participation Process Plan was submitted to the department; the plan documented reasonable measures to ensure participation by Interested and Affected Parties in the EIA process. The plan was found acceptable by the department and is appended to this report.

#### 5.5.2. Consultation with Other Relevant Stakeholders

Consultation with other relevant key stakeholders was undertaken through 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 notified through BIDs and notification letters.

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

The identified stakeholders of this project include:

**TABLE 15: KEY STAKEHOLDERS CONTACTED AS PART OF THE PUBLIC PARTICIPATION PROCESS**

LOCAL AUTHORITY
Ugu District Municipality
Ray Nkonyeni Local Municipality

PROVINCIAL AUTHORITY	
AMAFA	Bernadetp@amafapmb.co.za
Ezemvelo KZN Wildlife	Dominic.wieners@kznwildlife.com
Department of Water and Sanitation	<a href="mailto:Buthelezis2@dws.gov.za">Buthelezis2@dws.gov.za</a> Govenders2@dws.gov.za
Department of Environment, Forestry and Fisheries	
Department of Transport	Simphiwe.Nkosi@kzntransport.gov.za
STATE DEPARTMENTS	

### 5.5.3. Site Notification

The EIA Regulations [2017] 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 Interested and Affected Parties and inform them of the PP Process.

Indaloenhle Environmental Consultants erected a number of notices written in English and Zulu on (Date) at publicly accessible spaces [refer to Appendix E1].

### 5.5.4. Identification of Interested and Affected Parties

I&APs were identified throughout the BA process primarily from responses received from the notices mentioned above.

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

Additionally, hard copies of the dBAR were 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 E5. This database was updated on an on-going basis throughout the BA process.

### 5.5.5. Advertising

In honour of Section 41(2) of the EIA Regulations promulgated under the National Environmental Management Act, notification of the commencement of the BA process for the project was advertised in the following newspapers on the 31<sup>st</sup> of July 2020 and proof of advertisement is appended to this report:

- Ugu Eyethu (Zulu)
- The South Cost Herald (English)

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.

### 5.5.6. Public Meeting

The regulations issued by the Minister of Co-operative governance and traditional affairs in terms of section 27(2) of the Disaster Management Act, 2002 (Act No. 57 of 2002) published on 29 April 2020 in Government Notice No. R. 480 of Government Gazette No. 43258 banned all gatherings except -

23(1)(a) for funerals

23(1)(b) when at workplace or

23(1)(c) when buying or obtaining goods and services

It is therefore impermissible to gather interested and affected parties for the purpose of undertaking a Public Participation Meeting. The notices did not invite I&APs to convene at a confirmed venue for a Public meeting. The local leaders were requested to facilitate a small-scale notification process where attendees will be issued a Background Information Document and be requested to sign a register as acknowledgement of receipt of the Background Information Document. The register is appended to this BAR.

#### *5.5.7. 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 E3, in which all comments received, and responses provided to date have been captured.

#### *5.5.8. Key Issues Raised by the Public [Summarised]*

#### *5.5.9. Public Review of the draft BAR*

All registered I&APs were notified of the availability of the report through written and verbal communication.

The cBAR will be made available for authority and public review for a total of 30 days from (Date) to (Date)

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

#### *5.5.10. Final BAR*

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

The final BAR [i.e. fBAR] will incorporate all comments by Interested and Affected Parties and findings of specialist studies prior to submission to KZN EDTEA for review and decision-making.

#### *5.5.11. PPP Summary*

### **TABLE 16: SUMMARY OF PUBLIC PARTICIPATION PROCESS THUS FAR**

Activity	Description	Reference
<b>Identifying stakeholders</b>	Stakeholders were identified and a database of all I&APs were compiled.	Appendix E
<b>Publishing newspaper adverts</b>	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 UGU Eyethu and South Coast Herald newspapers on the 31 <sup>st</sup> of July 2020. Proof of advertisement is appended to this report.	Appendix E
<b>Erection of site notices</b>	A number of site notices were erected on the perimeter of the site on.	Appendix E
<b>Preparation of an on-going Issues Trail</b>	Comments, issues of concern and suggestions received from stakeholders thus far have been captured in a Comment and Response Report (ongoing).	Appendix E
<b>Release of Draft Reports</b>	This Draft Basic Assessment Report [dBAR] has been advertised and made available for a period of 30 days for public review and comment. The cBAR is available for review from (Date) till (Date).	Appendix E
<b>Public Meetings / Open Days</b>	Notification process by local authorities was undertaken.	Appendix E
<b>Release of final Reports</b>	The final Basic Assessment Report will incorporate all comments by IAPs and findings of the specialist studies, before being submitted to KZN DEDTEA for review and decision-making.	—

## 5.6. SUMMARY OF KEY SPECIALIST FINDINGS

### 5.6.1. Wetland and Aquatic Impact Assessment

The existing Mbecuka vehicular bridge is situated in Mbecuka rural settlement located 12km west of the town of Margate. The Macondo to Thundeza pedestrian bridge will be constructed within the Thundeza rural settlement located 9km north of Port Edward. Both bridges are located within the Ray Nkonyeni Local Municipality (previously Hibiscus Coast Local Municipality) within the province of KwaZulu-Natal.

The desktop and infield watercourse delineation exercise confirmed the presence of numerous watercourses within the 500m regulated area. However, only 4 watercourses were confirmed as likely to be adversely impacted by the construction and operation of the Mbecuka vehicular bridge and the Macondo to Thundeza pedestrian bridge. These include 2 wetland habitats and 2 riparian habitats. A list of the 4 watercourses discussed in this report is provided below:

#### **Wetland Habitats**

- iii i. W3 – Seep Wetland (0.41 Ha)
- iv ii. W4 – Seep Wetland (1.24 Ha)

#### **Riparian Habitats**

iii. R1 – Riparian Habitat (Transitional River) (3.14 Ha)

iv. R2 – Riparian Habitat (Upper Foothills River) (2.58 Ha)

This study confirmed that both bridges will be constructed within riparian habitats (i.e. Units R1 and R2). Furthermore, construction of the Mbecuka vehicular bridge will potentially impact two wetland habitats (i.e. Units W3 and W4) located upstream of the development site.

All riparian habitats and wetland habitats were found to be moderately modified (C PES Class) in terms of their present ecological state and also of low ecological importance and sensitivity. In terms of functionality, the most notable services provided by both wetland habitats include flood attenuation, water quality enhancing services and biodiversity maintenance.

Impacts likely to result from the construction and operation of both the Mbecuka and Macondo to Thundeza bridges were grouped into the following broad categories for ease of assessment in terms of impact significance: (a) loss of aquatic habitat and biota, (b) degradation of aquatic habitat and (c) water & soil pollution. Under a poor management scenario, the construction and operation of both bridges will result in environmental impacts of **medium impact significance**. Implementation of best practice mitigation measures will reduce construction impacts to a **low impact significance** and also reduce operational impacts to a **negligible to low impact significance**.

Summarised results of the impact significance assessments are provided in Table 2 and 3 below:

**TABLE 17: SUMMARISED IMPACT SIGNIFICANCE RESULTS FOR THE MBECUKA VEHICULAR BRIDGE.**

Impact	Construction Phase		Operation phase	
	Without mitigation	With mitigation	Without Mitigation	With Mitigation
Loss of freshwater habitat and biota	50 Medium	18 Low	N/A	N/A
Degradation of freshwater biota	40 Medium	18 Low	24 Medium	12 Low
Soil and water pollution	40 Medium	15 Low	15 Low	10 Negligible

**TABLE 18: SUMMARISED IMPACT SIGNIFICANCE RESULTS FOR THE MACONDO TO THUNDEZA PEDESTRIAN BRIDGE.**

Impact	Construction Phase		Operation phase	
	Without mitigation	With mitigation	Without Mitigation	With Mitigation



Loss of freshwater habitat and biota	18 Low	8 Negligible	N/A	N/A
Degradation of freshwater biota	24 Medium	15 Low	12 Low	6 Negligible
Soil and water pollution	15 Low	8 Negligible	N/A	N/A

A rehabilitation plan as well as a monitoring and auditing programme have been developed and included in the wetland impact assessment report to address construction impacts that will result from working within watercourses.

The results of the Department of Water and Sanitation (DWS) Risk Matrix indicated that both bridges were of **Moderate Risk** owing to construction impacts such as the diversion of the river and construction the bridge structures within riparian habitats. These impacts, however, can be mitigated sufficiently to reduce the risk rating to **Low**. Recommended mitigation measures to reduce the risk rating include (i) decommissioning the existing Mbecuka bridge and rehabilitating the site, (ii) undertaking construction within the instream habitat in winter, (iii) minimising water pollution from cement slurry, hydrocarbons and sediment; (iv) minimising habitat clearing outside the construction footprint, and (iv) minimising the impact of river diversion by shortening the duration of the river diversion. The low risk rating qualifies both developments for authorisation under the provisions of the General Authorisation (GA), provided recommended mitigation measures and special conditions stipulated in the wetland impact assessment report.

### 5.6.2. Vegetation Impact Assessment

The assessment of impacts that the proposed development might have on the natural vegetation present at the proposed site were identified and assessed concurrently with the aquatic impacts and are presented on the Wetland Impact Assessment Report. Findings are presented below:

The study area around the Mbecuka vehicular bridge was identified as a CBA: Irreplaceable area. This classification suggests that proposed development area critical for the conservation of biodiversity. The presence of a provincially Critically Endangered vegetation type (KwaZulu-Natal Coastal Belt Grassland) is the reason for the classification of the study area as a CBA: Irreplaceable. conservation important vegetation type. Given the small footprint of the proposed bridge upgrade, the proposed development is unlikely to compromise provincial conservation targets. The study area around the Macondo to Thundeza pedestrian bridge was identified as a non-prioritised area owing to high urbanisation within the catchment. This implies that the proposed development is unlikely to compromise provincial conservation targets.

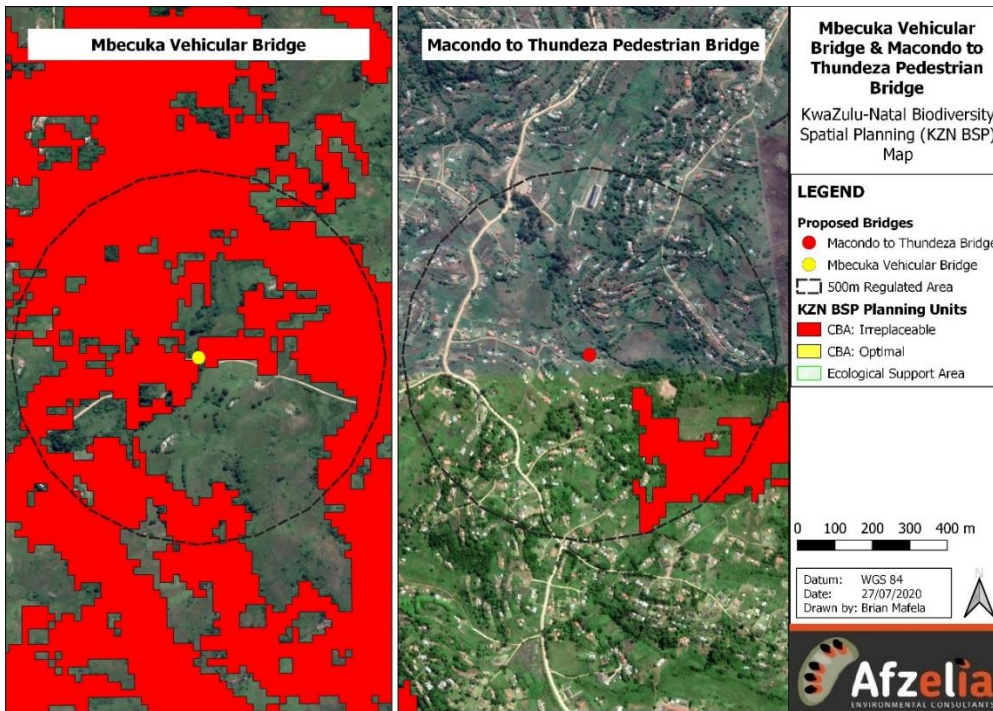


FIGURE 12: KZN BIODIVERSITY SPATIAL PLANNING MAP FOR THE STUDY AREA

## 5.7. IMPACTS AND RESIDUAL RISKS ASSESSMENT

### 5.7.1. 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 the construction of pedestrian and vehicular bridges which will be permanent, decommissioning is not applicable to this project, however, impacts associated with post construction clean-up are considered.

### 5.7.2. Methodology

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

**1. Nature [N]**

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.

**5.7.3. 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 19: 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

**Consultation Basic Assessment Report for the construction of Mcadolo to Thundeza pedestrian Bridge (Ward 11) and Mbecuka vehicular bridge (Ward 29), KwaZulu Natal**

Score		Elaboration
		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.
+ [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.

**5.7.4. 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 13]. 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 13].

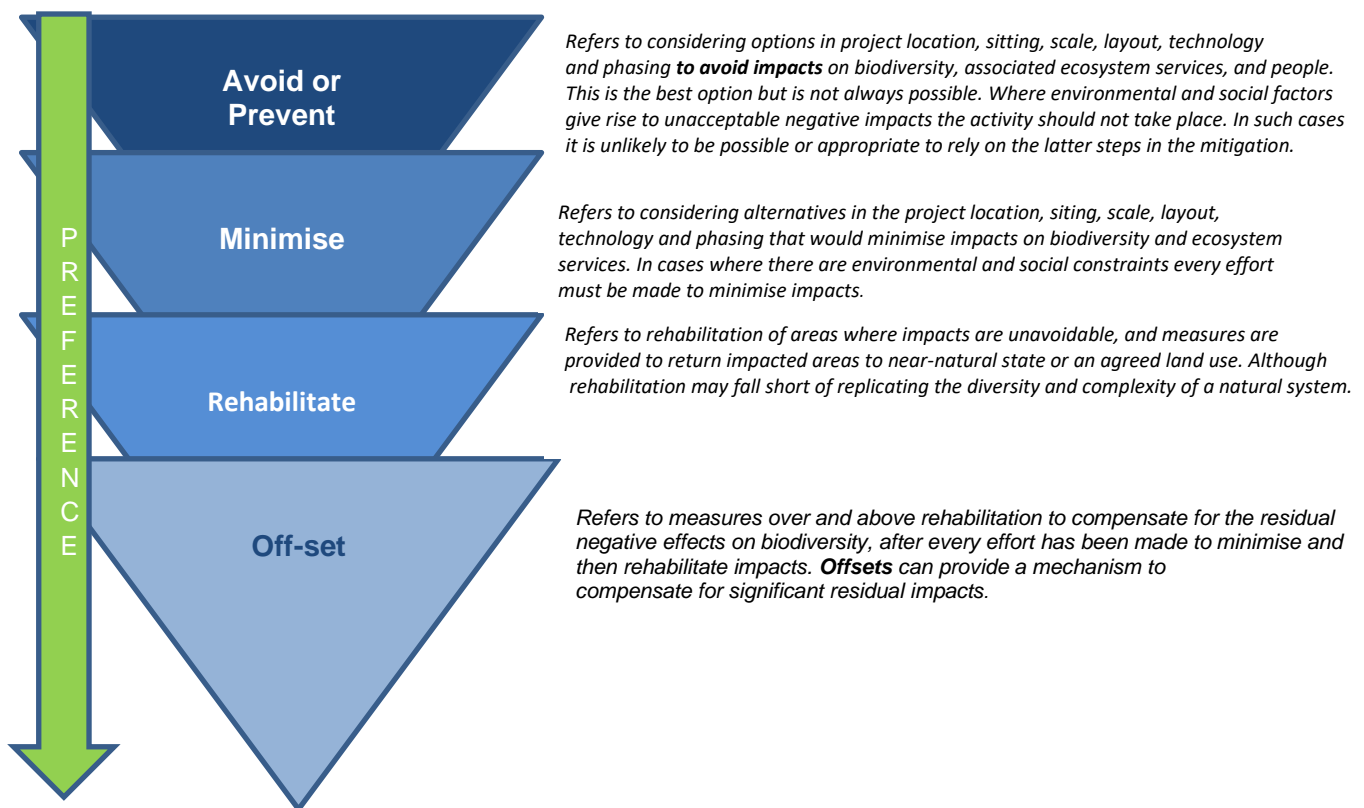


FIGURE 13: THE MITIGATION HIERARCHY

5.7.5. Impact Assessment

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

TABLE 20: PLANNING PHASE IMPACT ASSESSMENT – CONSTRUCTION OF PEDESTRIAN AND VEHICULAR BRIDGE

No.	Impact	Alternative	Mitigation	Significance = E+D+I+P	Interpretation
Phase: Planning and Design – Construction of pedestrian and vehicular bridges					
Sub-phase: Direct Impacts					

**Consultation Basic Assessment Report for the construction of Mcadolo to Thundeza pedestrian Bridge (Ward 11) and Mbecuka vehicular bridge (Ward 29), KwaZulu Natal**

1	Inadequate or incompetent Planning and Design for vehicular and pedestrian bridges [taking into consideration the best environmental solutions which can be accommodated by the budget assigned]	1	Without	-11	Negative high
			With	-8	Negative moderate
<b>Mitigation:</b> [a] Ensure best practicable solutions of design which is best suited to the study area and receiving environment which will then result in the provision of infrastructure for the use of people in the surrounding communities. [b] Consideration must still be given to design which will minimize the need for maintenance and costs associated with that. [c] Ensure correct, peer and supervisor reviewed designs are developed. Furthermore, it is paramount that the findings of this BAR and the associated specialist studies are incorporated into the design to avoid sensitive area particularly that of the wetland and aquatic assessment.					
2	Consideration for national, provincial and local plans in the planning for the development	1	Without	-8	Negative Moderate
			With	10	Positive High
<b>Mitigation:</b> All relevant plans for the area must be considered and adequate consultation with the relevant planning officials in the area.					
3	Development in sensitive habitats could lead to the diminishing of the socio-economic benefits.	1	Without	-9	Negative Moderate
			With	10	Positive high
<b>Mitigation:</b> All measures and considerations for the design of the bridges must be considered and optimization of social, economic, environmental and practical benefits ensured. Socio-economic benefits will actually be enhanced.					
4	Appropriate planning of exclusion of sensitive vegetation and steep areas.	1	Without	-8	Negative moderate
			With	-5	Negative low
<b>Mitigation:</b> Avoidance of the areas with severe degradation in the area. No-go areas must be clearly marked off.					
5	Possible lack of consideration of what the environment can accommodate.	1	Without	-10	Negative high
			With	-6	Negative low
<b>Mitigation:</b> All measures and considerations for the design of the pedestrian and vehicular bridges must consider the triple bottom line and ensure optimization of social, economic, environmental and practical benefits.					
6	Unstable design which will require maintenance in the near future	1	Without	-9	Negative Moderate
			With	-5	Negative low
<b>Mitigation:</b> Ensure that the best practicable design is used.					
7	Material shortages and poor management Practices. Impacts: [a] Design change due to material shortage [b] Poor resource allocation and allocation of tasks to incompetent personnel.	1	Without	-7	Negative moderate
			With	-5	Negative low
<b>Mitigation:</b> [a] Ensure timeous consultation and sourcing of material from local and international suppliers. [b] Ensure correct allocation or positioning of competent project team members.					
<b>Sub-phase: Indirect Impacts</b>					
8	Increased hardened surfaces within the watercourse will result to increased surface water runoff	1	Without	-8	Negative Moderate
			With	-5	Negative low
<b>Mitigation:</b> [a] Under no circumstances must the structures be placed higher than the ground surface thereby creating a drop off that may cause erosion.					

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Sub-phase: Cumulative Impacts				
Cumulative Impacts	1	Without	11	Positive high
		With	13	Positive very high
<p>Cumulative impacts in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities</p> <p>The impacts of the proposed development may not be significant or be a serious threat to the environment but a large number of projects in one area or occurring in the same vegetation type may have significant impacts (DEAT, 2004).</p> <p>Even though the possible extent of the cumulative impacts cannot be determined due to not knowing the number of projects that will be accepted, it is still important to try and identify the negative and positive impacts which may arise and this includes looking at this project in conjunction with other projects in the area.</p> <p>Improved safety for road users in Mbecuka area and connection between the Mcadolo and Thundeza may increase accessibility and lead to increased/ mushroomed developments.</p> <p><b>Mitigation:</b> The development will promote accessibility which can only have a positive impact in terms of socio-economic opportunities as well as safety.</p>				
Average without mitigation			-6.5	Negative Moderate
Average with mitigation			0	Neutral

TABLE 21: PLANNING PHASE IMPACT ASSESSMENT – NO-GO

No.	Impact	Alternative	Mitigation	Significance = E+D+I+P	Interpretation
<b>Phase: Planning and Design - No-go</b>					
1	The status quo would remain, and the short-term impacts will not occur	1	N/A	12	Positive very high
<b>Mitigation:</b> N/A					
2	Maintaining the status quo would also mean that the provincial and local departments will not be able to plan for socio-economic opportunities.	1	N/A	-12	Negative very high
<b>Mitigation:</b> The development should be planned for ensure economic growth.					
3	The condition of unsafe walkways and driveways at Mcadolo to Thundeza and Mbecuka will remain as they are. There will be no connection between Mcadolo and Thundeza and residents will remain at risk with limited access to facilities on either side of the watercourse.	1	Without	-11	Negative high
<b>Mitigation:</b> The development should be planned carefully to ensure that safety is addressed adequately.					
Average without mitigation				-3.7	Negative Low
Average with mitigation				0.0	Neutral

TABLE 22: CONSTRUCTION PHASE IMPACTS – PEDESTRIAN AND VEHICULAR BRIDGE

Consultation Basic Assessment Report for the construction of Mcadolo to Thundeza pedestrian Bridge (Ward 11) and Mbecuka vehicular bridge (Ward 29), KwaZulu Natal

No.	Impact	Alternative	Mitigation	Significance = E+D+I+P	Interpretation
<b>Phase: Construction of pedestrian and vehicular bridge</b>					
<b>Sub-phase: Direct Impacts</b>					
1	Loss of vegetation communities	1	Without	-10	Negative high
			With	-6	Negative Moderate
<p><b>Mitigation:</b> The scope of work does not involve clearance of vegetation and none exist within the construction footprint, it is important however to assess impacts that the project might have. The working strip required for the construction of the facilities must be effectively monitored to prevent vegetation removal. By maintaining the maximum amount of stabilising vegetation, the extent of erosive action will be contained.  [a] Vegetation clearing, and trampling must be avoided; [b] Existing roads must be used where feasible [c] Alien vegetation is likely to invade in areas where biological disturbance took place, the area should be actively managed to prevent the growth of alien invasive species.</p>					
2	Soil stripping and excavation: Impacts involve compaction of the soil and loss of topsoil. Topsoil contains most organic matter and decomposed organisms and nutrients; thus, the removal of the topsoil constitutes a major loss in terms of ecosystem function.	1	Without	-10	Negative high
			With	-4	Negative low
<p><b>Mitigation:</b> [a] The proposed sites for development are such that no access routes are feasible, it is therefore recommended that the excavated area are demarcated and do not remain open for extended periods, this will warn the public of the inherent dangers and enhance safety for road users and livestock grazing in close proximity to the site. [b] Topsoil must not be stockpiled for an extensive period (&gt; 3 months). This is to prevent the redundancy of the existing seed bank as well as the alteration of the soil characteristics (permeability, bulk density etc.). [c] Should any artefacts of archaeological significance be exposed during excavation, work on the area where the artefacts were found, shall cease immediately and the ECO shall be notified as soon as possible. Upon receipt of such notification, the ECO will arrange for the unearthed artefact to be examined by qualified personnel and or relevant provincial authority. [d] Under no circumstances shall archaeological artefacts be removed, destroyed or interfered.</p>					
3	Negative ecological impacts on the aquatic environment, wetlands and associated biodiversity of the watercourse during construction work. Impacts involve altering the characteristics of the watercourse consequently impact aquatic life present therein.	1	Without	-12	Negative high
			With	-5	Negative low
<p><b>Mitigation:</b> [a] Restricting all construction activities for bridge structures to the construction area; this mitigation measure will minimize damage to watercourse. In the event that the impact occurs corrective actions as per the EMP are to be implemented to ensure that the occurrence ceases. [b] No harvesting of riparian vegetation and any other vegetation in close proximity to the proposed site. [c] Biodiversity of the watercourse should be protected, animal killing for any purpose is impermissible. [d] Mixing of concrete should not be undertaken on bare grounds and concrete remains should be cleared immediately. [e] Refueling of machinery used on site should not be done near the watercourse. [d] Due to the sensitivity of the project sites, cleaning of material used during construction must not be undertaken on sites.</p>					
4	Hydrocarbons – leakages from petrol/diesel stores and machinery/vehicles, spillages from poor dispensing practices. Oils and grease - leakages from oil/grease stores and machinery/vehicles, spillages from poor	1	Without	-9	Negative Moderate



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	handling and disposal practices. These can cause negative ecological impacts to the natural vegetation in close proximity to the proposed site and riparian.		With	-4	Negative low
	<p><b>Mitigation:</b> The following measures should be implemented in conjunction with the generic pollution prevention measures provided in the Construction EMP: [a] Hazardous storage and refueling areas must be bunded prior to their use on site during the construction period following the appropriate SANS codes. [b] The bund wall should be high enough to contain at least 110% of any stored volume. [c] The surface of the bunded surface should be graded to the center so that spillage may be collected and satisfactorily disposed of. [d] The proper storage and handling of hazardous substances [e.g. Fuel, oil, cement, bitumen, paint, etc.] needs to be administered. [e] Storage containers must be regularly inspected so as to prevent leaks. [f] Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of stormwater.</p> <p>[f] Staff environmental induction must take place prior to construction commencing and any subcontractors utilised must be inducted before starting work onsite. [g] All contractor employees must receive basic environmental awareness training and shall be educated on the requirements of the EMP. [h] The environmental induction training is the responsibility of the project manager and the contractor and should be undertaken by the EO or a suitably qualified person. [i] The ECO must oversee and monitor the induction training to ensure that the training is sufficient, and that adequate training is provided prior to construction commencing. [j] All staff involved in work within the freshwater habitats must receive specific inductions related to the detailed methods statements. [k] All managers, contractors, labourers and personnel involved during the project are to be familiarized with the method statement. [l] It is vital that all personnel are adequately trained to perform their designated tasks to the accepted standards. [m] The ECO must monitor the compliance of the contractors and instruct the Contractors where necessary. [n] The ECO may request that the Project Manager suspend part or all the works if the Contractors repeatedly cause damage to the environment. [o] The suspension should be enforced until such time as the offending actions, procedure or equipment is corrected and the environmental damage repaired. [p] A copy of the method statement will always need to be made available at the construction site offices/site camp.</p> <p>[q] Drip trays should be utilized at all dispensing areas and must be placed under all stationary machinery and or vehicles. [r] No refueling, servicing nor chemical storage should occur within 50 m of the delineated wetland/aquatic habitat or within the 100-year flood line, whichever is applicable. [s] No vehicles transporting concrete, asphalt or any other bituminous product may be washed on site. [t] Vehicle maintenance should not take place on site unless a specific bunded area is constructed for such a purpose. [u] Ensure that transport, storage, handling and disposal of hazardous substances is adequately controlled and managed. [v] Correct emergency procedures and cleaning up operations should be implemented in the event of accidental spillage. [w] If a water pump is required, the water pump must operate inside or on top of a drip tray to prevent any spillage of fuel and limit the risk of soil/water contamination. [x] The drip tray will need to be lined with absorbent pads and checked daily while in use. [y] All equipment to be used within the sensitive working areas [within the channel] must be checked daily for oil and diesel leaks before gaining access to these working areas. [z] An emergency spill response procedure must be formulated, and staff are to be trained in spill response. [aa] All necessary equipment for dealing with spills of fuels/chemicals must be available at the site. [ab] Spills must be cleaned up immediately and contaminated soil/material disposed of appropriately at a registered site. [ac] 44-gallon drums must be kept on site to collect contaminated soil. [ad] These should be disposed of at a registered hazardous waste site. [ae] Fire prevention facilities must be present at all hazardous storage facilities. [af] The Material Safety Data Sheet (MSDS) for all hazardous substance, including hydrocarbon, shall be kept on site. Procedures detailed in the MSDS shall be followed in the event of an emergency situation. [ag] All hazardous chemical substance waste must be disposed of in accordance with the Hazardous Chemical Substances Regulations, 1995 (Regulation 15). [ah] The waste, resulting from the use of hazardous materials, shall be collected by a licenced hazardous waste service provider for disposal at a registered hazardous waste management facility</p>				
5	Alien plant invasion as a result of biological disturbance. Impact include reduced habitat quality and irreparable damage to the ecosystem	1	Without	-7	Negative Moderate
			With	-5	Negative low
	<p><b>Mitigation:</b> [a] Prevention of damage or disturbance to the natural environment; [b] Removal of alien plant invaders which are present in the area, prior to construction [c] Areas with alien vegetation which have not been removed during the construction should be cleared and rehabilitated. This will improve the current status of these areas and also prevent the introduction of alien invasive species in the area. [d] Ongoing monitoring of the project site for inspection of alien plan invasion, eradication of these species should be done as an when required to prevent the spread.</p>				
6	Nuisance caused by Dust and Air pollution during construction of the road	1	Without	-7	Negative moderate
			With	-5	Negative low

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<p><b>Mitigation:</b> [a] The current land use at the Mbecuka site is Road and Road Reserve, the road is unpaved and therefore dust is likely to be generated during construction phase, frequent and effective dust-suppression is advised [b] Dust must be suppressed on the construction site during dry periods by the regular application of water. [c] Water used for this purpose must be used in quantities that will not result in ponding and runoff. [d] Active work areas, stockpiles and loads of soil being transported must be watered to reduce dust. [e] Measure must be taken to immediately mitigate a situation in which excessive fugitive dust is observed. Works being undertaken must be undertaken with caution, or phase down while the source is being actively investigated and suppression measures be implemented. [f] Disturbed soils, slopes and areas of open excavation must be minimised to avoid wind erosion. [g] Limit the height of stockpiles. [h] Diesel exhaust emissions from heavy machinery on site (excavators, front end loaders and hauling trucks) must be controlled and minimised by regular checks and servicing of vehicles. [i] Any construction vehicle found to be emitting excessive smoke should be stopped from the operations for some mechanical attention before it could continue.</p>					
7	Concrete mixing, pouring and disposal practices.	1	Without	-10	Negative high
			With	-6	Negative low
<p><b>Mitigation:</b> [a] Cement/concrete batching is to be located in an area to be hardened and must first be approved by the ECO. [b] No batching activities shall occur directly on the ground. [c] The land surface to be protected from the negative impact that may arise due to concrete mixing activities. [d] Concrete pouring activity to be done in such a way that concrete spillages are avoided. If concrete spills occur, the affected areas must be rehabilitated immediately. [e] Cleaning of concrete mixer chutes only to be done in such way that it does not cause pollution or concrete spillages on to the ground. [f] Concrete remains should be cleared and disposed of appropriately.</p>					
8	Negative ecological impacts on watercourses and wetlands and associated biodiversity in the study area due to illegal dumping of waste material. Impacts involve physical damage to watercourse and wetland habitats and the mortality of aquatic, wetland and terrestrial plants and animals and also impact the aesthetics of the natural environment.	1	Without	-10	Negative High
			With	-5	Negative low
<p><b>Mitigation:</b> [a] Eating areas must not be located within 15 m of the wetland/riparian habitats. [b] Provide adequate rubbish bins and waste disposal facilities on-site and educate/encourage workers not to litter or dispose of solid waste in the natural environment but to use available facilities for waste disposal. [c] Clear and completely remove from site all general waste, constructional plant, equipment, surplus rock and other foreign materials once construction has been completed. [d] Recycling/re-use of waste is to be encouraged. [e] Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly at registered sites by a registered waste management company. [f] No litter, refuse, wastes, rubbish, rubble, debris and builder's wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period, but disposed of at an approved dumping site. [g] The construction site must be kept clean, tidy, and free from rubbish. [h] Provide adequate rubbish bins and waste disposal facilities on-site and educate/encourage workers not to litter or dispose of solid waste in the natural environment but to use available facilities for waste disposal. Litter bins must be equipped with a closing mechanism to prevent their contents from blowing out or animals from accessing the contents. [i] Clear and completely remove from site all general waste, constructional plant, equipment, surplus rock and other foreign materials once construction has been completed. No litter, refuse, wastes, rubbish, rubble, debris and builders waste must be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period. [j] The construction site must be kept clean and tidy and free from rubbish. Empty litter bins weekly [or as required before they reach capacity]. [k] Recycling/re-use of waste is to be encouraged. [l] No solid waste may be burned on site. [m] No building material, soils or rubble is to be disposed of within or close to any watercourse, including rivers, streams and riparian habitats. [n] No burning of waste is allowed on site.</p>					
9	Negative ecological impacts on vegetation and associated biodiversity in close proximity to the proposed site due to invasion by alien plant species resulting from damaged and disturbed habitat near the project area	1	Without	-11	Negative high
			With	-5	Negative low
<p><b>Mitigation:</b> [a] Restricting all construction activities to the construction area; removing alien plant invaders which are present in the vicinity of the construction area; checking the area regularly for new growth of alien plant invaders during the construction and once the proposed project is completed. [b] An on-going monitoring programme must be implemented. This monitoring plan can be incorporated into the routine inspection activities. [c] No weeds to grow in disturbed (rehabilitated) soils. [d] No herbicides to be used on aliens, manual removal is recommended.</p>					

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1 0	All road users are at risk during the construction phase due to exposure to heavy duty vehicles and increased traffic.	1	Without	-8	Negative Moderate
			With	-5	Negative low
<p><b>Mitigation:</b> [a] Social responsibility by the construction staff must be ensured at all times. [b] A safety officer must be delegated specific safety management tasks and the CLO must maintain a regularly open channel of communication with the surrounding homesteads. [c] Furthermore, all applicable safety regulations must be adhered to and clear signage in a local language erected. [d] In areas of open excavation, signage restricting movement is advised and the area must be clearly demarcated. [e] The project sites are currently of use by the Public, it is therefore recommended that temporal crossing structures are provided to ensure that day to day movement of the public is not restricted over the duration of the construction phase. [f] In provision of temporal access routes, no clearance of vegetation is permitted. Use of existing routes is advised.</p>					
1 1	All free roaming livestock are at risk during the construction phase due to exposure to heavy duty vehicles, increased traffic and open excavations.	1	Without	-9	Negative Moderate
			With	-5	Negative low
<p><b>Mitigation:</b> [a] Due care must be taken to protect animals from construction hazards. [b] No animals are to be harmed, snared, or caught and killed. [c] Excavations should not be left open for excessive periods. [d] open excavation should be barricaded using nets high enough to prevent entry of roaming livestock.</p>					
1 2	Noise pollution caused by construction activities and machinery	1	Without	-10	Negative high
			With	-6	Negative low
<p><b>Mitigation:</b> [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; [e] Select vehicle routes carefully at selected intervals to avoid excessive disturbances to the surrounding community; [d] Construction activities must abide by the national noise laws and the municipal noise by-laws with regard to the abatement of noise caused by mechanical equipment. In the absence of bylaws, national regulations on noise control must be complied with; [f] Ensure that the construction vehicles are under the control of competent personnel.</p>					
1 3	Potential for fires	1	Without	-9	Negative moderate
			With	-6	Negative low
<p><b>Mitigation:</b> [a] No open fires to be permitted within the construction footprint. [b] Ensure that no refuse waste is burnt on the site or on surrounding premises. [c] Ensure that all workers on site are aware of the proper procedure in case of a fire occurring on-site. [d] Ensure adequate fire-fighting equipment is available and train workers on how to use it. [e] The statutory requirements of provincial ordinances, municipal by-laws and the National Veld and Forest Fire Act, 1998 [Act No. 101 of 1998] must be complied with. [f] Cooking fires can only be made in controlled designated areas that are assessed prior to use. [g] Firefighting equipment to be placed at strategic areas relevant to the points where cooking fires are allowed. [h] A firebreak has to be created in high risk areas such as camp sites and material storage areas.</p>					
1 4	If runoff and erosion control measure are not effectively implemented by the contractors, erosion rills and gullies may form along the cleared and exposed soils within the construction footprint and lead to increased rates of erosion and sedimentation.	1	Without	-9	Negative Moderate
			With	-6	Negative low
<p><b>Mitigation:</b> [a] Unnecessary clearing of flora resulting in exposed soil prone to erosive conditions to be avoided. [b] Trees or existing grass strata outside of the construction corridor not to be removed as they will reduce the destructive force of water which can cause erosion. [c] Indigenous vegetation that does not interfere with the construction activities, to be left undisturbed. [d] All cleared areas must be ripped and rehabilitated after construction. [e] The top 200mm layer of topsoil must be removed and stockpiled in small heaps and replaced on the construction areas once the activities have been completed. [f] The affected areas have to be replanted with a grass mixture indigenous to the area. [g] The eradication of any alien vegetation to be followed by replacement with indigenous vegetation as soon as possible to ensure quick and sufficient coverage of exposed soil.</p>					
<b>Sub-phase: Indirect Impacts</b>					

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	Health and safety	1	Without	-6	Negative low
			With	11	Positive high
1 5	<p><b>Mitigation:</b> [a] The Contractor shall comply with all standard and legally required health and safety regulations as promulgated under the Occupational Health and Safety Act and associated regulations. [b] Programs raising awareness on COVID-19 should be undertaken [c] Number of labourers should be kept to a minimum where possible. [d] All personnel coming to site must be cleared of Flu-like symptoms. [e] Temperature screening to be done on site and upon arrival of each personnel. [f] Attendance register for all coming to site or site office including vehicle details should be kept at all times. [g] Personal Protective Equipment to be supplied to all employees and should be worn at all times. [h] Work tools such as spades and other hand-held tools should be cleaned after every use. [i] No cluster of people working closed together should be allowed. [j] Official training in the correct fit, use, care, storage, and limitations of all Personal Protective Clothing, Respiratory and Hearing Equipment must be given to the employees.</p>				
1 6	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	-6	Negative low
			With	-4	Negative low
<p><b>Mitigation:</b> [a] To as great an extent as possible, local labor must be sourced. [b] The CLO must be regularly engaged, and the community must be encouraged to work together to limit any possible crime.</p>					
<b>Sub-phase: Cumulative Impacts</b>					
1 7	<p>Cumulative impacts in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.</p> <p>The impacts of the proposed development may not be significant or be a serious threat to the environment but a large number of projects in one area or occurring in the same vegetation type may have significant impacts (DEAT, 2004).</p> <p>Even though the possible extent of the cumulative impacts cannot be determined due to not knowing the number of projects that will be accepted, it is still important to try and identify the negative and positive impacts which may arise and this includes looking at this project in conjunction with other projects in the area.</p> <p>Currently, there are no developments being undertaken on the proposed site or in close proximity to the proposed site. Based on the findings of the site investigations, there seems to be no evidence of detrimental impacts attributed to the previous developments that occurred on site. However, there is livestock grazing near the site and within the construction footprint, the activity associated with trampling could potentially lead to loss of vegetation communities and increased soil compaction.</p>	1	Without	-9	Negative moderate
			With	-6	Negative low
<p><b>Mitigation:</b> [a] Vegetation clearing, and trampling must be kept to a minimum. [b] Existing roads must be used where possible</p>					
1 8	There is minimal littering observed on site. This impacts on the aesthetics of the site. Mismanagement of waste generated during construction phase could increase the significance measure after [mitigation] from negative low to negative moderate or high.	1	Without	-8	Negative moderate
			With	-5	Negative low
<p><b>Mitigation:</b> [a] Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on site is placed, dumped or deposited inappropriately during or after the construction period of the project. [b] Litter generated by the construction crew must be collected in designated rubbish bins that are securely covered and disposed of weekly at registered waste disposal sites. [c] The construction site must always be kept in a clean and orderly state. [d] No waste shall be retained on site for a period exceeding 14 days. Waste containers must be emptied frequently to avoid rodents, insects or any other organisms accumulating on the site and becoming a health hazard to adjacent properties.</p>					

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Average for construction of vehicular and pedestrian bridges without mitigation			-8.3	Negative moderate
Average for construction of vehicular and pedestrian bridges with mitigation			-4.3	Negative low

TABLE 23: CONSTRUCTION PHASE IMPACT ASSESSMENT – NO-GO

No.	Impact	Alternative	Mitigation	Significance = E+D+I+P	Interpretation
<b>Phase: Construction - No-go</b>					
1	The status quo would remain, and the short-term impacts will not occur <b>Mitigation:</b> N/A	1	N/A	13	Positive very high
2	Maintaining the status quo would also mean that the provincial and local departments will not be able to plan for socio-economic opportunities. <b>Mitigation:</b> The development should be planned for ensure economic growth.	1	N/A	-13	Negative very high
3	The condition of unsafe walkways or connection between two areas and unsafe driveways will remain. <b>Mitigation:</b> The development should be planned carefully to ensure that safety is addressed adequately.	1	Without	-12	Negative high
Average without mitigation				-4.0	Negative Low
Average with mitigation				0.0	Neutral

TABLE 17: CONSTRUCTION: SOCIOECONOMIC IMPACTS

No.	Impact	Alternative	Mitigation	Significance = E+D+I+P	Interpretation
<b>Phase: Construction – Socioeconomic impacts</b>					
1	Employment opportunities	1	Without	5	Positive low
			With	10	Positive high
<b>Mitigation:</b> [a] Employment should be managed by selecting suitable employees according to a selection system that ensures transparent recruitment from local and impacted communities. This will ensure a fair recruitment process. [b] Human Resources policies and procedures should be developed and implemented to ensure that recruitment is done in a fair and transparent way, and that job creation opportunities are maximised. [c] Attention should be paid to employment opportunities for women and disabled persons. [e] Local employment opportunities should be maximised, with appropriate skill transfers for outside or migrant workers to pass those skills onto local workers					
2	Local economic development	1	Without	6	Positive low
			With	9	Positive moderate
<b>Mitigation:</b> [a] Business opportunities should be advertised in order for the community members to be informed about opportunities in the area.					
Average without mitigation				5.5	Positive Low
Average with mitigation				10	Positive high

TABLE 18: CONSTRUCTION: SOCIOECONOMIC: NO-GO

Consultation Basic Assessment Report for the construction of Mcadolo to Thundeza pedestrian Bridge (Ward 11) and Mbecuka vehicular bridge (Ward 29), KwaZulu Natal

No.	Impact	Alternative	Mitigation	Significance = E+D+I+P	Interpretation
<b>Phase: Construction - No-go</b>					
1	The status quo would remain with no resultant employment opportunities	1	N/A	-6	Negative low
<b>Mitigation:</b> N/A					
2	The status quo would remain with no resultant business opportunities	1	N/A	-6	Negative low
<b>Mitigation:</b> The development should be planned for to ensure economic growth.					
Average				-6	Negative Low

TABLE 24: OPERATION PHASE IMPACT ASSESSMENT – PEDESTRIAN AND VEHICULAR BRIDGES

No.	Impact	Alternative	Mitigation	Significance = E+D+I+P	Interpretation
<b>Phase: Operational – Pedestrian and vehicular bridges</b>					
<b>Sub-phase: Direct Impacts</b>					
1	Degradation, loss and fragmentation of habitat with regards to the secondary effects of vegetation disturbance, including but not limited to: erosion risk and encroachment/colonisation of terrestrial habitats by Invasive Alien Plants. Possible ecological consequences associated with this impact may include: [a] Reduction in representation and conservation of vegetation types/communities; [b] Reduction/loss of habitat for fauna; and [c] Reduction in and/or loss of species of conservation concern [i.e. rare, threatened/endangered species.	1	Without	-11	Negative high
			With	-6	Negative low
<b>Mitigation:</b> [a] Removal of vegetation must be kept to a minimum. [b] Workers must be regularly trained. [c] Machinery must be operated with responsibility.					
2	Increased hardened surfaces within the watercourse will result to increased surface water runoff but more significantly, it will result in increased runoff velocities at discharge points that will become areas at risk from erosion	1	Without	-9	Negative moderate
			With	-6	Negative low
<b>Mitigation:</b> [a] Outlet erosion protection structures must be designed to reduce outflows to energy levels that do not pose an erosion risk to downslope soils. [b] Outlet erosion structures must be properly installed along grade and elevation of the slope. [c] Under no circumstances must the structures be placed higher than the ground surface thereby creating a drop off that may cause erosion.					
3	The constructed bridges will enhance safety of users.	1	Without	11	Positive high
			With	14	Positive very high
<b>Enhancement:</b> The construction of pedestrian and vehicular bridges will increase the safety of citizens during flooding. The design of bridges will be made such that the bridges are able to withstand storms without posing threat to livelihood					
4	Pollution of soil, water and vegetation This refers to the alteration or deterioration in the physical, chemical and biological characteristics of water, soil and air resources which inevitable impacts on vegetation.	1	Without	-10	Negative high
			With	-6	Negative low

Consultation Basic Assessment Report for the construction of Mcadolo to Thundeza pedestrian Bridge (Ward 11) and Mbecuka vehicular bridge (Ward 29), KwaZulu Natal

<b>Enhancement:</b> The vehicular and pedestrian bridges must be maintained responsibly by the local authority to mitigate against littering and pollution which could lead to prolonged pollution.					
5	Educational facilities would become accessible to Thundeza residents as there will be a connection between Mcadolo and Thundeza. Mcadolo being the only neighboring residential area with an educational facility.	1	Without	11	Positive high
			With	15	Positive very high
<b>Enhancement:</b> Overall the development will lead to beneficial impacts for the indigent area.					
<b>Sub-phase: Indirect Impacts</b>					
6	Impact to species of conservation concern-Activities involving the clearing/harvesting of natural vegetation could result in the destruction or loss of plants and animal species of conservation significance.	1	Without	-11	Negative high
			With	-6	Negative low
<b>Mitigation:</b> [a] No clearing of vegetation and harvesting should be allowed within the construction footprint and within 500m radius of the proposed site. [b] No animals are to be harmed, snared, or caught and killed. [c] Use of existing roads is recommended as this will avoid fragmentation of natural habitats and consequently habitat loss. [d] Construction of access roads should be avoided to limit unnecessary clearance of natural vegetation.					
Average without mitigation				-3.1	Negative low
Average with mitigation				1	Positive low

TABLE 20: OPERATIONAL PHASE IMPACT ASSESSMENT – NO-GO

No.	Impact	Alternative	Mitigation	Significance = E+D+I+P	Interpretation
<b>Phase: Operational - No-go</b>					
1	The status quo would remain, and the short-term impacts will not occur	1	N/A	13	Positive very high
<b>Mitigation:</b> N/A					
2	Maintaining the status quo would also mean that the provincial and local departments will not be able to plan for socio-economic opportunities.	1	N/A	-13	Negative very high
<b>Mitigation:</b> The development should be planned for ensure economic growth.					
3	The condition of the walkways and driveways will remain unsafe for users	1	Without	-12	Negative high
<b>Mitigation:</b> The development should be planned carefully to ensure that safety is addressed adequately.					
Average without mitigation				-4.0	Negative Low
Average with mitigation				0.0	Neutral

TABLE 21: DECOMMISSIONING PHASE IMPACT ASSESSMENT – ALL ASPECTS

No.	Impact	Alternative	Mitigation	Significance = E+D+I+P	Interpretation
<b>Phase: Decommissioning</b>					
Not Applicable					

## 6. STUDY FINDINGS AND CONCLUSIONS

### 6.1. ENVIRONMENTAL IMPACT STATEMENT

#### 6.1.1. Introduction

Potential environmental impacts [biophysical and social] associated with the proposed construction of Mcadolo to Thundeza pedestrian bridge and Mbecuka vehicular bridge in the Port Shepstone area of 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.

**TABLE 22: SUMMARY OF IMPACTS**

Impact	Significance without mitigation	Significance with mitigation
Watercourse ecology	Low	Low
fauna and flora	Low	Low
Noise and air quality	Low	Low
Waste management	Low-Medium	Low
Heritage	Low	Low
Soil and erosion	Low-Medium	Low
Socio-economic safety and security	Low	Medium
Rehab	Low-Medium	Low

#### 6.1.2. Key Findings of the Study

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

The socio-economic impacts are however strongly positive, in that the development will result in safe conditions for the receiving community.

The following are key findings and recommendations of the impact assessment.

#### 6.1.3. Key Conclusions and Recommendations of the Specialist Studies

##### 6.1.3.1. Wetland and Aquatic Impact Assessment

##### *Culvert and bridge design recommendations*

- Culvert inverts should be buried one quarter of the rise below the average natural stream bed.
- Culverts should be designed with adequate capacity to carry maximum design flows without creating surcharge or backwater conditions.
- Reno mattresses must be installed at the outlet of each culvert or bridge



### *Stormwater management*

The following key design considerations for road stormwater management are recommended (where not already included in the SANRAL Drainage Manual):

- All stormwater discharges into the terrestrial environment must be attenuated at discharge points.
- Such attenuation infrastructure must ideally be located at least 30m away from any delineated watercourse. The longer the distance the better.
- Vegetated swales/side drains must be used to convey stormwater rather than concrete lined channels or V-drains. These features should be well vegetated with appropriate species and stabilized with reno mattresses or rock packs to prevent erosion and vertical incision.
- Stormwater structures susceptible to erosion must be bolstered with rocks.
- Road runoff must be discharged into the terrestrial habitat at regular intervals to reduce the risk of soil erosion at discharge points.

### *Construction footprint limitation and demarcation*

- Prior to commencement of construction, the construction footprint within the riparian must be demarcated using wooden pegs and an orange safety net.
- The demarcation fence must be signed off by the Environmental Control Officer (ECO).
- The fence must be maintained throughout the construction phase.

### *River diversion mitigation measures*

- The river must be diverted for the shortest period of time.
- It is recommended to use a river diversion method that requires the least alteration of the riverbed and bank structure.
- Water must be diverted via a non-motorised large diameter flume pipe.
- Water impounding behind the diversion structure must be minimised.

### *Bridge construction mitigation measures within the watercourse*

- All work to be done within the watercourse must be carried out at a time of low flow conditions (winter to early spring). It is prudent however to be prepared for increased flows by scheduling work according to the weather forecast and to have a contingency plan for unexpectedly large runoff from a sudden storm.
- The use of heavy equipment within the instream and wetland habitat should be avoided. The operation of heavy equipment should be confined to dry stable areas such the road.

### *Soil erosion control measures*

- Prior to commencement of construction, a silt fence / curtain must be installed downstream of the construction footprint but within the riverbed, where necessary.
- The silt fence / curtain must be maintained regularly to ensure that they function effectively.
- After every rainfall event, the contractor must check the site for erosion damage and immediately repair any damage recorded.

### *Soil management*

- Prior to commencing with earthworks, the topsoil must be stripped and stockpiled separately from subsoil.
- Topsoil must be kept for use during rehabilitation of landscaped areas.
- Topsoil must be stockpiled in stockpiles not exceeding 2m in height.
- All stockpiles must be kept free of weeds and invasive alien plants.
- If at risk of being eroded, all stockpiles must be secured with sandbags around the base of the soil stockpile.
- All stockpiles must be established outside the 30m buffer of all watercourses and on flat ground.
- There shall be no mining of any aggregate

#### *Pollution prevention measures*

- Any soil contaminated by hydrocarbons (fuel and oils) must be removed and the affected area rehabilitated immediately.
- Chemical toilets must be provided to workers during the construction phase. A single chemical toilet must be provided for every 10 employees.
- Chemical toilets must be serviced regularly by a registered service provider and waybills must be retained as proof of servicing.
- Chemical toilets must be placed at least 30m away from delineated watercourses.
- Fuel must be stored in a bunded structure with a roof. The bund must be able to contain at least 110% of the volumes of fuel.
- Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface.
- Drip trays should be utilised at all dispensing areas.
- A chemical spill kit must be present onsite at all times and once used it must be disposed of at a registered hazardous landfill site.
- All solid waste must be collected and placed in bins.
- All waste generated during construction is to be disposed of at registered landfill.

#### *6.1.3.2. Vegetation Impact Assessment*

##### *Vegetation protection mitigation measures*

- Vegetation clearing must be undertaken as and when necessary.
- The entire construction area must not be stripped of vegetation prior to commencing construction activities.
- Disturbed sites must be rehabilitated as soon as construction in an area is complete or near complete and not left until the end of the project to be rehabilitated.

##### *Invasive alien plant control*

- The control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs in.
- All invasive alien plants (IAPs) must be removed from the construction area.

- Mechanical control methods such as digging, hoeing, pulling out of weeds and invasive plants are recommended.
- Use of chemical treatment methods must be kept to a minimum.
- Where chemical treatment methods are used, the contractor must ensure that he uses watercourse friendly herbicides.
- The methods employed to control and eradicate a listed invasive species must also be directed at the new growth, propagating material and re-growth of such invasive species in order to prevent such species from reproducing, forming seed, regenerating or re-establishing itself in any manner.

#### 6.1.4. *Sensitivity Map (Appendix J)*

The following map consolidates the sensitivities of the study area as identified in the BA process and by each of the specialist studies. The sensitivity map must be considered when assessing this application, noting that each of these sensitivity findings have been addressed and mitigation measures have been provided for any possible impacts associated with these areas of sensitivity.

#### 6.1.5. EAP Opinion

This BAR provides an assessment of both the benefits and potential negative impacts anticipated as a result of the proposed construction of Mcadolo to Thundeza pedestrian bridge and Mbecuka vehicular bridge in the Port Shepstone area, KwaZulu-Natal.

Based on the findings of environmental impact assessment, there is unlikely to be any significant negative environmental impacts and the socio-economic benefits are evident. Mitigation measures contained herein have been informed by the extent, nature, duration and probability of impacts identified. Implementation of mitigation measures and conditions of the Environmental Management Programme appended to this document which is intended for the management of the impacts of construction of the proposed project and operation thereof, will result to minimal impacts attributed to the proposed project. Assessment findings, therefore, present no fatal flaws; the development will have long term positive impacts than negative impacts, the latter of which are short termed.

The following recommendations / conditions, although not exhaustive, may be considered for inclusion in the environmental authorisation:

- An Environmental Control Officer (ECO) must be appointed to oversee that the aspects stipulated in the Environmental Authorization are carried out properly
- Preconstruction environmental awareness training for all construction staff on site to ensure that basic environmental principles are adhered to
- The areas to be cleared as well as the construction area should be clearly demarcated
- All construction vehicles should adhere to clearly defined and demarcated roads
- Dust suppression and erosion management should be an integrated component of the construction approach
- No dumping of building waste or spoil material from the development should take place on areas other than a licenced landfill site or spoil site approved by the engineer
- All hazardous materials should be stored appropriately to prevent contamination of the project site. Any accidental chemical, fuel and oil spills that occur at the project site should be cleaned up appropriately as related to the nature of the spill; significant spills to be reported to the relevant department
- Weed control measures must be applied to eradicate the noxious weeds (category 1a & 1b species) on disturbed areas
- Rehabilitation plan must be costed for in tender documents

#### 6.1.6. 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.

### 6.1.7. Assumptions, Gaps and Limitations of the study

The BA process followed the legislated process required and as governed and specified by the EIA Regulations [2014 as amended in 2017]. Inevitably, when undertaking scientific studies, challenges and limitations are encountered. For this specific BA, the following challenges were encountered:

The information and recommendations contained herein are based upon information provided by the client and the assumption that all relevant information has been provided by all relevant sources consulted for requisition of such information. Furthermore, field investigation work has been restricted to a level of detail that satisfies the objectives of the study.

The document has been development with due reference to the following:

- Site visits and assessments
- Information on biophysical environment
- Information on the proposed works
- Recommendations from the Authorities

#### 6.1.7.1. Wetland and Aquatic Impact Assessment

The following assumptions and limitation are applicable to the wetland impact assessment study:

- Desktop delineation was undertaken using 5m and 10m contours, latest aerial imagery, and the latest Google Earth Imagery. Any vegetation changes may have influenced the accuracy of the delineation.
- The slope gradient was calculated using 5m and 10m contour lines which might not be very accurate.
- The handheld GPS device used has an accuracy of 3m.
- All literature and datasets used were accurate at the time of compiling this report.
- No technical specifications for the Mbecuka vehicular bridge were provided to the specialist at the time of compiling this report.

### 6.1.8. Recommendations

#### 6.1.8.1. Recommendations to the CA

It is advised that the application be assessed holistically, taking into consideration the study areas and the fact that the development at Mbecuka proposed site is confined to existing roads and servitudes required in order to meet the transportation and infrastructure planning needs of the area. The impacts associated with the proposed developments are significantly low.

**The project, in the EAP's opinion, does not pose a detrimental impact on the receiving environment and its inhabitants and can be mitigated to acceptable levels.**

The Applicant should be bound to stringent conditions to maintain compliance and a responsible execution of the project.

The construction period is planned to commence on the 15<sup>th</sup> February 2021 and span 7 months till the 15<sup>th</sup> of October 2021. The Environmental Authorisation [EA] is therefore requested to accommodate any unforeseen delays.

No post-construction monitoring is specified in this BA; however, it remains the duty of the Applicant to ensure the infrastructure is kept in sound condition.

#### 6.1.8.2. Recommendations to the Applicant

The Applicant must adhere to the recommendations provided by the specialist and the EAP. The EMPr details these recommendations.

The Applicant must take full responsibility for the execution of the project in a manner which does not negatively impact on the environment by ensuring that responsible decisions are made.

## 6.2. 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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L Jilimane [EAP]