

Basic Assessment Report



edtea

Department :

Economic Development, Tourism and
Environmental Affairs

PROVINCE OF KWAZULU-NATAL

(For official use only)

EIA File Reference Number:
NEAS Reference Number:
Waste Management Licence Number:
(if applicable)
Date Received:

DC24/0002/2014

KZN/EIA/0001441/2014

FINAL BASIC ASSESSMENT REPORT

Submitted in terms of the Environmental Impact Assessment Regulations, 2010 promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

This template may be used for the following applications:

- **Environmental Authorization** subject to basic assessment for an activity that is listed in Listing Notices 1 or 3, 2010 (Government Notices No. R 544 or No. R 546 dated 18 June 2010); or
- **Waste Management Licence** for an activity that is listed in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) for which a basic assessment process as stipulated in the EIA Regulations must be conducted as part of the application (refer to the schedule of waste management activities in Category A of Government Notice No. 718 dated 03 July 2009).

Kindly note that:

1. This **basic assessment report** meets the requirements of the EIA Regulations, 2010 and is meant to streamline applications. This report is the format prescribed by the KZN Department of Agriculture & Environmental Affairs. Please make sure that this is the latest version.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with text.
3. Where required, place a cross in the box you select.
4. An incomplete report will be returned to the applicant for revision.
5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it will result in the rejection of the application as provided for in the regulations.
6. No faxed or e-mailed reports will be accepted.
7. The report must be compiled by an independent environmental assessment practitioner ("EAP").
8. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
9. The KZN Department of Agriculture & Environmental Affairs may require that for specified types of activities in defined situations only parts of this report need to be completed.
10. The EAP must submit this basic assessment report for comment to all relevant State departments that administer a law relating to a matter affecting the environment. This provision is in accordance with Section 24

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O (2) of the National Environmental Management Act 1998 (Act 107 of 1998) and such comments must be submitted within 40 days of such a request.

11. **Please note that this report must be handed in or posted to the District Office of the KZN Department of Agriculture & Environmental Affairs to which the application has been allocated (please refer to the details provided in the letter of acknowledgement for this application).**

DEPARTMENTAL REFERENCE NUMBER(S)

File reference number (EIA):	DC24/0002/2014: KZN/EIA/0001441/2014
File reference number (Waste Management Licence):	

SECTION A: DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

1. NAME AND CONTACT DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Name and contact details of the EAP who prepared this report:

Business name of EAP:	Kinvig & Associates (PTY) Ltd		
Physical address:	Suite 3 Park Village Suites, Victoria Country Club Estates, 170 Peter Brown Drive, Montrose, 3231		
Postal address:	PO Box 1287, Hilton		
Postal code:	3245	Cell:	083 463-2919
Telephone:	033 347-1402	Fax:	086 678-4647
E-mail:	richard@kaec.co.za		

2. NAMES AND EXPERTISE OF REPRESENTATIVES OF THE EAP

Names and details of the expertise of each representative of the EAP involved in the preparation of this report:

Name of representative of the EAP	Education qualifications	Professional affiliations	Experience at environmental assessments (yrs)
Richard Kinvig	Ph.D. Zoology & Entomology Professional Natural Scientist: Biological Sciences	IAIAsa & Pr. Sci. Nat.	12

3. NAMES AND EXPERTISE OF SPECIALISTS

Names and details of the expertise of each specialist that has contributed to this report:

Name of specialist	Education qualifications	Field of expertise	Section/ s contributed to in this basic assessment report	Title of specialist report/ s as attached in Appendix D
B.C. Lynn & A.S Zwiers	M.Sc. in Engineering Geology, Durham University, England (1973)	Geotechnical assessment	Section C – 2	Report to Royal Haskoning DHV on the results of the geotechnical investigation for the proposed

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	<i>Pr.Sci.Nat.</i> : Professional Natural Scientist (1984)			Tugela Ferry River Bridge No. 3595, KwaZulu-Natal
Bruce Scott- Shaw	MSc Hydrology (UKZN)	Wetland and Riparian Assessment Report	Section C – 4	Watercourse Assessment
Nick Rivers- Moore	Ph.D. Hydrology University of Natal	Aquatic Assessment		Aquatic Assessment
Gavin Anderson	M. Phil in Archaeology/Social Psychology	Heritage impact assessment	Section C – 6	Desktop Heritage Survey of the Proposed Tugela Ferry Bridge
Stephen Jaya	BSc(Eng) (Civ) MSc (Brg Eng) PrEng MECZ	Engineering input		Extracts of Prelim Report to Environmentalist - Tugela River Bridge on P6 at Tugela Ferry

SECTION B: ACTIVITY INFORMATION

1. PROJECT TITLE

Describe the project title as provided on the application form for environmental authorization:

The proposed Construction of the Tugela River Bridge at Tugela Ferry, Msinga Local Municipality, Umzinyathi District Municipality, KwaZulu-Natal

2. PROJECT DESCRIPTION

Provide a detailed description of the project:

“The KwaZulu-Natal Department of Transport proposes to construct a new bridge at Tugela Ferry. Currently the P6 passes through Tugela Ferry via the existing bridge, which is a single lane structure. This causes significant traffic back up on either side of the bridge as vehicles have to give way to each other. Further there are significant safety issues as the Traffic Lights that govern the flow of traffic over the current bridge do not function and thus the road user’s safety is put in jeopardy every time they cross the bridge. The new double lane bridge, with an additional pedestrian use area (demarcated by a concrete wall to prevent access by pedestrians onto the vehicle lanes) will be located 15 metres (m) upstream of the existing bridge.

The new road and bridge will impact on the following private properties / enterprises: a house; a butcher shop on the north side of the Tugela River and a gauging station situated upstream of the proposed bridge development on the north bank of the Tugela River.

The gauging station is currently positioned 20 metres (m) upstream of the existing Tugela Ferry Bridge structure. The gauging station has been decommissioned and the equipment has

been relocated a new gauging station further upstream. The proposed construction activities will not impact on the new gauging station.

The bell-mouth of Main Road P6 and District Road D1272 will have to be re-designed and re-configured to facilitate the new north bound lane required to assist with traffic flows.

The upstream area of the south bank has limited development at present. The approach road can easily be linked into the existing main road, P6. An access road will have to be constructed to facilitate access to properties situated on the south river bank, and are currently accessed by a rural side road, which is currently un-registered.

From the site visit undertaken by the Environmental Assessment Practitioner it was established that more properties will be required to be relocated if the proposed bridge is positioned downstream of the existing bridge structure. It was identified that the existing Shell garage will require relocation as the south bound traffic and garage vehicles will interfere with each other, resulting in congestion and a hazardous scenario for road users and pedestrians alike.

In the preliminary engineering report it was established that the placement of a new structure on the downstream side of the existing bridge would reduce the turning radius of the approach curve on the south bound lane to levels which are not acceptable in terms of the standard road and bridge design manuals.

The above information was provided by the Engineer in the Preliminary report.

Storm water Management Plan

“On the bridge 75 mm diameter scupper pipes will be provided at 4 metre intervals. These will discharge the storm water, which accumulates on the bridge deck, directly into the main river channel.

Kerbs and channels will be provided at all cross-roads; there is a cross road on the south bank and another on the north bank. The road length under consideration is less than 200 m hence intermediate outlets are not considered necessary and thus have not been designed for. The channels and median drains constructed for storm water will discharge at outlets located at the bridge abutments along the median between the old and new bridges.

All channels will be protected against the potential for erosion to occur by a series of anti-erosion measures, *inter alia*: concrete lining, rip-rap, stone pitching or prefabricated paving blocks. Gabions must be provided where required. Scour protection at outlets must be provided where all chutes are created for the purposes of being outlets for storm water pipes.”

The above information was provided by the Engineer in the Storm water Management Plan (Stephen Jaya)

Alternatives

1. Site alternatives

Two alternative site positions were considered.

1.1 Site Option 1 (Preferred)

Position the new structure about 15 metres upstream of the existing bridge. This is the preferred option.

- Working at a distance of approximately 15 m upstream of the existing structure would affect a house and a butcher shop on the north side and a gauge station on the upstream north bank.
- The upstream south bank has limited development and the road from the proposed north bound lane of the bridge can easily feed and link to the existing alignment of main road P6.
- An access road will have to be constructed to provide access to the property on the southern river bank.

1.2 Site Option 2 (Not preferred)

Construction of the new bridge about 20 m downstream of the existing bridge. This option was rejected based on the following reasons:

- Positioning the new bridge downstream of the existing bridge would result in significant relocations of dwellings, offices and a fuel station on the north bank. These relocations of people as well as operating businesses would require further stringent and extensive environmental impacts to be assessed as well as the development of relocation plans as well as the apportionment of land and compensation for their “forced relocation”.
- From an alignment perspective a new bridge on the downstream side of the existing structure reduces the turning radius of the curve on the south bound lane of the current road where it intersects with the proposed new bridge. The reduction in the geometry of the turning radius is not an acceptable option, for the future utilisers of the bridge and from the current DoT standards for design.

2. Structure options

The preferred position of the new bridge is about 15 m upstream of the existing structure. The actual distance will be determined during detailed design and must take into account the manageability of construction issues. More importantly, this preferred position will ensure that there is no interference between the new structure and the existing structure especially with respect to the founding works and thereafter the piling, deck construction and during the operational phase, maintenance.

The new bridge must aesthetically blend into the surrounding view. The design of the new two lane bridge is a concrete structure which will be constructed at the same height as the existing bridge structure. There will be no additional supports that sit above the main deck, as all the strength required is provided by the supporting piers, and the concrete I-beam / lintel structure proposed to be implemented. The advantage of this design is that there will only be two piers in the main channel, which will align with the existing bridge piers. Two additional piers will be situated in close proximity to the bank, and will fall outside of the main channel (low flow channel). A further pier will be constructed on the embankment on the southern bank, with both abutments being firmly positioned outside of the river channel, which will allow for construction activities to occur throughout the year. In addition, abutments are from an

engineering perspective better situated outside of the flowing river as they can commonly cause vortices and these are able to erode the sifter material utilised to backfill around an abutment.

The following structure option was considered;

Precast Beam and Slab Bridge (Preferred)

The proposed option will see the placement of precast concrete “I-Beam” shaped lintels which will straddle the piers that have been constructed within the river. These I beams will form the basis for the deck which will then be cast *in-situ*. The concrete slab will form the driveable surface.

Steel Girder Structure (Not-preferred)

This option would see the construction of a bridge similar in appearance to the existing bridge. However, due to the size of the bridge requiring to accommodate two lanes as well as a separate pedestrian walkway, the costs, design requirements and the aesthetics were all factors that contributed to this option being the not-preferred option.

The alternatives were provided by the Engineer via email.

No-Go Alternative

The no-go alternative i.e. not constructing a bridge over the Tugela River.

The traffic situation at Tugela Ferry will become more tenuous. It will reduce the opportunity for an increase in local economic development in and around the area. Without the addition of a new bridge traffic will continue to back-up on either side of the existing one lane bridge. Further this poses a road safety hazard as commuters become impatient and the potential exists for a serious accident to occur on the bridge particularly at night or in poor light conditions. The seriousness of this is compounded by the fact that the signalisation that has been erected (robots) is and has not been working for a significant period of time.

3. ACTIVITY DESCRIPTION

Describe each listed activity in Listing Notice 1 (GNR 544, 18 June 2010), Listing Notice 3 (GNR 546, 18 June 2010) or Category A of GN 718, 3 July 2009 (Waste Management Activities) which is being applied for as per the project description:

GNR 544 (11)	<p><i>The construction of:</i></p> <ul style="list-style-type: none"> <i>(iii) bridges;</i> <i>(vi) bulk storm water outlet structures;</i> <i>(xi) infrastructure or structures covering 50 square metres or more</i> <p><i>Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</i></p>
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	<p>A double lane bridge with an associated pedestrian walkway is proposed to be constructed over the Tugela River. Storm water will be discharged via scupper pipes at four (4) metre intervals, and will discharge directly into the Tugela River, as with the existing structure. This bridge will require that piers are placed in the River channel. In addition, during construction a Cofferdam will be constructed that will redirect the water away from the construction area, as well as provide an area on which the machinery, such as piling machinery and further along in the construction phase, cranes to lift the precast beams into place, will be positioned on the cofferdam to provide access to the piers in the central portion of the main channel.</p>
<p>GNR 544 (18)</p>	<p><i>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from</i></p> <p style="padding-left: 40px;"> <i>(i) a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving</i> <i>(i) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or</i> <i>(ii) occurs behind the development setback line.</i> </p> <p>The Bridge piers will need to be founded on bedrock and thus the material sitting on the bedrock (sediment deposited over time on the river channel bottom will be dredged out. A sleeve will be put in place for the machinery to work in, during the drilling and “chiselling” of the bedrock and for the placement of reinforcing bar and the pouring of the concrete. All of these activities will result in the removal of large quantities of material from the watercourse.</p>

4. FEASIBLE AND REASONABLE 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.

Describe alternatives that are considered in this report. Alternatives should 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 of 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. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its

environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Sections B 5 – 15 below should be completed for each alternative.

5. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. List alternative sites were applicable.

Alternative:	Latitude (S):			Longitude (E):		
	°	'	"	°	'	"
Alternative S1 ¹ (preferred or only site alternative)	28	45	3.21	30	26	33.00
Alternative S2 (if any)	28	45	2.66	30	26	34.51
Alternative S3 (if any)						

In the case of linear activities:

Alternative:	Latitude (S):			Longitude (E):		
	°	'	"	°	'	"
Alternative S1 (preferred or only route alternative)						
• Starting point of the activity	28	45	10.26	30	26	34.14
• Middle point of the activity	28	45	03.02	30	26	33.72
• End point of the activity	28	44	59.36	30	26	33.25
Alternative S2 (if any)						
• Starting point of the activity						
• Middle point of the activity						
• End point of the activity						
Alternative S3 (if any)						
• Starting point of the activity						
• Middle point of the activity						
• End point of the activity						

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 500m along the route for each alternative alignment.

6. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	Size of the activity:
Alternative A1 ² (preferred activity alternative)	1980 m ²

¹ "Alternative S.." refer to site alternatives.

² "Alternative A.." refer to activity, process, technology or other alternatives.

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Alternative A2 (if any)
Alternative A3 (if any)
or, for linear activities:

Alternative:

Alternative A1 (preferred activity alternative)
Alternative A2 (if any)
Alternative A3 (if any)

Length of the activity:

165 m

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:

Alternative A1 (preferred activity alternative)
Alternative A2 (if any)
Alternative A3 (if any)

Size of the site/servitude:

3000 m²

7. SITE ACCESS -

Does ready access to the site exist?

~~YES~~

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

Ready access does exist to the site, however, temporary haul roads will need to be created for construction purposes along existing un-registered tracks to facilitate the machinery being able to gain access to the cofferdam / platform upon which bridge construction will be undertaken from.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

8. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as **Appendix A** to this report.

The site or route plans must indicate the following:

- 8.1. the scale of the plan which must be at least a scale of 1:500;
- 8.2. the property boundaries and numbers/ erf/ farm numbers of all adjoining properties of the site;
- 8.3. the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- 8.4. the exact position of each element of the application as well as any other structures on the site;
- 8.5. the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
- 8.6. walls and fencing including details of the height and construction material;

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- 8.7. servitudes indicating the purpose of the servitude;
- 8.8. sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
 - rivers, streams, drainage lines or wetlands;
 - the 1:100 year flood line (where available or where it is required by DWS);
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation including protected plant species (even if it is degraded or infested with alien species);
- 8.9. for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500 mm contours must be indicated on the plan; and
- 8.10. the positions from where photographs of the site were taken.

9. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under **Appendix B** to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

10. FACILITY ILLUSTRATION

A detailed illustration of the facility must be provided at a scale of 1:200 and attached to this report as **Appendix C**. The illustrations must be to scale and must represent a realistic image of the planned activity/ies.

11. ACTIVITY MOTIVATION

11.1. Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 37,000,000
What is the expected yearly income that will be generated by or as a result of the activity?	R nil
Will the activity contribute to service infrastructure?	YES
Is the activity a public amenity?	YES
How many new employment opportunities will be created in the development phase of the activity?	15
What is the expected value of the employment opportunities during the development phase?	R
What percentage of this will accrue to previously disadvantaged individuals?	65%
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?	R N/A
What percentage of this will accrue to previously disadvantaged individuals?	unknown%

11.2. Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

Presently the P6 passes through the CBD of Tugela Ferry via the existing single lane bridge. Traffic back up on either side of the bridge is a common occurrence as vehicles have to give way to each other. In addition, the signalisation infrastructure that is currently in place does not appear to be working or have worked for a long duration of time. The current situation poses a safety risk to motorists and pedestrians, whom may not always head the precautionary principles and travel at excessive speeds and do not consider other road utilisers. The new bridge will improve the traffic flow as it will work on a counter flow system, i.e. traffic in both directions simultaneously. This will reduce the potential for accidents to happen and reduce road user's frustration and impatience. The benefit that may accrue will potentially be that there will be additional road users making use of this particular road network. A new bridge and a safer route option that will result of the development of the proposed bridge will create increased levels of access to Dundee and other areas of Northern Natal. This has an additional benefit as Northern Natal has a number of popular tourist destinations, such as Isandlwana and Rourke's Drift.

Indicate any benefits that the activity will have for society in general:

The building of another double lane bridge will eliminate the traffic back up as vehicles will be able to cross the river in both directions. The building of another bridge will have economic benefits for the local community as more people will utilise this route as an opportunity to gain access to the hinterland of Northern KZN. The road on the Greytown side of the Tugela is currently undergoing some upgrading and maintenance and this thus aligns with the development of a new double lane bridge.

Indicate any benefits that the activity will have for the local communities where the activity will be located:

The proposed upgrade will provide approximately 15 direct employment opportunities to the local community during the construction phase. In addition, the upgrade will create key linkages which will provide potential opportunities for Local Economic Development of the town of Tugela Ferry and the surrounding community.

12. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline:	Administering authority:	Date:
National Water Act (Act 36 of 1998)	Department of Water Affairs	1998
National Environmental Management Act (Act No. 107 of 1998)	Department of Agriculture and Environmental Affairs	1998
South Africa's Constitution (Act 108 of 1996), specifically the Bill of Rights (Chapter 2, Section 24)	The State	1996
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)	Department of Agriculture and Environmental Affairs & Ezemvelo KZN Wildlife	2004
The National Heritage Resources Act (Act No 25 of 1999 as amended)	Amafa aKwaZulu-Natali	1999

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KwaZulu-Natal Nature Conservation Ordinance 15	KwaZulu-Natal, Department of Agriculture and Environmental Affairs	1974
Integrated Environmental Management (IEM)	Department of Environment, Agriculture	2002
Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)	Department of Agriculture, Forestry, and Fisheries	1983
Fencing Act (No. 31 of 1963)	Department of Agriculture	1963
KwaZulu-Natal Provincial Roads Act (Act No. 4 of 2001)	Department of Transport	2001
Municipal Systems Act (Act No 32 of 2000)	Department of Co-operative Governance and Traditional Affairs	2000
KwaZulu-Natal Planning and Development Act, 2008 (Act No.6 of 2008).	The local authority and COGTA	2008

13. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

13.1. Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES	
5 m ³	

If yes, what estimated quantity will be produced per month?

How will the construction solid waste be disposed of? (describe)

The construction solid waste must be collected in and if possible waste streams separated into demarcated skips placed within the construction camp. Solid waste containers must be made available within the development footprint and the works front. These waste receptacles must be taken to the construction camp at the end of each day and emptied into the skips. The skips must come from a reputable supplier and proof of disposal in the form of a waybill from the Pomeroy Landfill Site (or approved landfill site) must be submitted to the ESO (Environmental Site Officer) for inclusion in the Environmental Site file that will be checked by the ECO. The Environmental Management Programme (EMPr) will make provision for effective monitoring of the construction site to ensure that construction solid waste is adequately managed.

Where will the construction solid waste be disposed of? (provide details of landfill site)

The construction solid waste would be disposed of at the registered Pomeroy Landfill Site. Permission by the contractor must be sought prior to depositing of waste at the Pomeroy Landfill Site.

Will the activity produce solid waste during its operational phase?

NO	
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If yes, what estimated quantity will be produced per month?

How will the solid waste be disposed of? (provide details of landfill site)


Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine the further requirements of the application.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?


YES	
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If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

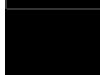
Is the activity that is being applied for a solid waste handling or treatment facility? 

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.


13.2. Liquid effluent

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


If yes, what estimated quantity will be produced per month? 

Will the activity produce any effluent that will be treated and/or disposed of on site? 

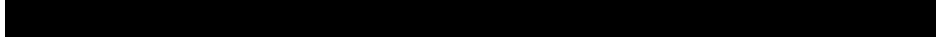
If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

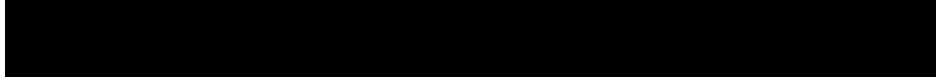
Will the activity produce effluent that will be treated and/or disposed of at another facility? 

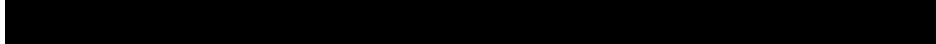
If yes, provide the particulars of the facility:

Facility name: 

Contact

person: 

Postal address: 


Postal code: 

Telephone: 

Cell: 

E-mail: 

Fax: 


Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:


13.3. Emissions into the atmosphere

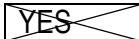
Will the activity release emissions into the atmosphere?  NO

If yes, is it controlled by any legislation of any sphere of government? 

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

If no, describe the emissions in terms of type and concentration:


13.4. Generation of noise

Will the activity generate noise?  YES

If yes, is it controlled by any legislation of any sphere of government?  YES

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

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If no, describe the noise in terms of type and level:

Noise could be generated by the use of construction equipment. Potentially the most significant noise impact will be generated during the founding and piling operations where large scale machinery will be utilised.

The decision has been taken based on the findings of the specialist geotechnical assessments to utilise oscillated piles as these piles are the only suitable type of piles. The benefit thereof is that they create less vibration and noise than precast or driven piles.

Trucks will be running regularly to and from the construction phase to remove spoil material dredged from the river bottom and to bring in materials for the construction of the bridge. Measures to reduce noise will be implemented, *inter alia*: only working during specified work times and regular maintenance of machinery. Additional measures are included in the EMP; and relevant legislation regarding noise levels will be strictly adhered to.

TABLE OF ACCEPTABLE NOISE LEVELS AS PER SANS

Type of district	Daytime ratings level Lr for ambient noise dB (A)	Night time ratings level Lr for ambient noise dB (A)
Sub-urban districts with little road traffic	50	40
Urban districts	55	45

14. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

<input checked="" type="checkbox"/> municipal	<input type="checkbox"/> water board	<input type="checkbox"/> groundwater	<input checked="" type="checkbox"/> river, stream, dam or lake	<input type="checkbox"/> other	<input type="checkbox"/> the activity will not use water
---	--------------------------------------	--------------------------------------	--	--------------------------------	--

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:	48 000 litres
---	---------------

Does the activity require a water use permit from the Department of Water Affairs?	<input checked="" type="checkbox"/> YES
--	---

If YES, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this report.

A General Authorisation for a water use is underway with the Department of Water and Sanitation.

15. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The construction of a bridge is not an energy efficient process and limited opportunities exist when considering the construction thereof. However, the utilisation of preformed concrete beams and other components off-site, may make the process slightly more energy efficient.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

N/A

SECTION C: SITE/ AREA/ PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No.
(e.g. A):

- Subsections 1 - 6 below must be completed for each alternative.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

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

Alternative S2 (if any):

Alternative S3 (if any):

LOCATION IN LANDSCAPE indicate the landform(s) that best describes the site (Please cross the appropriate box).

Alternative S1 (preferred site):

Ridgeline	Plateau	Side slope of hill/mountain	Closed valley	Open valley	Plain	Undulating plains/low hills	Dune	Sea-front
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Alternative S2 (if any):

Alternative S3 (if any):

2. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Has a specialist been consulted for the completion of this section?

YES

If YES, please complete the following:

Name of the specialist:	B.C. Lynn & A.S Zwiars		
Qualification(s) of the specialist:	M.Sc. in Engineering Geology, Durham University, England (1973) Pr.Sci.Nat. : Professional Natural Scientist (1984)		
Postal address:	P.O. Box 586, Kloof		
Postal code:	3640		
Telephone:	031 764 7335	Cell:	
E-mail:	dlpbn@dlp.co.za	Fax:	031 764 7365

Are there any special or sensitive habitats or other natural features present on any of the alternative sites?

YES

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If YES, specify and explain:

The bridge will be constructed over the Tugela River. The Tugela River and surrounding areas are sensitive to erosion, as a result of the shallow soils and the underlying geology of the area.

Further the Tugela River is a sediment driven system and thus changes to its flow will impart impacts even if only impacts of low significance that are able for the most part to be mitigated fully.

Are any further specialist studies recommended by the specialist?

NO

If YES, specify:

If YES, is such a report(s) attached in Appendix D?

YES

NO

Is the site(s) located on any of the following (cross the appropriate boxes)?

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	<input checked="" type="checkbox"/> YES		
Dolomite, sinkhole or doline areas			<input checked="" type="checkbox"/> NO
Seasonally wet soils (often close to water bodies)	<input checked="" type="checkbox"/> YES		
Unstable rocky slopes or steep slopes with loose soil	<input checked="" type="checkbox"/> YES		
Dispersive soils (soils that dissolve in water)			<input checked="" type="checkbox"/> NO
Soils with high clay content (clay fraction more than 40%)			<input checked="" type="checkbox"/> NO
Any other unstable soil or geological feature			<input checked="" type="checkbox"/> NO
An area sensitive to erosion	<input checked="" type="checkbox"/> YES		

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

3. GROUND COVER

Has a specialist been consulted for the completion of this section?

NO

If YES, please complete the following:

Name of the specialist:

Qualification(s) of the specialist:

Postal address:

Postal code:

Telephone:

E-mail:

Cell:

Fax:

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Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites? If YES, specify and explain:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
<i>Aloe marlothii</i> (3) and <i>Aloe maculata</i> ca (50). These species fall within the ordinance namely Schedule 12, however their scarcity and significance are questionable. These plants are exceedingly common around the entire vicinity of Tugela Ferry and within the Tugela River Valley and thus we would not consider them vitally important.	
Are there any special or sensitive habitats or other natural features present on any of the alternative sites? If YES, specify and explain:	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
The bridge will be constructed over the Tugela River. The Tugela River is a sensitive environment however, the vegetation situated within and associated with this proposed development is of limited importance and is not a sensitive vegetation type. The removal of vegetation will exacerbate erosion in sensitive areas.	
Are any further specialist studies recommended by the specialist? If YES, specify:	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If YES, is such a report(s) attached in <u>Appendix D</u> ?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

Signature of specialist: _____ Date: _____

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition ^E	Natural veld with scattered aliens^E	Natural veld with heavy alien infestation^E	Veld dominated by alien species^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an “E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

Input from the EAP regarding the vegetation.

Preamble:

Having undertaken a precursory assessment of the site and having evaluated the information presented by the previous EAP and the vegetation that was recorded in the wetland assessment report it can be concluded that the vegetation at this particular site is of limited to no significance in terms of the conservation and biodiversity significance.

The majority of the vegetation is alien in nature and or pioneer indigenous vegetation. It must be stated however, that all vegetation plays a role in stabilising soils particularly in a riparian area and thus its loss will be required to be managed in an appropriate way.

Based on the commentary provided by *Ezemvelo* KZN Wildlife and DAFF, as well as the EDTEA’s response to the existing in-house specialist undertaking the vegetation assessment, we consider that a specialist study is not required and therefore please view the assessment of the vegetation as a subsidiary report undertaken by individuals with a significant knowledge of

vegetation. The transformed nature of the site and the significant disturbance that is imparted on the receiving environment within the proposed footprint of the site negates the need for a specialist report.

Vegetation Recorded:

During a site visit conducted on 18th May 2015 the development area was determined to be highly degraded and transformed. This is as a result of anthropogenic influences commonly associated with built-up environments, and in areas where poverty is high.

The northern bank is best described as highly disturbed *Cynodon dactylon* and *Eragrostis plana* / *E. curvula* grassed areas. These species have been able to establish and given their pioneer nature and robustness have been able to survive the ongoing disturbance imparted by the surrounding community and their livestock.

The proposed site is dominated by ruderal / pioneer / invasive indigenous graminoids species namely; *Cynodon dactylon* and *Eragrostis curvula*. Other species noted within the species assemblage include *Aristida junciformis*, *Bothriochloa insculpta*, *Dactyloctenium aegyptium*, *Eleusine coracana*, *Panicum maximum*, *Sporobolus africanus*, *Paspalum notatum* and *Panicum natalense*.

Within the graminoid dominated species assemblage several herbaceous weeds and woody alien species occurred. These species are commonly associated with over utilised and disturbed areas. The species that were recorded varied in their abundance and distribution across the proposed development footprint. The following species were commonly encountered during the field survey: *Amaranthus* sp., *Senna didymobotrya*, *Tagetes minuta*, *Xanthium strumarium*, *Datura stramonium*, *Tribulus terrestris* and *Zinnia peruviana*.

Indigenous and protected succulent herbaceous plants included 3 *Aloe marlothii* and over 50 *Aloe maculata* individuals;

The southern bank is considered to be an extremely degraded and species depauperate riparian area. The interface between the terrestrial and aquatic environment is dominated by a thick and relatively impenetrable stand of *Phragmites australis*. Moving away from the interface (ecotone) the following indigenous plant species were identified; *Acacia tortilis* (Umbrella thorn), *Searsia dentata*, *Commiphora neglecta*. A number of other shrubby and woody alien plant species, such as *Lantana camara* and *Solanum mauritianum* were recorded. A number of woody alien species were also recorded in the vicinity of the proposed footprint, namely; *Jacaranda mimosifolia*, *Tipuana tipu* and *Morus alba*.

The under-storey or herbaceous layer as it is commonly referred to, comprised of; *Cynodon dactylon* (dominant) and spreading/flat growing herbs, *Alternanthera pungens*, *Cucumis zeyheri* and *Guilleminea densa*.

The study site has been transformed by urban sprawl, development and heavy livestock stocking rates. In the interest of reducing the overall negative impacts associated with the proposed Tugela Ferry Bridge, it is recommended that an invasive alien plant programme be developed and implemented during the construction and operational phase of the project. Further we would also recommend that any plants listed in the ordinance, more specifically Schedule 12, namely;

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Aloe marlothii (3) and *Aloe maculata* (50) should be uplifted and relocated prior to the commencement of construction and alternative sites for their relocation identified.

The EAP would recommend a brief walk through prior to construction commencing to ensure that cryptic species have not been missed. This is unlikely though given the transformed and degraded nature of the receiving environment.

4. Wetland Assessment

Has a specialist been consulted for the completion of this section?	<input checked="" type="checkbox"/> YES		
If YES, please complete the following:			
Name of the specialist:	Bruce Scott-Shaw peer reviewed by Ryan Edwards		
Qualification(s) of the specialist:	MSc Hydrology (UKZN)		
Postal address:	PO Box 949, Hilton,		
Postal code:	3245		
Telephone:	033 3432352	Cell:	078 399 9139
E-mail:	bruce@naturestamp.co.za	Fax:	086 776 4789
Are there any special or sensitive habitats or other natural features present on any of the alternative sites?	<input checked="" type="checkbox"/> YES		
If YES, specify and explain:	The Tugela River and associated fluvial floodplain adjacent to the main river channel is considered to be sensitive, even though it has undergone significant transformation and change and has been disturbed for a significantly long period of time.		
Are any further specialist studies recommended by the specialist?	<input checked="" type="checkbox"/> NO		
If YES, specify:			
If YES, is such a report(s) attached in <u>Appendix D</u> ?	<input checked="" type="checkbox"/> YES		<input type="checkbox"/> NO
Signature of specialist:	_____		Date: _____

The following recommendations were provided by the wetland specialist:

1. Soil erosion and sedimentation

- No stockpiling of any materials should take place adjacent to the river
- Erosion control measures must be implemented in areas sensitive to erosion such as near water supply points, edges of slopes, etc. These measures could include the use of sand bags, hessian sheets, silt fences and retention or replacement of vegetation.
- Disturbed sites must be rehabilitated as soon as construction in an area is complete or near complete.
- Vegetation clearing must be undertaken as and when necessary. The entire construction area must not be stripped of vegetation prior to commencing construction activities.

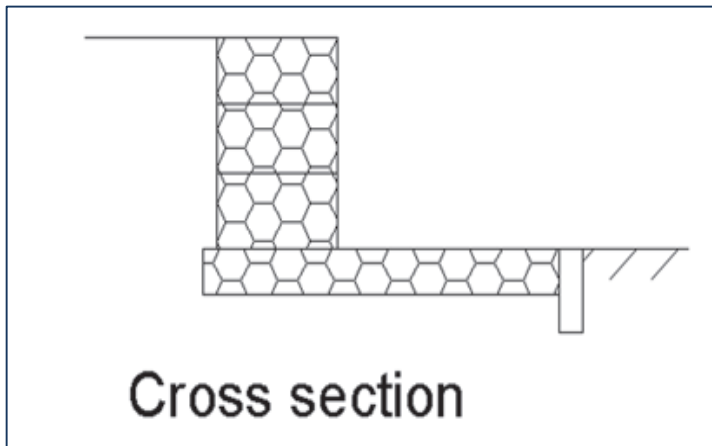
Reduction in riparian vegetation

- Protect as much of the remaining indigenous vegetation as possible. Remove alien invasive species where construction activities are occurring and replace these with indigenous vegetation, once construction is completed.

- Rehabilitate disturbed riparian vegetation as soon as construction in this area has ended. Rehabilitation must be aimed at improving the ecological status and function of the ecosystem, i.e. through the removal of invasive alien species and the planting of indigenous species within the construction area and 15 m on either side of the construction footprint.

Disturbance of channel bed and banks

- Use vehicular digging of the banks of the river only in areas where this is deemed necessary. Working during the winter months will also reduce soil erosion potential in disturbed areas.
- There shall be no mining of soil / sand required for construction purposes from the banks of the river. All materials required for construction i.e. aggregate, sand and the cleaned dump rock must be brought in, if needed for construction purposes, and from a registered source. This imported material must also be stockpiled away from the river's edge and the floodplain to avoid issues in the event of a flood.
- Steep areas along the river bank which have been disturbed must be protected through the use of gabion baskets on a mattress. A cross section of the protection measure is shown below.



- The gabions are passive structures that protect the riverbank from high-energy river flow. The gabions can be planted with indigenous vegetation including sedges, Cyperaceous or Juncaceous species which will grow within the gabion baskets and help to further stabilise the banks of the river.

Pollution of water resources and soil

- Proper storage and handling of hazardous substances (hydrocarbons and chemicals) must occur during the construction phase of the bridge.
- Proper management and disposal of construction waste must occur during the construction phase of the bridge. Washing of paint brushes, containers, equipment etc. within the river must not occur.
- Portable toilets must be placed outside the 1:100 year flood line or 50m away from the Rivers edge.
- Spillages of fuels, oils and other potentially harmful chemicals should be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately and appropriately.

2. LAND USE CHARACTER OF SURROUNDING AREA

Cross the land uses and/or prominent features that currently occur within a 500m radius of the site and give a description of how this influences the application or may be impacted upon by the application:

Land use character			Description
Natural area	YES	<input checked="" type="checkbox"/>	The vegetation was found to be highly degraded and transformed.
Low density residential	<input checked="" type="checkbox"/>	NO	
Medium density residential	YES	<input checked="" type="checkbox"/>	One house will be affected by the construction of the bridge.
High density residential	<input checked="" type="checkbox"/>	NO	
Informal residential	<input checked="" type="checkbox"/>	NO	
Retail commercial & warehousing	YES	<input checked="" type="checkbox"/>	There is a butchery on site that will be affected.
Light industrial	<input checked="" type="checkbox"/>	NO	
Medium industrial	<input checked="" type="checkbox"/>	NO	
Heavy industrial	<input checked="" type="checkbox"/>	NO	
Power station	<input checked="" type="checkbox"/>	NO	
Office/consulting room	<input checked="" type="checkbox"/>	NO	
Military or police base/station/compound	<input checked="" type="checkbox"/>	NO	
Spoil heap or slimes dam	<input checked="" type="checkbox"/>	NO	
Quarry, sand or borrow pit	<input checked="" type="checkbox"/>	NO	
Dam or reservoir	<input checked="" type="checkbox"/>	NO	
Hospital/medical centre	<input checked="" type="checkbox"/>	NO	
School/ crèche	<input checked="" type="checkbox"/>	NO	
Tertiary education facility	<input checked="" type="checkbox"/>	NO	
Church	<input checked="" type="checkbox"/>	NO	
Old age home	<input checked="" type="checkbox"/>	NO	
Sewage treatment plant	<input checked="" type="checkbox"/>	NO	
Train station or shunting yard	<input checked="" type="checkbox"/>	NO	
Railway line	<input checked="" type="checkbox"/>	NO	
Major road (4 lanes or more)	<input checked="" type="checkbox"/>	NO	
Airport	<input checked="" type="checkbox"/>	NO	
Harbour	<input checked="" type="checkbox"/>	NO	
Sport facilities	<input checked="" type="checkbox"/>	NO	
Golf course	<input checked="" type="checkbox"/>	NO	
Polo fields	<input checked="" type="checkbox"/>	NO	
Filling station	<input checked="" type="checkbox"/>	NO	
Landfill or waste treatment site	<input checked="" type="checkbox"/>	NO	
Plantation	<input checked="" type="checkbox"/>	NO	
Agriculture	<input checked="" type="checkbox"/>	NO	
River, stream or wetland	YES	<input checked="" type="checkbox"/>	The construction of the bridge will occur within a water course and the extensive flood plain associated with the Tugela River
Nature conservation area	<input checked="" type="checkbox"/>	NO	
Mountain, hill or ridge	<input checked="" type="checkbox"/>	NO	
Museum	<input checked="" type="checkbox"/>	NO	

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Historical building	YES		The existing bridge is considered a Provincial Monument.
Protected Area		NO	
Graveyard		NO	
Archaeological site		NO	
Other land uses (describe)		NO	

3. CULTURAL/ HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or within 20m of the site?

YES	
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If YES, contact a specialist recommended by AMAFA to conduct a heritage impact assessment. The heritage impact assessment must be attached as an appendix to this report.

Briefly explain the recommendations of the specialist:

The existing Bridge at Tugela Ferry is noted as being a Provincial Monument and falls within 20 metres of the proposed new bridge, however, the old structure will not be interfered or impacted upon in anyway during the construction of the new bridge.

The SAHRIS paleontological sensitivity map indicates that this area is coded as 'blue' and 'green' Blue requires no paleontological impact assessment (PIA), whilst green requires at least a desktop PIA. However since the area to be affected is small, and the area has already been disturbed.

Mr. G. Anderson (Heritage Specialist) would suggest that the PIA desktop is exempt as well.

Will any building or structure older than 60 years be affected in any way?

	NO
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Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

	NO
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If YES, please submit the necessary application to AMAFA and attach proof thereof to this report.

SECTION D: PUBLIC PARTICIPATION

1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

- (a) Fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—

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- (i) the site where the activity to which the application relates is or is to be undertaken; and
- (ii) any alternative site mentioned in the application;
- (b) Giving written notice to—
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the local and district municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity (as identified in the application form for the environmental authorization of this project); and
 - (vii) any other party as required by the competent authority;
- (c) Placing an advertisement in—
 - (i) one local newspaper; or
 - (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
- (e) Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
 - (i) Illiteracy;
 - (ii) Disability; or
 - (iii) Any other disadvantage.

Please note: The above was adhered to. Please see Appendix G English and Zulu site notices were erected following the change in Environmental Assessment Practitioner as per the agreed way forward with the EDTEA (Competent Authority).

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

- (a) indicate the details of the application which is subjected to public participation; and
- (b) state—
 - (i) that an application for environmental authorization has been submitted to the KZN Department of Agriculture & Environmental Affairs in terms of the EIA Regulations, 2010;(ii)
 - (iii) a brief project description that includes the nature and location of the activity to which the application relates;
 - (iv) where further information on the application can be obtained; and

- (iv) the manner in which and the person to whom representations in respect of the application may be made.

Please note: The above was adhered to. Please see Appendix G
An additional Zulu Advert was placed in the *Isoleswe* newspaper at the change of Environmental Assessment Practitioner as per the agreed way forward with the EDTEA (Competent Authority).

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

Please note: The above was adhered to. Please see Appendix G

4. DETERMINATION OF APPROPRIATE PROCESS

The EAP must ensure that the public participation process is according to that prescribed in regulation 54 of the EIA Regulations, 2010, but may deviate from the requirements of subregulation 54(2) in the manner agreed by the KZN Department of Agriculture & Environmental Affairs as appropriate for this application. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate.

Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before this application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations (regulation 57 in the EIA Regulations, 2010) and be attached as **Appendix E** to this report.

6. PARTICIPATION BY DISTRICT, LOCAL AND TRADITIONAL AUTHORITIES

District, local and traditional authorities (where applicable) are all key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of this application and provided with an opportunity to comment.

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YES	NO
-----	----

Has any comment been received from the district municipality?

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

Has any comment been received from the local municipality?

YES	
-----	--

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

A letter regarding permission to dispose of the general waste to the Pomeroy Waste Disposal Site has been received from the Msinga LM. The condition is that the waste disposal will be reviewed every three (3) months.

The Msinga LM have reviewed and approved the storm water management plan prepared and presented by RHDHV.

Has any comment been received from a traditional authority?

YES	
-----	--

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

The traditional leaders want to be consulted during the planning and construction phase of the project.

The traditional leaders have been added to the I&AP register and will be informed of the progress related to the project and on the award of the construction tender will be made aware of the impending construction and will be liaised with by the Engineer and Contractor as per their comments in their letters of no objection to the proposed development.

7. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

YES	
-----	--

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

Responses have been received from several Stakeholders to the draft BAR that was distributed as well as responses / questions raised during the public meeting held on the 29th March 2014.

Key Stakeholder Comments (Synthesised)

EKZN Wildlife

- Adhere to the storm water management plan
- Avoid concrete enrichment on the receiving environment
- Design must not affect the flow of the Tugela River
- Stabilising vegetation may only be removed where necessary
- Ensure that river banks are not damaged
- River banks to be stabilised and re-vegetated after construction

COGTA

- Submit an application in terms of the KwaZulu-Natal Planning and Development Act, Act 6 of 2008

DAFF

- DAFF has no objection due to the transformed nature of the receiving environment.

DWS

WATER USE AUTHORISATIONS AND WATER RESOURCES

- This Department requests clarity on the structures as mentioned above to be relocated or reinstalled in order to make an informed decision for the abovementioned proposal.
DWS would like to confirm that we have relocated our instrumentation from the old recorder hut into the concrete recorder hut, further upstream (response from DWS dated 16 October 2014, Nirdosh Punchum).
- Proof of consultation and a signed service agreement from the municipality for the provision of water supply for the proposed project must be submitted to this Department.
- The abstraction of water from a water resource constitutes Section 21 (a) water use;
DWS confirmed that a GA maybe applied for (Pers. Comm. Coleen Moonsamy)

SOLID WASTE MANAGEMENT

- The details of the contract must be made available to this Department;
- Safe disposal certificates from a permitted waste disposal site must be kept on hand and must be furnished to this Department when requested.
- Department requires a signed acceptance letter from the Pomeroy Landfill Site for permitting the disposal of solid waste during the construction phase for the above-mentioned project (approval letter is attached **Appendix E**).
- Solid waste must be placed in skips and stored in a designated stored collection area prior to being disposed of and must not cause any groundwater or surface water pollution or

pose any health hazard. Furthermore all solid waste must be stored undercover and surrounded by walls (bunds) to prevent contaminated water spreading into the environment.

- Contaminated and hazardous waste must be disposed of at a permitted landfill site that is authorised to accept such waste. The collection of hazardous solid waste should be carried out in a manner that will prevent spills or leaks that may pose a threat to the environment, including surface and groundwater.

SEWAGE AND WASTEWATER MANAGEMENT

- A signed service level of agreement for the maintenance and disposal of contents of the chemical toilets must be provided to this Department (Attached at **Appendix E**, is an approval from the Uthukela DM approving Sanitech to dispose of effluent into their sewer system) .
- Toilets must be situated out of the 1:100 year flood line of any watercourse.
- Water containing waste must not be discharged into the natural environment
- Measures to contain the water containing waste and safely dispose of it must be implemented.

STORM WATER MANAGEMENT

- A detailed Storm water Management Plan (SWMP) must be developed and implemented both during and after the construction phase. The SWMP must be approved by the Msinga Local Municipality (attached an approval letter from the Msinga LM at **Appendix E**). Furthermore the approved SWMP must be submitted to this Department for comment.
- It is imperative that there is proper management of storm water on site both during the construction and operational phases for the proposed project.
- After the construction phase of the proposed project the site should be contoured to ensure free flow of runoff and prevent ponding.
- Drainage must be controlled to ensure that runoff along the project route will not culminate in off-site pollution or result in damage to properties downstream of any storm water discharge.

EROSION

- Erosion control measures must be put into place to minimize erosion along the proposed project. In addition extra precaution must be taken in areas where soils are deemed highly erodible.
- Erosion control measures must be implemented in areas sensitive to erosion such as near water supply points, edges of slopes etc. These measures could include the use of sand bags, hessian sheets, retention or replacement of vegetation.
- Stockpiling of soil or any other materials used during the construction phase must not be allowed on or near steep slopes, near a watercourse or a water body.

SPILLAGES

- The Spill Response Plan stipulated in the EMPr of the above-mentioned document is hereby noted.

- The Umzinyathi District Municipality must be contacted with regard to any discharges either to the municipal storm water drainage system or to the sewer system (if provided in the area).

GENERAL

- There must be no forms of secondary pollution arising from the disposal of sewage and refuse. The Contractor must be clearly briefed on the method of disposal and compliance must be ensured / monitored. In addition, any pollution arising from the above project must be immediately addressed.
- The storage of materials, chemicals, fuels, etc to be used during the construction phase must not pose a risk to the surrounding environment. Such storage areas must be located out of the 1:100 year flood line of any water resource and unauthorised access to these areas must be controlled. Temporary bunds must be constructed around chemical or fuel storage areas to contain possible spillages.
- The Report entitled: "Tugela River at the Tugela Ferry Bridge. Flood line Study Report, dated 17th January 2014, is hereby noted.
- The Report entitled: "Preliminary Report to Royal Haskoning DHV on a Geotechnical Investigation for the proposed Tugela River Bridge No. 3595, KwaZulu-Natal", dated May 2014, is hereby noted.

EDTEA

- Pg 16 - Water Use: It is stated that a water use permit from the Department of Water Affairs (DWA) will be required. Proof that the application has been submitted to DWA must be included in the final BAR.
- A report compiled by a person who is employed by the EAP is not considered by the Department to be a specialist report. The report must be peer reviewed by a suitably qualified professional person. If the peer reviewer considers the report to be acceptable, then the report will be considered to be a specialist report.
- Pg 18 - Groundcover: It is noted that Mr Brian Mafela is listed as the specialist and he is employed by the EAP. There are two solutions to this scenario. Either Mr Mafela's findings must be peer reviewed or he should not have been listed as a specialist. If the latter route is followed, Mr Mafela's findings can still be utilized in Section E: Impact Assessment and in the EMP. The Department will not pursue this issue for this application due to the transformed nature of the study site.
- It is noted that Mr John Phipson peer reviewed the Wetland & Riparian Delineation and Impact
- Assessment. A CV containing Mr Phipson's qualifications and previous work experience must be forwarded to the Department.
- The Preliminary Geotechnical Investigation Report by Davies Lynn & Partners does not contain recommendations for the construction of the bridge. This is due to the unavailability of the results of the remaining borehole drilling programme (Pgs 6 & 7). On Pg 10 it is also stated that "Rock socket design can be finalized once all boreholes have been drilled and the UCS and structural characteristics of the bedrock across the entire site have been assessed".
- Information on the design loads and acceptable settlements was also required. I have contacted Mr Andy Zwiers of Davies Lynn & Partners and he confirmed that the

investigation is still to be completed. He also mentioned that in terms of the geohydrology, it would be incorporated naturally in their report by mentioning the position of the water table.

- The Department therefore requires a follow up Geotechnical Investigation Report to be included in the Final BAR which contains information on the results of the remaining borehole drilling programme. This report must also contain construction recommendations.
- The letter from DWA dated 20 March 2014 states that a Geotechnical and a Geohydrological investigation must be conducted. It is noted that a Preliminary Geotechnical Investigation Report has been conducted, but no Geohydrological Report. Confirmation must be obtained from DWA as to whether a Geohydrological investigation is required or whether the position of the water table, which will be included in the follow up Geotechnical Investigation, will suffice.
- Appendix G4 - Newspaper adverts: One English and one isiZulu advert appear in this section (**The Mercury and ISOLEZWE published 11 March 2014**).
- The name(s) of the newspaper(s) in which the adverts appeared must be provided as well as the date of publication (**The Mercury and ISOLEZWE published 11 March 2014**).

See comments and response report in Appendix E.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

The community are concerned about job opportunities and if local people will be employed.

Stakeholders and Government departments are concerned about environmental impacts like erosions, storm water and pollution, especially in sensitive areas like the riparian areas.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached as Appendix E to this report):

All general workers will be obtained from the local community and the contractor may bring his own skilled and qualified workers.

All the environmental impacts have been addressed in this report and the EMPr.

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

2.1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

Basic Assessment Report

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the planning and design phase:

Alternative S1 (preferred alternative)

Direct impacts:

The proposed positioning of the new double lane bridge and roads will impact on private properties / enterprises, namely; a house and a butcher shop, both of which are on the north bank of the Tugela River.

- As a result of this People will temporarily lose their source of income.
- People will lose their house or access to their houses.

The planning and design of the new double lane bridge will not have any other direct impacts on the receiving environment.

Indirect impacts:

The design of the new double lane bridge could impact on the aesthetics and the architectural language of the existing structure and thus must not be impeded upon or changed in anyway. Thus the design and adoption of a low concrete pier and lintel bridge structure has been selected as the preferred option.

Cumulative impacts:

Alternative S2 (if any)

Direct impacts:

The design and positioning of the bridge will have significantly greater direct impacts on the receiving environment, most notably the social environment with a number of businesses and homes being required to be re-located on both the north and south bank of the Tugela River.

Indirect impacts:

The design of the new double lane bridge will impact on the aesthetics and the architectural language of the existing structure, and thus this must not be impeded upon or changed in anyway as the current bridge structure is a Provincial Monument (Anderson, 2015).

Additionally the visual impact will be more significant in the alternative alignment position as the roads and access network into this area will need to be altered significantly and the new double lane bridge will be situated further from the existing structure than the preferred alternative.

No-go alternative (compulsory)

Direct impacts:

The current situation will become worse as there is bound to be additional traffic utilising this road as more of the population become mobile. The current traffic backups will increase.

The danger of the crossing of the existing bridge will be compounded as peoples impatience will continue to grow, and result in ever increasing levels of risk taking.

Pedestrians will not have a dedicated bridge to cross the Tugela River thus exposing them to potential incidents involving motor vehicles.

Basic Assessment Report

The no-go alternative will also have an impact on air quality as vehicles will be waiting to cross the bridge as a result of it only being a single lane bridge with running engines. This will create and exacerbate the localised poor air quality resulting from vehicle emissions. The potential also exists that whilst vehicles are stationary, oil leaks and other fluids required for the operation of motor vehicles may become elevated, whilst the vehicles wait to cross the current single lane bridge.

Local Economic Development will be severely restricted as access to and use of this road by non-local residents and communities members will remain low due to the inconvenience and perceived hazard to utilising the current bridge across the Tugela Ferry.

Indirect impacts:

No indirect impacts – no construction will take place.

Cumulative impacts:

No job opportunities or skills transfer and development will be able to occur during the construction phase, as the construction of the new double lane bridge and associated roadways will not take place.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1 Preferred Alternative	Alternative
<p>Direct impacts:</p> <p>Impact on private properties/enterprises: The people that will be affected by the construction of the bridge must be consulted during the planning phase and all the parties must agree on reasonable compensation and to being relocated to a new premises that will fall outside of the current proposed alignment of the new double lane bridge and feeder roads.</p> <p>Indirect impacts:</p> <p>Cumulative impacts:</p> <p>The requirement to move people and their place of employment may cause some unhappiness and may create a situation where aggrieved parties are not entirely happy with the outcomes of the deliberations around compensation.</p> <p>This unhappiness may cause elongated discussions and thus time delays in terms of delivery of this significant and required new double lane bridge and access.</p>	

b. Process, technology, layout or other alternatives

List the impacts associated with any process, technology, layout or other alternatives that are likely to occur during the planning and design phase (please list impacts associated with each alternative separately):

Alternative S2 (not-preferred alternative)

Basic Assessment Report

The design and positioning of the bridge will have significantly greater direct impacts on the receiving environment, most notably the social environment with a number of businesses and homes being required to be re-located on both the north and south bank of the Tugela River.

Indirect impacts:

The design of the new double lane bridge will impact on the aesthetics and the architectural language of the existing structure. The existing single lane bridge structure must not be impeded upon or changed in anyway. Additionally the visual impact will be more significant in the alternative alignment position, as the roads and access network into this area will need to be altered significantly and the new double lane bridge will be situated further from the existing structure than the preferred alternative.

No-go alternative (compulsory)

Direct impacts:

The current situation will become worse as there is bound to be additional traffic utilising this road as more of the population become mobile. The current traffic backups will increase.

The danger of the crossing of the existing bridge will be compounded as peoples impatience will continue to grow, and result in ever increasing levels of risk taking.

Pedestrians will not have a dedicated bridge to cross the Tugela River thus exposing them to potential incidents involving motor vehicles.

The no-go alternative will also have an impact on air quality as vehicles will be waiting to cross the bridge as a result of it only being a single lane bridge with running engines. This will create and exacerbate the localised poor air quality resulting from vehicle emissions. The potential also exists that whilst vehicles are stationary, oil leaks and other fluids required for the operation of motor vehicles may become elevated, whilst the vehicles wait to cross the current single lane bridge.

Local Economic Development will be severely restricted as access to and use of this road by non-local residents and communities members will remain low due to the inconvenience and perceived hazard to utilising the current bridge across the Tugela Ferry.

Indirect impacts:

No indirect impacts – no construction will take place.

Cumulative impacts:

No job opportunities or skills transfer and development will be able to occur during the construction phase, as the construction of the new double lane bridge and associated roadways will not take place.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1:

The selection of the preferred option is the only suitable mitigation for the significant relocations of commercial enterprises and local community

Alternative A2:

members housing that will be undertaken if the alternative option, east (downstream) of the existing single lane bridge structure is authorised.

2.2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the construction phase:

Alternative S1 (preferred site)

Direct impacts:

Soil Removal:

- The excavation of the soils in the area directly adjacent the banks of the Tugela River will result in the potential for accelerated scour and associated sediment loading of the Tugela River.
- The placement of the excavated material, in close proximity to the river may result, in the event of a flood, material being transported into the river and thus increasing the sediment load.
- Changes to soil structure – changes in the inherent soil porosity and subsurface water flow, which may affect local hydrological functioning.
- The construction of the newly aligned road will transform historically permeable surfaces to an impermeable surface. This will result in a change to the hydrological functioning of the direct area, and the amount of infiltration that may occur. The result is that areas of focussed discharge will result. These focussed discharge points will need to be armoured against the potential for erosion and scour to occur. The need for such is two-fold. Firstly, protect the receiving environment and ensuring that the integrity of the infrastructure is not affected. Storm water from the newly constructed road must be managed through the implementation of a storm water management plan. The storm water management plan must consider *inter alia* the development of erosion, water quality degradation and also pollution.

Erosion:

- Clearing of vegetation from the banks of the Tugela River will result in the exposure of the soils to both wind and water erosion. The impact is the degradation and change in the soils structure and fertility as well the potential for erosion to occur as the presence of rooting materials has been removed and thus the binding quality thereof lost.

Biodiversity:

- The removal of plants will result in a change in the vegetation composition of the area.
- The loss of riparian vegetation will result in the alteration of the riparian habitat.
- The disturbance of riparian habitat due to construction activities will also provide an opportunity for invasive alien plants to proliferate in the area.
- Habitat reduction (vegetation clearance) and disturbance / interference with potentially sensitive fauna.

Impacts on the river associated with the bridge construction

- The natural functioning of the river will be interrupted through the:

- Dredging of the river bottom for the founding of the piles that will support the bridge piers, will result in the turbidity and sediment load in the river being elevated.
 - The deposition of dump rock during the process of constructing the cofferdam and placing of the flumes and / or piping to allow natural flows to be maintained.
 - Disposal of waste into the river (unlikely event as the concrete pouring process will be well controlled and undertaken through a sleeve that will remain in place) and other issues such as Hydrocarbons entering the river must be managed through regular maintenance and monitoring.
 - Loss of riparian habitat suitable for local flora and fauna
- Stream quality:
 - This impact will be exacerbated during the rainy season, when run-off from the construction site directly into the river may cause sedimentation and localised pollution.
 - Modification of the river flow and riverine dynamics of the area given that the placement of additional structures within the channel will have an effect on the sediment deposition as well as the manner in which the river flows. This may potentially cause changes to the river channel, which will in turn potentially have an impact on the habitat utilised by aquatic fauna.
 - Dredging of the deposited sediments from the bedrock on the river bottom will result in sediments being uplifted and carried downstream during the process of piling preparation and capping.

Elevated dust levels:

- As a result of the removal of plants and associated soil disturbance during excavations it is likely that dust will be generated. In addition the vehicular movement across and to the site will also result in additional dust being generated.
- Dust emissions associated with vehicle movement with respect to site preparation, the construction of the new road section and driving to and from the site from the contractors' camp and spoil sites will result in dust being generated.

Vehicular and pedestrian traffic:

- Soil compaction and disturbance as a result of vehicular movement and pedestrian traffic will result in the establishment of preferential flow paths , resulting in runoff velocities increasing, associated erosion and the potential alteration of natural flow regimes and drainage patterns
- Faunal disturbance – sensitive fauna will be disturbed by vehicular traffic.
- Disturbance of natural vegetation as a result of the removal of vegetation as well as the accidental damage incurred as a result of construction.

Waste production:

- Potential contamination of the surrounding environment due to improper storage and transport of waste.
- Human and wildlife health would be affected by leakage and improper storage of hazardous material.
- Groundwater and air pollution from improper waste management.

- Visual aesthetics and odour impacts.
- Increased vehicular traffic from transport of waste from the site might result in the spillage of waste.
- Incorrect disposal of waste off-site.

Types of waste include:

- Solid waste – e.g. plastics, metal and wood.
- Chemical waste – e.g. petrochemicals, resins and paints. This must be treated as hazardous waste.
- Sewage – sewage associated with chemical toilets being removed.

Road safety:

- The provision of a new bridge will benefit road users as it will substantially improve the road safety of all road users.
- Traffic flow will be more efficient.
- Pedestrians will now have a designated means of crossing the Tugela River and thus will not come into direct contact with the vehicular traffic.

Indirect impacts:

Alien plant encroachment:

- Seed-bank enrichment – Seed contamination via building material and equipment imports, vehicles and workers (seeds attached to machinery and workers clothes alike).
- Soil disturbance and native plant removal – reduced competition as a result of the removal of indigenous plants and thus opportunities are increased for alien plant species as they flourish in conditions where disturbance and change are taking place.

Biodiversity:

- Removing riparian vegetation will result in increased opportunity for bank destabilisation and soil erosion.
- The removal of riparian vegetation will disturb the habitat that faunal species may be making use of in the direct vicinity of the proposed new double lane bridge. Increased human activities have the potential to have a negative impact on the faunal and avi-faunal species that may be inhabiting the area and utilising the vegetation as a place to feed, roost and rear young.
- A positive impact will result from the removal of invasive alien species in the direct vicinity of the bridge and the rehabilitation of the area utilising indigenous plant species will assist in establishing the correct plant species and thus increasing the opportunities for re-colonisation of areas in the near vicinity.

Erosion:

- Soil erosion leads to sedimentation wash. Sedimentation build-up in the stream will impact on instream habitats both at the construction site and downstream. The potential impacts are the sedimentation of rocky riffles and areas previously not exposed to significantly high levels of sediment.
- An increase in stream turbidity, as a result of sedimentation, will cause a reduction in the depth of light penetration into the water column. This effectively decreases rates of photosynthetic activity and thus primary productivity in submerged plants.

- Turbidity can increase surface water temperature and lead to thermal stratification. This however is unlikely due to the fast flowing nature of the Tugela River and the continual flow of the river even during the dry periods of the year.

Noise disturbance:

- Associated with construction activity (vehicles, equipment and workers creating disturbance).

Poaching of local fauna:

- Construction workers may illegally poach local fauna (e.g. birds).

Cumulative impacts:

The most significant and positive impact is the opportunity to develop the local economy through improved access and access of local producers to markets not directly in the surrounding areas.

The benefit will accrue to the local community and associated businesses.

Alternative S2 (if any)

As for Alternative 1 the preferred alternative, with the following additional impacts are identified for the Not-preferred alternative.

- The most significant of which will be that the alternative positioning of the new bridge will result in significantly higher social issues.
 - * Additional businesses will be required to be relocated out of the direct pathway of the bridge and associated new roads that will be created in order to link into the new bridge.
 - * On the opposite side to the main town houses and local residents will be required to be removed and relocated into new houses.
 - * Relocation of people also results in the social fabric changing and the members of the existing community to which the residents are moved may not be accepting of these individuals or vice versa.
- The financial consideration will also be significantly higher should the non-preferred alternative be sought as significant compensation would need to be paid to the affected community members.

As the social, economic and the environmental (bio-physical impacts) require equal weighting and consideration and balancing with no particular group of factors superseding another. The option to re-align the bridge downstream of the existing bridge is of a higher impact than locating the new bridge upstream of the existing bridge.

No-go alternative (compulsory)

Basic Assessment Report

The current situation will become worse as there is bound to be additional traffic utilising this road as more of the population become mobile. The current traffic backups will increase.

The danger of the crossing of the existing bridge will be compounded as peoples impatience will continue to grow, and result in ever increasing levels of risk taking.

Pedestrians will not have a dedicated bridge to cross the Tugela River thus exposing them to potential incidents involving motor vehicles.

The no-go alternative will also have an impact on air quality as vehicles will be waiting to cross the bridge as a result of it only being a single lane bridge with running engines. This will create and exacerbate the localised poor air quality resulting from vehicle emissions. The potential also exists that whilst vehicles are stationary, oil leaks and other fluids required for the operation of motor vehicles may become elevated, whilst the vehicles wait to cross the current single lane bridge.

Local Economic Development will be severely restricted as access to and use of this road by non-local residents and communities members will remain low due to the inconvenience and perceived hazard to utilising the current bridge across the Tugela Ferry.

Indirect impacts:

No indirect impacts – no construction will take place.

Cumulative impacts:

No job opportunities or skills transfer and development will be able to occur during the construction phase, as the construction of the new double lane bridge and associated roadways will not take place.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1	Alternative S2
<p>In order to mitigate the potential impacts that may be imparted as a result of the proposed new double lane bridge, roadways and ancillary infrastructure control measures must be implemented. The measures are expanded upon in the EMPr as well as additional recommendations made in the specialist reports to try and reduce all possible impacts to the category of low to very low .</p> <p>Soil</p> <ul style="list-style-type: none"> * Soil disturbance will be minimized through the ECO, engineer and the contractor visiting the site and determining the position of the site camp. The site camp and lay-down areas must be cleared and grubbed and any topsoil, nominally 150 mm (in this area) must be stockpiled to a height no greater than 2 metres and vegetated with <i>Eragrostis tef</i>. * In addition the engineer, along with the ECO and a surveyor must determine the extent of the construction zone, i.e. 40 metres which is 	

<p>the minimum width that will facilitate the construction of the bridge, including the cofferdam.</p> <ul style="list-style-type: none">* No construction personnel or vehicles may leave the demarcated areas except when authorised to do so by the relevant authority / ECO;* The time that stripped areas are left open to exposure must be minimised. Care must be taken to ensure that lead times are not excessive. for example a two week work plan must be implemented* Wind screening and storm water control must be undertaken to prevent soil loss from the site;* Erosion prevention and control measures must be implemented in areas where there are steep slopes. Berms, sand bags and hessian sheets must be used to contain all sediment whilst energy dissipaters must be constructed at all outflow points.* The site must be monitored for any sign of off-site siltation. All exposed earth must be rehabilitated promptly with suitable vegetation to protect the soil. <p>Biodiversity</p> <ul style="list-style-type: none">* Vegetation disturbance must be kept to a minimum especially in the river bed and the surrounding riparian zones. The demarcated area mentioned above must be strictly adhered to. The contractors camp and laydown area must take the receiving environment into consideration and must be placed where there will be minimal impact imparted on the vegetation, as this area is water scarce and the vegetation and basal cover is generally already exceedingly denuded.* Rehabilitate disturbed areas after construction by removing all construction debris and planting suitable indigenous riparian vegetation. A BoQ must be compiled by a suitably qualified botanist prior to construction commencing and this BoQ must be costed with an allowance for inflation and must be incorporated into the construction tender document and be part and parcel of the contract award.* The contractor must seek approval for a suitable camp site from both the Engineer and ECO prior to setting up a construction camp;* The size of the construction camp must be minimized and restricted to areas which are already deemed to be disturbed;* Areas which are identified by the ECO as being ecologically sensitive and which are adjacent to any construction work must be suitably demarcated, preferably utilising orange Bonnox Fencing to prevent damage by labour or plant;* The labour force must through the environmental awareness training that must take place at the inception of the construction phase must be made aware that plant harvesting is not permitted and strict measures will be put in place to ensure that anyone caught doing so will face a large fine and possible dismissal.* Machine / vehicle operators must receive clear instructions to remain within demarcated access routes.	
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- * Remove all invasive alien plants in the construction footprint and 20 m on either side of the demarcated construction zone.
- * Monitor and maintain disturbed areas to prevent infestation by invasive alien plant species during and after the construction phase is complete - ideally this must take place every 3 months for a period of one year, then every six months for the following two years and then yearly to year 5.
- * The monitoring and maintenance must be worked into the overall budget for the project and a contingency set aside to undertake works into the future.

Aquatic environment

- * Stream quality:
 - * Construction activities must be conducted in terms of the construction environmental management programme and recommendations made by the wetland specialist. This includes the manner in which the cofferdam is constructed and the dump rock that is used in its construction. The dump rock must be free of any fine material that could contribute to the sediment load in the river. When dredging occurs precautions must be taken to ensure that the material that is removed during the preparation for the founding's and piers is done in an effective way and that the material for the most part is removed, without being exposed to significant water velocities within the channel that will carry sediment downstream.
- * Modification of the river flow:
 - * The natural downstream flow of the river is to be maintained during construction. This will be achieved by employing flumes and concrete culverts within the cofferdam to direct flows away from the immediate works areas around the base of each of the instream piers. The flume pipes must be removed from the channel when the cofferdam is removed and the original flow patterns re-instated on completion of construction and removal of the cofferdam. The banks of the watercourse must be reinstated using previously excavated material and topsoil upon completion of construction activities. It is essential that the material that is returned to the river banks is well compacted and immediately rehabilitated using a combination of gabion structures, such as, reno-mattresses, as well as the dense planting of indigenous tree species that will anchor the soil and provide the basis for the re-instatement of the riparian vegetation corridor. Any activities conducted within or near watercourses must be strictly monitored by an ECO and current best practice, as outlined in the EMP, and other formal documentation (construction method statement prepared by RHDHV) must be strictly adhered to.

<ul style="list-style-type: none"> * Use of river water for construction activities must to be approved by the Department of Water and Sanitation prior to use; Given the relatively low volumes of water to be extracted (48 m³ / month for the duration of the construction period) and the fact that no wetland systems are present within 500 metres of the proposed activity a General Authorisation for the proposed Tugela Ferry Bridge is being sought. * No stockpiling of any materials may take place adjacent to the river with all stockpiling happening in an area away from the floodplain bench which lies directly adjacent to the river channel. <p>* Erosion</p> <ul style="list-style-type: none"> * Control measures must be implemented in areas sensitive to erosion such as near water supply points, edges of slopes, discharge points, etc. These measures include but are not limited to - the use of sand bags, hessian sheets, silt fences and retention or replacement of vegetation. The management of storm water must consider the stockpiles of material and if necessary water must be diverted away from these areas to ensure that the stockpiles are not eroded and that the storm water is directed through an attenuating structure to reduce velocities and the sediment load prior to it entering into the Tugela River. * 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; an ethos of progressive rehabilitation / re-instatement must be in place from the beginning of the construction phase. * Vegetation clearing must be undertaken as and when necessary. The entire construction area must not be stripped of vegetation prior to commencing construction activities; this is particularly true of areas where the new roads will be constructed to feed onto the new bridge as these areas will not take as long to construct as the actual bridge structure. <p>* River Turbidity:</p> <ul style="list-style-type: none"> * Increases in the turbidity of the river must be monitored and controlled. A method to control turbid water is through the use of sediment traps or turbidity curtains. * Turbidity curtains must be erected to limit downstream impacts of bridge building activities. These floating barriers are designed to control sediment and run-off at construction sites and usually comprise of vertical liners with floats at the top and a ballast chain at the bottom. These will only be required during the most high risk activities relating to the, cofferdam construction, dredging of the river bottom for the foundation and abutment construction and the removal of the cofferdam structure. 	
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- * During bridge construction, place debris catch netting / containment system under the bridge structure to ensure that no building materials fall into the river and contaminate same. See EMPr for more detail.
- * Under no circumstances may solid waste be left near the river nor allowed to enter the riverine system – this includes litter. This must be cleared twice daily.
- * The issue of storm water from the bridge directly into the river via scupper pipes has been raised. It is unlikely that this will have a significant impact, and no more so than the current situation, and as with most bridges in South Africa, where this situation is repeated.
- * It is likely that gabion baskets and reno mattresses will be required at the storm water pipe outlets to counter initial erosion until vegetation has established.

Faunal

- * No wild animal may under any circumstance be handled, removed or be interfered with;
- * No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin;
- * Disturbance to birds, animals and reptiles and their habitats must be minimized wherever possible;

Noise and Dust

- * Construction vehicles / machines are to be fitted with standard silencers prior to the beginning of construction;
- * Construction workers must be made aware that creating noise such as hooting and shouting on the site when working is not acceptable and that they must consider the environment and the community that surrounds the proposed development.
- * Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers etc.) will be used as per operating instructions and maintained properly during site operations;
- * Vehicles travelling to and from the construction site must adhere to the speed limits so as to avoid producing excessive dust (usually a restriction of 35 km/hr is put in place for smaller access roads and 45 km/ hr on larger roads);
- * Vehicles and machinery are to be kept in good working order and to meet the manufacturer's specifications for safety, fuel consumption etc. Should excessive emissions be observed, the Contractor is to have the equipment seen to as soon as possible;
- * When feasible, shut down idling vehicles and equipment;
- * Material stockpiles should be seeded with *Eragrostis tef* (summer) or *Lolium perenne* (winter) to reduce the opportunity for dust being generated off stockpiles. In

addition, the two above mentioned grass species will add significant nutritional value to the stockpiles as these species are annual species and can then be worked back into the stockpiled material as a form of “green composting”. All seed applications must be done at a ratio of 6 kgs/ ha. During germination the grass species must be regularly watered and thereafter they do not require regular watering in the case of *E. tef*.

- * All access roads that are being utilised must be dampened whenever necessary. In dry and windy conditions this exercise is imperative to prevent the excessive generation of dust;
- * The site camp must also be regularly dampened to prevent the generation of dust as it is likely that all machinery will park within the construction camp at night, and will thus create dust.
- * If vegetating the stockpiles is possible or feasible, then the stockpiles should be covered in hessian cloth or screened from the prevailing winds by erecting shade cloth supported by driven wooden stakes.

Waste production

- * All solid waste must be disposed of at a registered landfill site (Pomeroy Landfill Site); proof of disposal in the form of waybills must be kept on record in the environmental file that must be maintained by the ESO (Environmental Site Officer) and reviewed on a monthly or bi-monthly basis by the ECO (Environmental Control Officer).
- * Adequate solid waste disposal containers must be provided within the site camp and at the work face. These bins must be in place at all times and the regular focus of toolbox talks to ensure that the staff on the project comply with the EA and EMPr. These bins must also be secured against scavenging animals. They should have a lid to prevent animals from accessing them.
- * Waste must be separated into individual streams. At the very least general waste must be separated from construction waste and hazardous waste.
- * Hazardous waste includes *inter alia* hydrocarbons, contaminated soils, hydraulic fluids and paints. This waste may need to be taken to Shongweni as this is a registered landfill for this type of material. The contractor must be aware thereof and make provision for such in their tender submission.
- * General waste includes plastics, food waste and day to day litter that accumulates as a result of individuals working and sleeping at the construction site.

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<ul style="list-style-type: none">* Construction waste includes, cement bags, surplus cement from pours, building rubble that may be needed to be removed when the butchery and the house are demolished.* Demarcated and fenced Waste storage area (comprising Bonnox covered with shade cloth) must be provided during construction for the effective storage of waste materials within the construction camp. These areas must be regularly serviced, ideally twice a month, depending on the waste generated.* The construction site must be inspected for litter on a daily basis. Extra care must be taken on windy days to prevent “wind scatter”.* Consideration and opportunities for reducing and the management of waste for example recycling, use of biodegradable material must be explored and if feasible implemented.* Existing waste disposal facilities must be able to handle the increased waste generation.* Contaminated water associated with construction activities, such as run off from an onsite batching plant must be contained in a storage container, (Jo-Jo tank) and this must be regularly drained and it must be insured that this kind of contaminated water is not allowed to enter the natural drainage systems.* Water generated as a result of onsite ablutions must have a separate collection tank that can be drained when the company that services the portable toilets services the toilets. This must be allowed for in the tender document and the contractor made aware of such a requirement.* Soil that is contaminated with, e.g. cement, petrochemicals or paint must be disposed of at a registered hazardous landfill site by a registered service provider.* Chemical waste must be stored in appropriate containers and disposed of at licensed hazardous disposal facilities.* Sewage - During construction portable sanitation facilities must be erected. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding bush). These facilities must also be serviced weekly and monitored on a daily basis by a responsible individual to ensure that they are not leaking and contaminating the ground or surface water that will find its way in the Tugela River.* There must be a minimum of 1 chemical toilet for every 15 workers. See EMPr. The toilets must be on an impervious surface. Ideally a concrete plinth should be constructed for the purposes of having a toilet(s) placed thereon. These will ensure that the toilet is upright and level at all times and will assist in monitoring the toilet(s) for leaks.	
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The following recommendations were provided by the wetland specialist:

Construction Phase:

Soil Management: (erosion and sedimentation control):

- * To prevent erosion and sedimentation, construction activities (piling and founding) should be undertaken during the dry season when flows will be substantially reduced.
- * Topsoil must be removed from the re-alignment areas and not spoiled. Top-soil and sub-soil stockpiles to be placed on opposite sides of the road as this is where they will cause the least impact.
- * Vehicles should be parked out of the flood line when not in use in order to prevent compaction of the soil profile and any hydrocarbon spills from entering the soil profile and the groundwater.
- * The construction camp should be located more than 100 m from the Tugela River and any other watercourses.
- * Topsoil should be replaced in the correct order it was extracted and erosion prevention measures must be put in place on areas with a steep gradient (such as geo-textiles).
- * Sediment barriers/controls must be installed in vulnerable areas prior to any construction and the resultant erosion occurring on the site.
- * Any excess subsoil must be removed from the road area once back filling is completed, and spoiled at an agreed spoil site.

Disturbance of the linear channel flow and channel bed:

- * Monitor the water quality to determine the baseline quality for operational comparisons;
- * Excess stockpiles must not be placed in or near the channel;
- * Construction in the channel must be undertaken as quickly as possible and must be carefully monitored;
- * The construction of the bridge features must be isolated from the flow of the channel in order to prevent downstream wash. The diversion of water during the operation of the cofferdam must be temporary with only small diversions allowed at any one time in order to reduce the impact on the opposite bank;

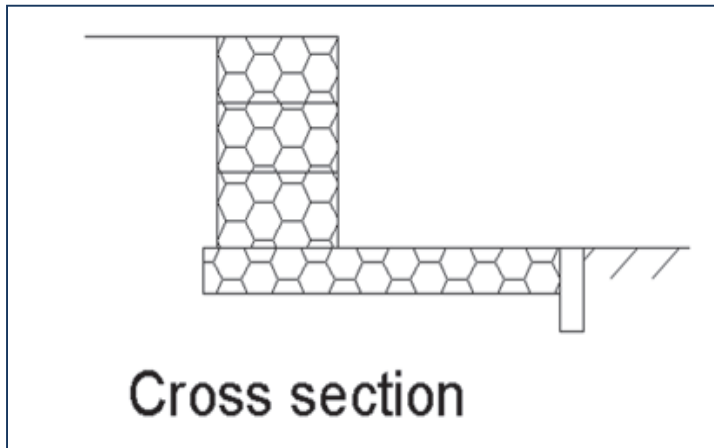
Loss of natural/indigenous vegetation and alien invasion:

- * All growth forms of Category 1 weeds and invader plants shall actively be removed from all works areas, at all times;
- * Areas for re-vegetation/alien clearing should be demarcated in order to prevent further disturbance. Furthermore, access roads for machinery should avoid any of the vegetation focus areas and areas with existing natural vegetation;
- * All Category 2 and 3 weeds and invader plants shall be actively removed all prior to flowering.

- * An appropriate re-vegetation technique should be implemented according to a re-vegetation plan compiled by a vegetation specialist; and
- * Follow up assessments should be undertaken to prevent alien re-growth in alignment with time frames identified by a re-vegetation plan / vegetation specialist.

Bank erosion:

- * Re-vegetation must be followed up during operation to check that the banks are stabilized;
- * Disturbed areas (not identified before) should be rehabilitated according to a rehabilitation plan.



- * Gabions are passive structures that protect the riverbank from high-energy river flow. The gabions can be planted with indigenous vegetation including sedges, Cyperaceous or Juncaceous species which will grow within the gabion baskets and help to further stabilise the banks of the river.

Pollution (water, air and noise):

- * A Spill Contingency Plan for both construction and operational phases should form part of the Environmental Management Programme (EMPr). The Spill Contingency Plan should address measures to prevent and mitigate the spillage of hazardous materials, which include oil, grease and petrochemicals as well as herbicides which may be used as part of the alien clearing operation.
- * All chemicals should be appropriately stored and handled. Storerooms must be more than 100 m from watercourse zones and have appropriate concrete flooring and bunding to a capacity of 110% of the volume of all the stored Hazardous substances.
- * Spillages of fuels, oils and other potentially harmful chemicals should be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any

contaminated soil must be removed and the affected area rehabilitated immediately and appropriately.

- * No washing of construction equipment and vehicles must be done on site.
- * The existing drain should be checked frequently to ensure that effluent and rubbish is not entering the drain and this drain is not becoming blocked and causing water to find an alternate alignment into the Tugela River that may erode and pollute the river.
- * Storm water drains associated with the bridge must be directed to scupper pipes along the bridge. Trash collectors to be placed at the inlets to these to prevent larger general waste from entering the pipes and blocking them, as well as preventing these larger articles entering the river system.
- * Any remnant rubbish, spoil, machinery and contaminants need to be removed from the development area.
- * Proper management and disposal of construction waste must occur during the construction phase of the bridge. Washing of paint brushes, containers, equipment etc. within the river must not occur.
- * Portable toilets must be placed outside the 1:100 year flood line or 50 m away from the Rivers edge.

Operational Phase

Modification of flow regimes:

- * If flow regimes are altered (long-term) such as around the piers, rehabilitation measures should be implemented according to a rehabilitation plan in response to the monitoring and recommendations of the changes in flow regime by a qualified specialist.

Pollution (water, air and noise):

- * Rubbish bins need to be placed near the bridge development for pedestrians and vehicles;
- * Routine water quality measurements should be undertaken to determine if the quality has changed from the baseline condition; and

Increase in invasive alien species:

- * Follow up assessments should be undertaken to determine the success of the re-vegetation process.
- * Any alien invasive plants emerging from the new banks and spoil areas need to be removed before seeding occurs.
- * A monitoring programme must be implemented to enforce the continual eradication of alien invasive species during the construction phase. See EMPr for the invasive alien plant control plan.

Indirect Impacts.

Aesthetic aspects

- * To prevent negative visual impact, the construction camp must not be located in highly visible areas. It must be positioned on previously disturbed areas.
- * Prior to establishment an agreement as to the contractors camp and laydown areas positioning must be reached between the community, Engineer and ECO.
- * The site must be cleared and grubbed prior to establishment and all topsoil must be stockpiled and protected from erosion, (wind and water) by either vegetating it with grass or utilising shade cloth as a wind break in areas where the prevailing wind comes from.
- * It must be contained to prevent any visual intrusion and be kept in a clean and orderly state at all times. This will deter rodents and other fauna from entering the camp.
- * Natural shades must be used to colour roofs (construction camp). In addition, roofs and other buildings must be constructed with non-reflective materials.

Noise

- * Operational hours (of construction) must be limited to between 07h00 and 17h00 to avoid sleep/rest disruption and general disturbance of adjacent land users.
- * Construction on Sundays must be prohibited.
- * Construction workers must be made aware of not creating unnecessary noise raucous behaviour, hooting, engine revving etc.

Poaching of local fauna

- * No animals used for hunting e.g. dogs, under the supervision of construction workers, are allowed onto the property.
- * Any construction worker found to be poaching on the property will be subjected to instant dismissal

Social anxiety

- * All Interested and Affected Parties must be contacted in order to inform them of the starting date of construction and the proposed duration.
- * All Interested and Affected parties must be notified of the construction process and the manner in which it will be implemented via public notices.
- * All Interested and Affected Parties must be given the correct correspondence information should they wish to contact the Environmental Consultant, Proponent, Project Manager, Engineer and/or Contractor/s during the construction phase via public notice, which must be prominently placed at both ends of the project boundaries/work face and kept in good repair at all times so as to be clearly legible.

2.3. IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the operational phase:

Alternative S1 (preferred alternative)

- Many of the potential negative impacts associated with repair and maintenance are similar to the construction phase impacts. These would include waste generation, dust and emission generation, water pollution, noise, surface runoff, erosion, and establishment and spread of alien vegetation.
- As a result of vehicular activity and usage, high concentrations of phosphorous, lead, iron, chromium, manganese, ammonia, cadmium, copper and zinc are usually deposited as a result of this road usage.
- These pollutants accumulate on impervious surfaces during the preceding dry period (winter). During the first significant rains of the summer season ("first flush" effect) these chemicals and compounds are drawn out of and off the roadbed. These substances will then be discharged directly into the Tugela River should scupper pipes be used. This is a standard practice manner to deal with storm water and it is unlikely that the current levels will change significantly, and thus this manner of disposal is suitable.
- For the lifespan of the bridge the potential exists for increased channel flow velocity around and the in-channel piers. The result is that potentially scouring and a change in the riverbed morphology will result. These may lead to additional sediment deposition downstream of the bridge in the form of a mid-channel island. The formation of a mid-channel island is possible however, a mid-channel island is already in existence as a result of the original bridge structure. The aquatic assessment specialist has identified that the construction of the new double lane bridge structure will not contribute significantly to the functioning of the river and thus the impacts on the down-stream receiving environment. However, this will be required to be monitored on an on-going basis.
- Backwash of water upstream during flood events.

Indirect impacts:

- Erosion of surrounding banks due to storm water. Erosion between the two bridges as a result of the additional piers and obstructions within the channel. It may prove pertinent that the river banks are provided with additional reinforcement through the implementation of rip-rap laid down on the river banks to reduce the potential for vortices to occur and the resultant scouring of the banks.

Cumulative impacts:

Positive Impacts

- Improved and safer traffic flows and pedestrian safety.
- Significantly fewer individuals will require relocation
- The existing structure cannot be amended as this will compromise its Provincial Monument status. Further additional structures cannot be safely added to the existing bridge due to the original design capacity and loads.

- The placement of a bridge directly upstream of the existing bridge will potentially provide some protection to the existing bridge from large debris that will be washed downstream in large flood events.
- The maintenance costs for the existing bridge will potentially be reduced as it will no longer have vehicles utilising it, only foot traffic and livestock.

Negative Impacts

- Increased channel flow velocity around bridge abutments and piers can cause erosion and changes to the channel flow and regime;
- Backwash of water upstream during flood events;
- The deposition of contaminated storm water into the Tugela River will potentially be slightly elevated as a result of the expected increase in vehicular traffic usage.

Alternative S2 (if any)

- Many of the potential negative impacts associated with repair and maintenance are similar to the construction phase impacts. These would include waste generation, dust and emission generation, water pollution, noise, surface runoff, erosion, and establishment and spread of alien vegetation.
- As a result of vehicular activity and usage, high concentrations of phosphorous, lead, iron, chromium, manganese, ammonia, cadmium, copper and zinc are usually deposited as a result of this road usage.
- These pollutants accumulate on impervious surfaces during the preceding dry period (winter). During the first significant rains of the summer season ("first flush" effect) these chemicals and compounds are drawn out of and off the roadbed. These substances will then be discharged directly into the Tugela River should scupper pipes be used. This is a standard practice manner to deal with storm water and it is unlikely that the current levels will change significantly, and thus this manner of disposal is suitable.
- For the lifespan of the bridge the potential exists for increased channel flow velocity around the in-channel piers. The result is that potential scouring and a change in the riverbed could result. This change may lead to sediment deposition downstream of the bridge in the form of a mid-channel island. The formation of a mid-channel island is possible however, a mid-channel island is already in existence as a result of the original bridge structure. The aquatic assessment specialist has identified that the new two land bridge structure will not contribute significantly to the mid-channel island. Further it must be considered that the Tugela River is a sediment driven system and that flushing and sediment deposition are natural occurrences within the Tugela River system.
- Backwash of water upstream during flood events.

Indirect impacts:

- Erosion of surrounding banks due to storm water. Erosion between the two bridges as a result of the additional piers and obstructions within the channel. It may prove pertinent that the river banks are provided with additional reinforcement through the implementation of rip-rap laid down on the river banks to reduce the potential for vortices to occur and the resultant scouring of the banks.

Cumulative impacts:

Positive Impacts

- Improved and safer traffic flows and pedestrian safety.
- The existing structure cannot be amended as this will compromise its Heritage Status and additional structures cannot be safely added to the existing bridge.
- The maintenance costs for the existing bridge will potentially be reduced as it will no longer have vehicles utilising it, only foot traffic and livestock.

Negative Impacts

- A large number of individuals and associated businesses will require relocation and removal as a result of the not-preferred or **Alternative 2 Option** being selected.
- Increased channel flow velocity around bridge abutments and piers can cause erosion and changes to the channel flow and regime;
- Backwash of water upstream during flood events;
- The deposition of contaminated storm water into the Tugela River will potentially be significantly higher as a result of the expected increase in vehicular traffic usage.
- The placement of the alternative bridge location downstream of the current structure may result in a significantly altered mid channel island and significant change to flow patterns.

No-go alternative (compulsory)

The current situation will become worse as there is bound to be additional traffic utilising this road as more of the population become mobile. The current traffic backups will increase.

The danger of the crossing of the existing bridge will be compounded as peoples impatience will continue to grow, and result in ever increasing levels of risk taking.

Pedestrians will not have a dedicated bridge to cross the Tugela River thus exposing them to potential incidents involving motor vehicles.

The no-go alternative will also have an impact on air quality as vehicles will be waiting to cross the bridge as a result of it only being a single lane bridge with running engines. This will create and exacerbate the localised poor air quality resulting from vehicle emissions. The potential also exists that whilst vehicles are stationary, oil leaks and other fluids required for the operation of motor vehicles may become elevated, whilst the vehicles wait to cross the current single lane bridge.

Local Economic Development will be severely restricted as access to and use of this road by non-local residents and communities members will remain low due to the inconvenience and perceived hazard to utilising the current bridge across the Tugela Ferry.

Indirect impacts:

No indirect impacts – no construction will take place.

Cumulative impacts:

No job opportunities or skills transfer and development will be able to occur during the construction phase, as the construction of the new double lane bridge and associated roadways will not take place.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1

Alternative S2

An operational EMPr must be compiled which will address the possible impacts resulting from the operation of the bridge and must make recommendations as to how to mitigate these impacts.

- This operational EMPr must be approved by all concerned and competent authorities prior to the operation of the bridge.
- Conditions of road and bridge must be in good order at all times.
- Monitoring of the water quality and the habitat diversity should take place for a period of two years after the bridge has been operational to understand the changes in the biophysical environment, if any, from the new bridge structure, and inform management protocol going forward.

Measures to minimise the potential negative impacts on the biophysical environment are similar as those outlined in the site specific construction phase EMPr attached in **Appendix F** of this document.

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the operational phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative)

Not Applicable

Alternative A2

No-go alternative (compulsory)

The current situation will become worse as there is bound to be additional traffic utilising this road as more of the population become mobile. The current traffic backups will increase.

The danger of the crossing of the existing bridge will be compounded as peoples impatience will continue to grow, and result in ever increasing levels of risk taking.

Pedestrians will not have a dedicated bridge to cross the Tugela River thus exposing them to potential incidents involving motor vehicles.

The no-go alternative will also have an impact on air quality as vehicles will be waiting to cross the bridge as a result of it only being a single lane bridge with running engines. This will create and exacerbate the localised poor air quality resulting from vehicle emissions. The potential also exists that whilst vehicles are stationary, oil leaks and other fluids required for the operation of motor vehicles may become elevated, whilst the vehicles wait to cross the current single lane bridge. These fluids and potentially hazardous substances will find their way into the Tugela River at the onset of any rainfall events.

Local Economic Development will be severely restricted as access to and use of this road by non-local residents and communities members will remain low due to the inconvenience and perceived hazard to utilising the current bridge across the Tugela Ferry.

Indirect impacts:

No indirect impacts – no construction will take place.

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Cumulative impacts:

No job opportunities or skills transfer and development will be able to occur during the construction phase, as the construction of the new double lane bridge and associated roadways will not take place.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1

Alternative A2

See mitigation measures for alternative S1

2.4. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING OR CLOSURE PHASE

There are no impacts associated with the decommissioning and closure of the project as the bridge structure is likely to be a permanent structure unless damaged by flooding.

a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the decommissioning or closure phase:

Alternative S1 (preferred alternative) **N/A**

The decommissioning or closure phase will have the same impacts as for the construction phase.

Alternative S2 **N/A**

No-go alternative (compulsory) **N/A**

The current situation will become worse as there is bound to be additional traffic utilising this road as more of the population become mobile. The current traffic backups will increase.

The danger of the crossing of the existing bridge will be compounded as peoples impatience will continue to grow, and result in ever increasing levels of risk taking.

Pedestrians will not have a dedicated bridge to cross the Tugela River thus exposing them to potential incidents involving motor vehicles.

The no-go alternative will also have an impact on air quality as vehicles will be waiting to cross the bridge as a result of it only being a single lane bridge with running engines. This will create and exacerbate the localised poor air quality resulting from vehicle emissions. The potential also exists that whilst vehicles are stationary, oil leaks and other fluids required for the operation of motor vehicles may become elevated, whilst the vehicles wait to cross the current single lane bridge.

Local Economic Development will be severely restricted as access to and use of this road by non-local residents and communities members will remain low due to the inconvenience and perceived hazard to utilising the current bridge across the Tugela Ferry.

Indirect impacts:

No indirect impacts – no construction will take place.

Cumulative impacts:

No job opportunities or skills transfer and development will be able to occur during the construction phase, as the construction of the new double lane bridge and associated roadways will not take place.

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Indicate mitigation measures to manage the potential impacts listed above:

Alternative S1 **N/A**

Alternative S2

See mitigation measures for construction phase.

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the decommissioning or closure phase (please list impacts associated with each alternative separately):

Alternative A1 (preferred alternative) **N/A**

See impacts for construction phase.

Alternative A2 **N/A**

No-go alternative (compulsory)

Direct impacts:

The current situation will become worse as there is bound to be additional traffic utilising this road as more of the population become more mobile. The current traffic backups will increase.

The danger of the crossing of the existing bridge will be compounded as peoples impatience will continue to grow, and result in ever increasing levels of risk taking.

Pedestrians will not have a dedicated bridge to cross the Tugela River thus exposing them to issues of motor vehicular incidents.

The no-go alternative will also have an impact on air quality as vehicles will be waiting to cross with running engines, thus creating localised poor quality air as a result of vehicle emissions. The potential also exists that whilst vehicles are stationary oil leaks and other vehicle leaks may become elevated, whilst the vehicles wait to cross the bridge.

Local Economic Development will be severely restricted as access to and use of this road by non-local residents and communities members will remain low due to the inconvenience and perceived hazard to utilising the current bridge across the Tugela Ferry.

Indirect impacts:

No indirect impacts – no construction will take place.

Cumulative impacts:

No job opportunities or skills transfer and development will be able to occur during the construction phase, as this construction of the new double lane bridge will not take place.

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1 **N/A**

Alternative A2

See mitigation measures for construction phase.

2.5. PROPOSED MONITORING AND AUDITING

For each phase of the project and for each alternative, please indicate how identified impacts and mitigation will be monitored and/or audited.

Alternative S1 (preferred site)	Alternative S2
<p>Monitoring and auditing is a stipulation of an Environmental Authorisation and Environmental Management Programme. The nature of construction will require that a consolidated environmental audit report be compiled on a monthly basis with site visits to be undertaken bi-monthly</p> <p>It is recommended that at the inception of the project that an inception and training visit be undertaken to guide the contractor, determine the location for the site camp, demarcate the working servitude and ensure that the contractor is aware of the constraints related to the site and how the management of the construction must be undertaken in a sympathetic manner with the receiving environment which must be considered sensitive. The ECO must visit the site weekly to establish a good working relationship with the contractor and ensure that the contractor is compliant with the EMP and the EA.</p> <p>The ECO must prioritise the monitoring of environmentally sensitive work such as the rehabilitation of the riparian area and also during the landscaping phase.</p> <p>Auditing must be undertaken monthly by an independent environmental auditor</p> <p>A full time independent Environmental Site Officer must be appointed. There must be an environmental site instruction book on site for use by the ECO.</p> <p>In addition the following must be on site in one of two separate files:</p> <ul style="list-style-type: none"> * Environmental Authorisation and any amendments thereto * EMP * Rehabilitation Plan * General Authorisation from DWS * Storm water management plan * Construction Method Statement and amendments thereto <p>The other file must contain the following:</p> <ul style="list-style-type: none"> * Complaints register * MSDS Sheets * Waybills for waste disposal * Waybills for sewage waste disposal * Approvals from the Municipality District and Local for waste disposal * Toolbox talks register * Induction training for staff and labour force * Monthly audit reports 	

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<ul style="list-style-type: none"> * Materials sources * Register of notifications * Register of incidents * Register of chemicals stored on site * Register of employees * Register of any training that may take place 	
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Alternative A1 (preferred alternative)

Alternative A2

Same as above.

3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative S1 (preferred site)

1. With regard to the biophysical environment, the proposed development will result in the loss of habitat, and is likely to impact on the local fauna and flora. The mitigation measures in this report and EMPr must be implemented to reduce impacts such as habitat destruction, erosion and pollution.
2. Impacts on the river such as river contamination, sedimentation, turbidity and flow rate will have a high impact if mitigation measures are not implemented.
3. Proper storm water management during the construction and operational phase will reduce the negative impacts on the Tugela River such as pollution, erosion and habitat destruction both at the bridge site and downstream.
4. With regard to sewage disposal there are no significant impacts predicted if mitigation measures are implemented.
5. There does not appear to be any solid waste issues with regards to the proposed development provided the above mentioned mitigation (stated in the impact / mitigation sections) are instituted during all phases of the development.
6. The potential traffic issues related to the proposed development would not be highly significant as an increase in traffic (and heavy vehicles) would only be expected in the construction phases. This may result in road deterioration of the P6 access road and other minor roads in the immediate area. If these roads are maintained regularly by the contractor this issue will be negated.
7. During the operational phase traffic will be faster and there will be less traffic back-ups.
8. This project will have a positive impact on the local community (social upliftment, improved infrastructure) as well as road users driving through Tugela Ferry. This project will also result in a potential economic injection to the local community as the route passing through Tugela Ferry will become safer, quicker and more convenient and will promote people wanting to visit

the battlefields around Dundee as well as Isandlwana and Rourke's Drift to make use of this access, as opposed to driving through Ladysmith and Dundee.

Alternative A1 (preferred alternative) N/A

Alternative A2 N/A

No-go alternative (compulsory)

Direct impacts:

The current situation will become worse as there is bound to be additional traffic utilising this road as the population becomes more mobile. The current traffic backups will increase.

The danger of the crossing of the existing bridge will be compounded as peoples impatience will continue to grow, and result in ever increasing levels of risk taking.

Pedestrians will not have a dedicated bridge to cross the Tugela River thus exposing them to issues of motor vehicular incidents.

The no-go alternative will also have an impact on air quality as vehicles will be waiting to cross with running engines, thus creating localised poor air quality as a result of vehicle emissions. The potential also exists that whilst vehicles are stationary, oil leaks and other vehicle leaks may become elevated, whilst the vehicles wait to cross the bridge.

Local Economic Development will be severely restricted as access to and use of this road by non-local residents and communities members will remain low due to the inconvenience and perceived hazard of utilising the current bridge across the Tugela Ferry.

Indirect impacts:

No indirect impacts – no construction will take place.

Cumulative impacts:

No job opportunities or skills transfer and development will be able to occur during the construction phase, as this construction of the new double lane bridge will not take place.

SECTION F. RECOMMENDATION OF EAP

Is the information contained in this report and the documentation attached hereto in the view of the EAPr sufficient to make a decision in respect of this report?

If "NO", please contact the KZN Department of Agriculture & Environmental Affairs regarding the further requirements for your report.

YES	

If "YES", please attach the draft EMPr as Appendix F to this report and list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

It is in the view of the Environmental Assessment Practitioner that the preferred activity is (i) biophysically acceptable, (ii) socially beneficial, and (iii) will maximize the purpose and need of the application.

It is recommended that the preferred activity is granted environmental authorization, as described in Section 2 of this Basic Assessment Report.

This report is accompanied by an EMPr that includes mitigation measures and recommendations made by the various specialists. This EMPr must to be approved by the EDTEA prior to construction commencing.

Mitigation Measures to be included in the EA

- Limit disturbance in the river bed and the surrounding riparian zones to a maximum width of 40 metres.
- Promote the ethos of undertaking progressive re-instatement.
- Rehabilitate disturbed areas after construction by removing all construction debris and planting suitable indigenous riparian vegetation.
- Ripping and re-vegetation of laydown areas and the contractor's camp must be undertaken to the satisfaction of the ECO prior to the contractor leaving site.
- A monitoring programme must be implemented to enforce the continual eradication of alien invasive species during the construction phase.
- Monitor disturbed areas to prevent infestation by invasive alien plants after the construction phase is complete - this must take place every three (3) months for the first year and every six (6) months for the following two years and thereafter yearly to year five (5).
- Prevent contaminated run-off from the construction site flowing directly into the Tugela River and surrounding watercourses.
- Erosion prevention measures must be implemented: Berms, sand bags and Hessian sheets must be used to contain all sediment whilst energy dissipaters must be constructed at all outflow points.
- The construction sites and downstream area must be monitored weekly for any signs of off-site siltation.
- All solid waste must be disposed of at a registered landfill site; proof of this must be kept on site in the Environmental Site file.
- Adequate solid waste disposal containers must be supplied to prevent littering and attraction of scavenging animals. These containers must be sealed all times

- Separation of waste into the various components, i.e. hazardous, general and construction waste is essential.
- Methods for reducing and managing waste e.g. recycling, use of biodegradable material etc. must be applied.
- Sewage - During construction it is recommended that portable sanitation facilities be erected. These facilities must be on an impervious surface. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding bush). These facilities must also be monitored and serviced twice weekly to prevent leakage and contamination of the water table and the Tugela River.
- Operational hours (of construction) must be limited to between 07h00 and 17h00 to avoid sleep/rest disruption and general disturbance of adjacent land users.
- All borrow pits must be approved by the Department of Minerals and Resources.
- A Community Liaison Officer and a full time independent Environmental Site Officer must be appointed.
- Silt laden water must not be directly discharged over land or directly into water courses, and must be contained in settlement ponds and managed before release. Such overland discharge must not cause erosion.
- Erosion and sedimentation control measures must include:
 - Minimising the removal of vegetation;
 - Clearly demarcating boundaries in order to limit construction activities;
 - Permanent or temporary fences must be erected and maintained to ensure that activities are conducted within the demarcated area, and thus limit impacts on the environment;
 - Suppliers/contractors must ensure that all vehicles utilize dedicated routes for construction; and,
 - Where erosion and/or sedimentation occurs, such areas require immediate attention and implementation of further preventative measures.

Recommendations made by the wetland specialist:

Soil erosion and sedimentation

- No stockpiling of any materials should take place adjacent to the river
- Erosion control measures must be implemented in areas sensitive to erosion such as near water supply points, edges of slopes, etc. These measures could include the use of sand bags, hessian sheets, silt fences and retention or replacement of vegetation.
- Disturbed areas must be rehabilitated as soon as construction in an area is complete or near complete.
- Vegetation clearing must be undertaken as and when necessary. The entire construction area must not be stripped of vegetation prior to commencing construction activities. This applies particularly to the new road alignments that will be constructed as part of this project.

Reduction in riparian vegetation

- Protect as much indigenous vegetation as possible. Remove alien invasive species where construction activities are occurring and replace the alien vegetation with indigenous vegetation.
- Rehabilitate disturbed riparian vegetation as soon as construction in an area has been completed. Rehabilitation must be aimed at improving the ecological state and

function of the ecosystem, i.e. through the removal of invasive alien species and the planting of indigenous species that are endemic to the project area, namely, Thukela Valley Bushveld.

Disturbance of channel bed and banks

- Use vehicular digging of the banks of the stream only in areas where this is deemed absolutely necessary. Working during the winter months will reduce soil erosion potential in disturbed areas as well as limit downstream impacts as flow levels within the river will be at their lowest.
- There shall be no mining of soil / sand required for construction purposes from the banks of the river. Aggregate, sand and other materials must be brought in, if needed for construction purposes. This must be stockpiled away from the river's edge.
- Steep areas along the river bank which have been disturbed must be protected through the use of gabion baskets on a reno-mattress.
- Gabions are passive structures that protect the riverbank from high-energy river flow. The gabions can be planted with indigenous vegetation, which has been overthrown with topsoil, including sedges, Cyperaceous or Juncaceous species which will grow within the gabion baskets and help to further stabilise the banks of the river.

Pollution of water resources and soil

- It is imperative that the correct storage and handling of hazardous substances (hydrocarbons and chemicals) occurs during the construction phase of the bridge.
- Proper management and disposal of construction waste must occur during the construction phase of the bridge. Washing of paint brushes, containers, equipment etc. within the river must never happen.
- Portable toilets must be placed outside the 1:100 year flood line or 50m away from the River's edge.
- Spillages of fuels, oils and other potentially harmful chemicals should be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately and appropriately. Spillages of this sort MUST be handled by a recognised and qualified spill response company such as Drizit or Spilltech.

Water Quality Monitoring

- Water quality testing and monitoring must be undertaken at two predetermined positions above and below the construction area to ensure that the water column is not carrying significantly elevated levels of particulate matter. The monitoring must be undertaken below (outside) the sediment turbidity curtain. Monitoring will only be required during the most high risk activities relating to the, cofferdam construction, dredging of the river bottom for the foundation and abutment construction and the removal of the cofferdam structure.
- Testing of the water quality should also consider chemical changes and these should be monitored particularly during the dredging for the piling of the piers and the pouring of the concrete, even though the risks associated are relatively low as a sleeve will be in place to act as a chute and contain the steel and cement during this exercise.

SECTION G: APPENDICES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s)

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Comments and responses report

Appendix F: Draft Environmental Management Programme (EMPr)

Appendix G: Other information