ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED REPLACEMENT OF THE NSELENI RIVER BRIDGE NO.261 ON P425 WITH PROPOSED RE-ALIGNMENT BETWEEN EMPANGENI AND NSELENI; UMHLATHUZE AND MFOLOZI MUNICIPALITIES, UTHUNGULU DISTRICT, KZN

DC28/0013/2013

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DOCUMENT DESCRIPTION

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Report name:	Environmental Management Programme for The Proposed Replacement of the Nseleni River Bridge No.261 on P425 between Empangeni and Nseleni; Umhlathuze and Mfolozi Municipalities, UThungulu District, KZN
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Project name:	Replacement of the Nseleni River Bridge No.261 on P425 between Empangeni and Nseleni; Umhlathuze and Mfolozi Municipalities, UThungulu District, KZN
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Arlene Singh Environmental Consultant	17 May 2013	
Reviewed &Authorised By:	**Date**	**Signature**
Hantie Plomp Managing Director	20 May 2013	

TABLE OF CONTENTS

GLOSSARY OF TERMS

Audit
A verification process that is used to obtain information regarding the implementation of the EMPr. It is an objective tool used to make improvements at the workplace.

Biophysical Environment
All aspects of the natural environment including physical features such as watercourses, groundwater and soils as well as the biological features such as plants and animals.

Bunding
An impervious containment system for potential spillages from tanks / containers stored on site. The bunded area shall have a capacity greater than 110% of the total tankage contained. The bunding shall be constructed of a material impermeable and resistant to the stored material.

Client
The KwaZulu-Natal Department of Transport (KZN DoT)is regarded as the client.

Construction Activity
A construction activity is any action taken by the Contractor, his Sub Contractors, suppliers or personnel during the construction process.

Contractor
Construction companies appointed on behalf of the client to undertake the construction activities, as well as their subcontractors and suppliers.

Construction camp
The area allocated for the establishment of equipment, repair area, ablution facilities, lay down and rest areas, etc. It also serves as the central point for the storage of fuel and construction material.

DEA
Department of Environmental Affairs

EA
Environmental Authorisation

ECO
Environmental Control Officer
Individual appointed by the project Manager and who is responsible for the implementation of the EMPr, liaison between DoT, Royal HaskoningDHV, Contractor and authorities, and monitoring, reviewing and verifying compliance with the EMPr by the Contractor.

EMPr
Environmental Management Programme report
The EMP for the project sets out general instructions that will be included in a contract document for the construction phase of the project. The EMPr will ensure the construction activities are conducted and managed in an environmentally sound and responsible manner. The EMPr also details the organisational structure required to ensure the effective implementation of the EMPr and measures to monitor and improve the application of the EMPr.

Environment
The environment means the surroundings within which humans exist and that could be made up of water, air, soil, sand, plants and animals.

Environmental Aspect
An environmental aspect is any component of a contractor's construction activity that is likely to interact with and on the environment.

Environmental Impact
An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Environmental Consultant
An independent consultant that is appointed by the client to compile an Environmental Management program and to undertake environmental audits or Control Officer Functions.

Environmental Specifications
Instructions and guidelines for specific construction activities designed to help prevent, reduce and/or control the potential environmental implications of these construction activities.

Fauna
Any and all animals identified within or outside of the construction area. Animals may not be harmed in any way.

Site Environmental Control Officer
An environmentally knowledgeable or qualified person nominated by the appointed contractor and/or client who will ensure the day-to-day implementation of the EMPr by contractors.

General Waste
Domestic waste, commercial waste, non-hazardous industrial waste e.g. paper, plastics, food, tins, wood, building rubble, etc.

Hazardous Substance
Any substance that poses a significant risk to health and safety, property or the environment. These substances have been classified under the SABS Code 0228: *'The Identification and Classification of Dangerous Goods and Substances'*. Hazardous substances / materials are those that are potentially: poisonous, flammable, carcinogenic or toxic. Some examples of hazardous substances / materials:

a. diesel, petroleum, oil, bituminous products;
b. cement;
c. solvent based paints;
d. lubricants;
e. explosives;
f. drilling fluids;
g. pesticides, herbicides; or
h. LP gas.

Hazardous Waste
Any inorganic or organic element or compound that because of its toxicological, physical, chemical or persisting properties, may exercise detrimental acute or chronic impacts on human health or development. Hazardous wastes are classified in accordance with the 'Minimum Requirement for the Handling, Classification and Disposal of Hazardous Waste' published by the Department of Water Affairs and Forestry (1998). Hazardous waste produced on site may include: oil and other lubricants such as diesel, paints and solvent, containers that contained hazardous chemicals e.g. antifreeze and equipment, steel, other material (rags), soil and water contaminated by hazardous substances.

Hazardous Waste Landfill Site
A waste disposal site that is designed managed and permitted by DWA or DEA to allow for the disposal of hazardous waste.

Incident
The occurrence of a pollution or degradation event that will have a direct or indirect effect on the environment e.g. surface water, groundwater, soils, ambient airas well as plants, animals and humans.

Land owner
The individual or company that owns the land through which the servitude crosses.

Project
This refers to all construction activities associated with the proposed activities.

PM
Project Manager or Representative of the appointed firm responsible for overall management of the construction phase of the project including the management of all Contractors.

Rehabilitation
Rehabilitation is defined as the return of a disturbed area, feature or structure to a state that approximates to the state (where possible) that it was before disruption, or to an improved state.

Servitude
A servitude is a right to access which allows a local authority access to a property for inspection or installation of roads, pipes, sewerage lines, electricity cables and so on. It is registered against the title deed.

SHE
Safety, Health and Environment.

Social Environment
Persons likely to be directly or indirectly affected by the project construction activities.

Solid Waste
Means all solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

Topsoil
The layer of soil covering the earth which provides a sustainable environment for the germination of seeds, allows water penetration, and is a source of micro-organisms and plant nutrients.

Watercourse
A river or spring; a natural channel or depression in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse.

Waste
An unusable or unwanted substance or material.

Workforce
The entire project team including people employed by the Client or the Contractor, persons involved in activities related to the project, or persons present at or visiting the construction area, including permanent contractors and casual labour.

TERMS AND ABBREVIATIONS

DWA:	Department of Water Affairs;
DAEA:	Department of Agriculture and Environmental Affairs;
EMPr:	Environmental Management Programme Report;
EA:	Environmental Authorisation;
ECO:	Environmental Control Officer;
DOT:	Department of Transport;
DAFF:	Department of Forestry and Fisheries;
DMR:	Department of Mineral Resources;
PE:	Project Engineer;
EER:	Engineer, Environmental Representative.

1. INTRODUCTION

The project, initiated by the KwaZulu-Natal Department of Transport (KZN DoT), proposes the replacement of the damaged Nseleni River Bridge on the P425. The existing Bridge built shortly after 1931 consists of a single lane, that due to heavy vehicle impact and lack of maintenance can no longer not comply with the required standards for the class and loading it has to carry. The preferred replacement structure will be situated upstream, adjacent to the old steel truss bridge with a slight revised road alignment.

The proposed replacement bridge will consist of a new two lane (3,5m wide with 1,5m shoulders), three span (20m-26m-20m) continuous in-situ box girder concrete deck (total length of 66m) upstream and immediately adjacent to the old steel truss. A cross section of the pier columns on either side of the Nseleni River, rectangular in shape with rounded edges to accommodate river flow around the pier. Both piers are approximately 14 metres high.

- Ancillary components forming part of the proposed structures:
    - In situ vehicle barriers on the deck edge and before the sidewalk, matching KZN DoT's (and SANRALS's) existing standards and design procedure (revised 2012).
    - 1,5m barrier-protected pedestrian sidewalk on one side of the bridge.
    - Bearings and expansion joints

The preferred position of the new bridge upstream from the current bridge provides for a future upgrade of the P425 with a Road Class 3 compliance of 100 km/h design speed and a smaller environmental footprint. The new road alignment is approximately 13m wide with a road reserve of 30m.

Preservation of the existing steel bridge, being a historical structure is proposed, entailing barriers designed to prevent vehicular and pedestrian access as well as safety and educational signage following closure. This EMPr is concerned with the implementation of environmental management and mitigation measures related to the sections that require environmental authorisation.

- The following activities **require an environmental authorisation**:

- The construction of the new bridge, road re-alignment, coffer dam and construction platforms will take place at or within the river (watercourse).
- During road and bridge construction materials will be brought in, coffer dams will be built, erosion protection measures will be implemented and excavations and moving of soil, sand or rock in excess of 5 cubic meters will take place.
- The road will not be lengthened by more than a kilometre, but the alignment between the existing and new re-aligned sections may comprise small areas that will be widened by more than 6m.
- The clearance/removal of severely degraded Riparian vegetation to access the site.

The P425 provides access to communities between Empangeni and Nseleni links the town to the villages of Lubana and Mabuyeni as well as to Mpemvu Primary School and Owen Sithole College if Agriculture. The P 425 serves as an alternate emergency route from Empangeni and Nseleni to the N2.

In terms of The Constitution of the Republic of South Africa (Act No. 108 of 1996) everyone has the right:

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

This EMPr is developed to ensure the sustainable implementation and operation of the proposed project. Due consideration has been given to the development in terms of the planning, construction and operational phases whilst considering the needs of the environment and interested and affected parties. Where relevant, rehabilitation and closure aspects have also been considered and addressed.

1.1. Project Owner

The details of the project Owner are as per Table 1-1:

Table 1-1: Project Owner

Name of Owner	Department of Transport		
Contact Person	Mr David Bryan		
Postal Address	Private Bag X9043 Pietermaritzburg, 3200		
Telephone Number	033 355 0542	Fax Number	033 342 6738
Mobile Number	083 628 1417	E-mail	David.bryan@kzntransport.gov.za

1.2. Independent Environmental Assessment Practitioner and Control Officer

Royal HaskoningDHV appointed Triplo4 Sustainable Solutions as the Independent Environmental Assessment Practitioner (EAP) to compile the EMPr. Table 1-2 indicates the details of the EAP:

Table 1-2: Environmental Assessment Practitioner

Name of Consultancy	Triplo4 Sustainable Solutions		
Contact Person	Hantie Plomp		
Postal Address	P.O.BOX 6595, Zimbali, 4418		
Telephone Number	032 946 3213	Fax Number	032 946 0826
Mobile Number	083 308 8003	Email	hantie@triplo4.com

1.2.1. Expertise of EAP to Prepare the EMPr

Hantie Plomp has a Masters Degree in Environmental Management and has been professionally registered with the South African Council for Natural Scientific Professions (SACNASP) since 2001. She is also an accredited professional (AP) with the Green Building Council of South Africa (GBCSA). Hantie previously worked at Royal HaskoningDHV previously known as SSI Engineers & Environmental Consultants were she established the environmental sector within KZN and was the Regional

Environmental Manager for 5 years. Prior to this she was at AngloGold Ashanti for 19 years were she headed up the Environmental Systems Section comprising EMS, Audits and Environmental Assessments within the Environmental Management Department and acted as Head of the Environmental Management Department on a number of occasions. She was an Alternate Director at Midvaal Water Company. She was also part of the project team that investigated water treatment options for contaminated mine water. Her employment with the production and consulting companies provided extensive experience in a broad range of environmental aspects, including but not limited to legal compliance and internal systems audits, waste management, water management and the management and execution of environmental authorisations. Her extensive environmental management experience of more than 15 years in a number of environmental areas enables the company to provide a wide range of environmental consulting services to both the private and public sectors.

Specific project experience related to Basic Assessments (BA) and Environmental Impact Assessments (EIAs) and the associated development of EMPr's include, but are not limited to:

- EIAs for residential and commercial developments;
- EIA / Waste license application for a crematorium;
- EIAs for new mining right applications and industrial expansion projects;
- BAs for developments within 100 metres of the high water mark;
- BAs for developments in excess of 1ha within rural context or 5ha within an urban environment;
- BAs for fuel stations;
- BA / Waste License for Recycling Operations;
- BAs and EMPr's for roads and pipelines with watercourse crossings;
- EMPr's for sport field developments; and
- EMPr for a cemetery.

1.3. Applicable Documentation

This EMPr must be read in conjunction with the Environmental Authorisation(once issued) for the proposed development and any other relevant documentation by DWA, DAFF, Mfolozi and uMlathuze Municipalities and the Client. These could include but not be limited to: A General water use licence, a permit for removal of protected plant species on site, conditions for establishment, hazardous chemicals permit for asphalt plants, if to be used from the Department of Environmental Affairs, health permits for sanitation from provincial health officials and fuel storage permit (temporary and permanent) from the Department of Environmental Affairs and mining permits or licenses for borrow-pits.

1.3.1 Environmental Authority

Table 1-3.1: Environmental Authority Contact Detail

Name of Authority	Department of Environmental Affairs uThungulu district – Compliance, monitoring and enforcement component		
Contact Person	Kershia Ramsern		
Telephone Number	035 780 6847	Fax Number	035 789 8211
Mobile number		Email	kershia.ramsern@kzndae.gov.za

1.4 Applicable Environmental Legislation

The following Environmental legislation was considered in the evaluation of the activities and development of the EMP:

LEGISLATION	SECTIONS	RELATES TO
The Constitution (No 108 of 1996)	Chapter 2	Bill of Rights.
	Section 24	Environmental rights.
National Environmental Management Act (No 107 of 1998 [as amended])	Section 2	Defines the strategic environmental management goals and objectives of the government. Applies through-out the Republic to the actions of all organs of state that may significantly affect the environment.
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	The developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
National Environmental Management: Waste Act (No 59 of 2008)		Provides for specific waste management measures and the remediation of contaminated land.
Environment Conservation Act (No 73 of 1989) and regulations	Sections 19 and 19A	Prevention of littering by employees and sub-contractors during construction and the maintenance phases of the proposed project.
National Heritage Resources Act (No 25 of 1999) and regulations	Section 34	No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.
	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.
	Section 36	No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
	Section 38	This section provides for Heritage Impact Assessments (HIAs), which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The Heritage Impact Assessment (HIA) will be approved by the authorising body of the provincial directorate of environmental affairs, which is required to take the provincial heritage resources authorities' comments into account prior to making a decision on the HIA.
National Environmental Management: Air	Section 32	Control of dust
	Section 34	Control of noise

LEGISLATION	SECTIONS	RELATES TO
Quality Act (No 39 of 2004)	Section 35	Control of offensive odours
Occupational Health and Safety Act (No 85 of 1993)	Section 8	General duties of employers to their employees
	Section 9	General duties of employers and self employed persons to persons other than their employees
National Water Act (No 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution
	Section 20	Control of emergency incidents
Hazardous Substances Act (No 15 of 1973) and regulations		Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances
National Road Traffic Act (No 93 of 1996)		Road safety
SANS 10103 (Noise Regulations)		The measurement and rating of environmental noise with respect to annoyance and to speech communication

The list of applicable legislation and permits provided is intended to serve as a guideline only and is not exhaustive.

The project owner, project engineer and all contractors, subcontractors and agents responsible for the planning and implementation of the project must ensure that **the following activities will not take place** prior to receiving an environmental authorisation from DAEA.

The Department of Transport is to undertake a development that triggers the following environmental legislation:

Describe each listed activity in Listing Notice 1 (GNR 544, 18 June2010), Listing Notice 3 (GNR 546, 18June 2010) or Category A of GN 718, 3 July 2009 description:

GNR 544, 2010	Activity 11	The construction of canals; channels, bridges, dams, bulk storm water outlet structures and /or infrastructure or structures covering 50 square metres or more 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. **The construction of a new bridge, road re-alignment, coffer dam and construction platforms will take place at or within the river.**
GNR 544, 2010	Activity 18	The infilling or depositing of any material of more than 5 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from a watercourse. **During road and bridge construction materials will be brought in, coffer dams will be built, erosion protection measures will be implemented and excavations and moving of soil, sand or rock will take place.**
GNR 544, 2010	Activity 22	The construction of a road, outside urban areas, (i) with a reserve wider than 13,5 meters or, (ii) where no reserve exists where the road is wider than 8 metres. **The new road is to be approximately 13m wide and will have**

		a road reserve of 30m
GNR 544, 2010	Activity 47	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre - (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres – excluding widening or lengthening occurring inside urban areas. **The road will not be lengthened by more than a kilometre, although the alignment between the existing and new re-aligned sections may comprise small areas that will be widened by more than 6m.**
GN544: Listing Notice 3, 2010	Activity 12	(a) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; **The proposed new Nseleni Bridge alignment will occur within the riparian zone (high sensitivity) and will require clearing of vegetation. This zone has been highly transformed and degraded by cultivation.**

2. ENVIRONMENTAL MANAGEMENT PLAN

2.1. EMPr Methodology

The methodology adopted is that of an Environmental Management Programme (EMPr) as described in the Integrated Environmental Management (IEM) Guidelines published by the Department of Environment Affairs in 1992 as well as Section 33 of the EIA Regulations, 2010.

The EMPr has been structured to include:

- Specific goals of the Environmental Management Programme;
- Details of management actions;
- Parties responsible for carrying out management recommendations;
- Timing and duration of management actions;
- Personnel training and financial obligations; and
- Guidelines for monitoring and auditing of compliance.

The EMPr specifies the minimum requirements to be implemented by as per the scope of works and scope of the EMPr, in order to minimise and manage the potential environmental impacts and ensure sound environmental management practices.

The provisions of this EMPr are binding on the KwaZulu-Natal Department of Transport during the life of the project, thus until decommissioning and closure.

It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all time.

To simplify the EMPr requirements, each aspect related to the EMPr has been addressed in the table below. Each action within the EMPr is supported by the priority of when the specific action will need to be implemented. Each of these aspects is briefly described below for ease of reference.

ENVIRONMENTAL ASPECT

This section highlights the various aspects associated with the project i.e. the Applicant / Contractor's activities that will interact with the environment.

ENVIRONMENTAL MEASURES AND ACTION PLANS

This section indicates the actions required to either prevent and/or minimise the potential impacts on the environment that is associated with the project.

TIMEFRAMES

This section in the table indicates when the actions for that specific aspect must be implemented and/or monitor.

RESPONSIBILITY

This section indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr.

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Proponent, Project Manager, Site Manager/Engineer, Contractor/Operator and Environmental Control Officer are as detailed below.

The Project Owner / Project Manager (KZN Department of Transport) shall:

- Be fully conversant with the EMPr for the project;
- Ensure that the Project Engineer and the Contractor/Operator are aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regard to the environment;
- Ensure that all stipulations within the EMPr are communicated and adhered to by the Project Engineer and the Contractor/Operator;
- Monitor the implementation of the EMPr throughout the project by means of regular site visits and meetings; and
- Order the removal of any person(s) and/or equipment in contravention of the specifications of the EMPr.

The Project Engineer shall:

- Be fully conversant with the EMPr;
- Ensure compliance with the EMPr;
- Have overall responsibility for the implementation of the EMPr;
- Liaise with the Project Manager and Contractor/Operator on matters concerning the environment;
- Prevent actions that will harm or may cause harm to the environment, and take steps to prevent pollution of the site;
- Implement remedial measures in the event of pollution incidents or environmental impacts;
- Monitor and verify that environmental impacts are kept to a minimum;
- Review and approve construction methods where necessary; and
- Order the removal of any person(s) and/or equipment in contravention of the specifications of the EMPr.

The Contractor shall:

- Be fully conversant with the EMPr;
- Ensure compliance with the EMPr;
- Ensure that all the environmental specifications contained within this EMPr are adhered to at the site;
- Regularly liaise with the Site Manager on matters relating to the environment; and
- Confine activities to the demarcated construction site.

The above responsibilities listed for the Contractor will also apply to any appointed sub-consultants.

The Environmental Control Officer (ECO) shall:

- Be fully conversant with the EMPr;
- Be fully conversant with all environmental legislation and ensure compliance;

- Ensure that all the environmental specifications contained within this EMPr are adhered to at the site;
- Regularly liaise with the Site Manager on matters relating to the environment; and
- Compile monthly reports as to the progress of the construction phases and report to all parties involved (Site Manager, Project Proponent).

2.1 Limitations and Assumptions Regarding Assessment and Mitigating of Aspects

The assumption is that all significant issues have been identified during the development of the EMPr.

Environmental issues, concerns and development constraints were identified using professional judgement, project information, experience of similar projects, a review of available literature, site visits and consultation with the authorities.

The significance of environmental issues was evaluated and mitigation and management measures were identified as part of the EMPr development.

The effectiveness of the EMPr is limited by the level of adherence to the conditions set forth in this report by the Applicant and the various contractors and agents acting on behalf of the Applicant.

It is further assumed that compliance with the EMPr will be monitored and audited on a regular basis as set out in the EMPr. It should also be noted that this EMPr is a dynamic document that should be continually updated, as and when required.

2.2. Scope of the EMPr

The EMPr is to be implemented by The KZN Department of Transport as well as any employee, contractor, agent or sub-contractor appointed to act on behalf of The KZN Department of Transport in the execution of the project, in order to ensure environmental compliance on site.

An Environmental Code of Conduct (Section 4) has also been developed that provides a simplified set of rules that should be adhered to by all persons involved with the project at all times. This is to be displayed at strategic points where it will invoke constant environmental awareness.

2.3. Objectives of the EMPr

The EMPr plays a key role in the implementation of consistent and continued environmental management for the duration of the project life cycle.
Specifically, the EMPr for the Proposed Nseleni Bridge:

- Encourage good management practices through planning and commitment to environmental issues;
- Define how the management of activities and their impact on the environment is to be reported and how performance should be evaluated;
- Provide practical environmental conditions / requirements to:
  - Minimise disturbance of the natural environment;
  - Ensure water resource protection;
  - Prevent or minimise all forms of pollution;
  - Protect indigenous flora and fauna;
  - Prevent soil erosion and facilitate the re-vegetation of affected areas;
  - Ensure the maintenance of newly vegetated areas;
  - Restrict noise disturbance;
  - Ensure compliance with all applicable laws, regulations, standards and guidelines for the protection of the environment; and
  - Provide for the best practical means available to prevent or minimise adverse environmental impacts.
- Develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of waste;
- Describe all monitoring procedures required to identify impacts on the environment; and
- Train the Owner of the project, its employees and contractors with regard to their environmental obligations.

3. ENVIRONMENTAL MANAGEMENT COMPLIANCE, MONITORING AND REPORTING

DOT /the Main Contractor / Project Engineer shall appoint an Environmental Site Officer (ESO) for the duration of the construction period. The ESO shall be a senior member of The Department of Transport / the construction or on-site team and have overall environmental management responsibilities for the site.

The ESO shall monitor the activities of the Main Contractor and all subcontractors, and shall ensure that mitigation measures contained in this document are implemented and adhered to. The ESO shall liaise with the Environmental Control Officer (ECO) on a regular basis to inform the ECO of the adherence to and effectiveness of the prescribed management measures.

The ECO shall be appointed by the Applicant or Project Engineer. All further duties of the ESO and ECO shall be relevant as detailed in the EMP and Section 2.1.

3.1. EMP Compliance Monitoring and Auditing

Cognisance must be taken of the National Environmental Management Act, Act No. 107 of 1998 (S.28). In terms of these acts those responsible for environmental damage must pay the repair costs, both to the environment and human health, and the preventative measures, to reduce or prevent further pollution and or environmental damage. Compliance with all other applicable legislation is required.

Environmental monitoring is the continuous evaluation of the status of the environment and condition of environmental elements. Its purpose is to detect change that takes place in the environment over time and involves the measuring of physical, social and economic variables associated with development impacts. Monitoring will be undertaken by the Applicant, Permits and/or Licenses as per licensing conditions and relevant authority requirements. The ECO shall audit the site for compliance with the monitoring specifications / requirements.

In this regard, monitoring measures stipulated in this document pertain to, but are not restricted to:

- Erosion control; and
- Waste management; and
- Rehabilitation of disturbed areas

Environmental auditing is the process of comparing the impacts predicted with those that have actually occurred during implementation. The performance audit will ensure that the monitoring was correctly undertaken and that compliance was achieved.

The ESO shall monitor the works on a day to day basis and shall report any problems in terms of adherence with the EMPr directly to the Engineer and ECO.

Environmental Inspections and Audits shall be undertaken by the ECO with the assistance of the ESO on a monthly basis during the Construction Phase. The ESO shall have all necessary documentation available during the audits. The results of these audits will be included in EMPr Compliance Reports to be submitted to the municipality, the consulting engineers and the appointed contractor.

3.1.1. Complaints and Environmental Incidents

Identifying, recording and reporting complaints and environmental incidents further ensures the monitoring and auditing of environmental compliance and assessment of performance against the actual and perceived environmental aspects and impacts on site.

The ESO shall record any complaints received from the community and surrounding businesses in a complaints register. The complaint/s must be communicated to the Site Manager and ECO who will respond accordingly. Info as below must be noted:

- *Time, date and nature of complaint;*
- *Name of Complainant;*
- *Response and investigation undertaken and by whom; and*
- *Mitigation and/or remediation measures recommended / implemented.*

The ESO shall record all environmental incidents in an incident register as below. The incidents must be communicated to the Site Manager and ECO.

- *Time, date, location and nature of incident;*
- *Immediate actions taken and by whom;*
- *Mitigation and/or remediation measures recommended / implemented to prevent a recurrence*

4. ACTIVITIES, ASPECTS AND IMPACTS AND THE MANAGEMENT THEREOF

The proposed replacement bridge could potentially result in negative impacts on the receiving environment. These potentially significant negative impacts have been identified by the Environmental Assessment Practitioner (EAP), based on the specialist ecological report.

4.1. Summary of Environmental Impacts and Significance Identified

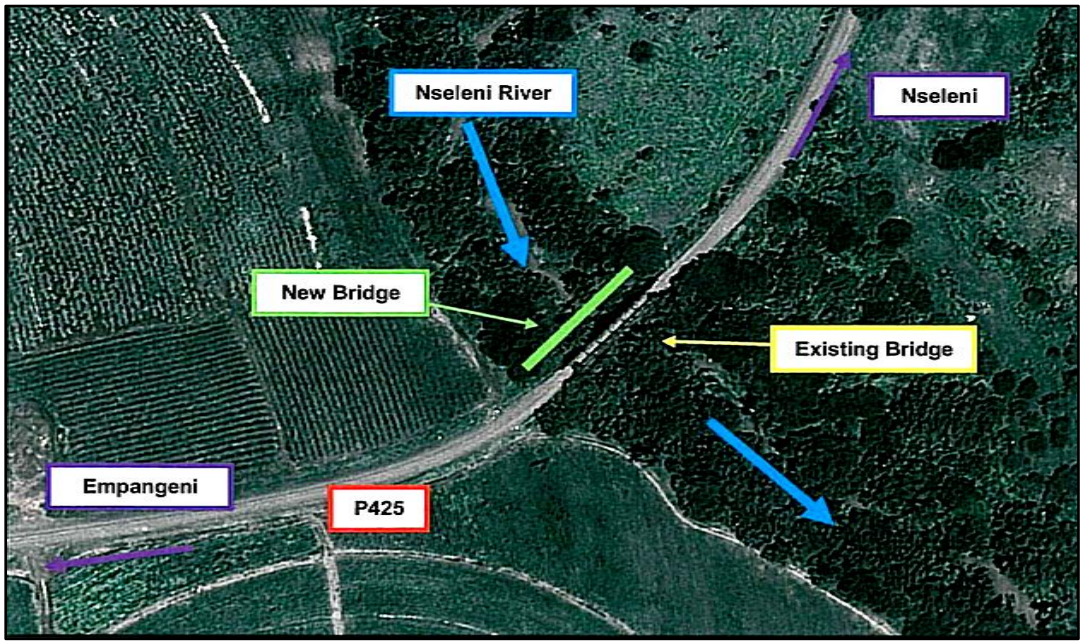
Aspect of Environment	Impacts	Significance (Pre-Mitigation)	Significance (Post-Mitigation)
▪ ECOLOGICAL	Degradation	High	Low-Med
▪ ROUTING	Access and haulage routes	Med	Low
▪ SITE LAY-OUT & DESIGN	Incorrect siting & inadequate design Poor construction practices	High	Low-Med
▪ STORM WATER	Management of storm water runoff	Med-High	Low-Med
▪ RESOURCE CONSUMPTION	Usage of resources	Med	Low-Med
▪ SAFETY AND SECURITY	Public & commuter safety Health & safety of workers	Med-High	Low
▪ AVOIDANCE OF DRAINAGE LINES	Maintenance of buffers	High	Low-Med
▪ AESTHETICS	Vegetation and waste management	Low-Med (Pos)	Med-High (Pos)
▪ EROSION	Soil management	High	Low
▪ WATER POLLUTION & WETLAND IMPACTS	Effluent management / clean-and-dirty water separation; Spillage and seepage; Onsite pollution by waste products; Uncontrolled access with dumping and usage of area for informal “toilet” facilities; Erosion and siltation	Med-High / High	Low-Med
▪ ALIEN VEGETATION (CONSTRUCTION PHASE)	Plants removal	Low-Med (Pos)	Med-High (Pos)
▪ ALIEN VEGETATION (OPERATIONAL PHASE)	Re-establishment of alien and invader species	Med -High	Low-Med
▪ WASTE MANAGEMENT	Disposal of waste from site	Low-Med	Low
▪ WASTE WATER / EFFLUENT DISPOSAL	Quality of waste water (sewage & effluent) disposed	Med	Low-Med
▪ NOISE/DUST	Anthropogenic effects	Low- Med	Low
▪ REHABILITATION / LANDSCAPING	▪ Alien plant control ▪ Site restoration ▪ Planting Indigenous grass	Low-Med (Pos)	Med-High (Pos)

Aspect of Environment	Impacts	Significance (Pre-Mitigation)	Significance (Post-Mitigation)
	mix		
▪ SOCIO-ECONOMIC BENEFITS	Continued work opportunities for contractors New job opportunities direct benefits to community,	Med (Pos)	High (Pos)
▪ VISUAL	Maintenance of site	Low-Med (Pos)	Med-High (Pos)

The above-mentioned aspects can potentially cause negative impacts that may occur during the planning, construction and operational phases of the proposed project:

In order to prevent and/or minimise these impacts, care must be taken with, *inter alia*, the disposal of waste, spillage, storage, noise and dust control, selection of sites, preservation and re-establishment of indigenous vegetation, sediment management and the demarcation and management of sensitive areas. This can be achieved by effective implementation of the necessary mitigation measures as stipulated in the EMPr. With adequate management the associated risks and significant negative impacts of the proposed project can be minimized and/or entirely negated. All of the above will be dealt with in this EMPr.

Position of Replacement Bridge:



Road Alignment:

4.2. Planning and Design Phase& Pre-Construction Activities

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
4.2.1. Administrative and Legal Requirements			
Planning Requirements	1. Ensure that environmental legal requirements are duly considered in the planning phase	Project Developer/ Project Engineer	During design and prior to, construction
	2. Appoint and EAP and conduct the required environmental processes in terms of the NEMA to ensure legal compliance, when relevant.	Project Engineer	Prior to, construction
	3. Confirm that changes to the original design, such as route alignment, do not trigger the requirement for a basic assessment process and environmental authorisation from DAEA, as stipulated in section 1 of this report.	Project Developer/ Project Engineer	During design and prior to, construction
	4. Consider and implement where feasible environmentally responsible lay-out and sustainable designs to reduce resource consumption (electricity, water) and prevent potential pollution and /or environmental degradation during the operational phase of the project.	Project Developer/ Project Engineer	During design and prior to, construction
	5. Consider and implement where feasible favourable socio-economic options / solution, including but not limited to incorporation with existing facilities and infrastructure and logistical arrangements and implementation of low energy or renewable energy options.	Project Developer/ Project Engineer	During design and prior to, construction
	6. Include the EMPr in all tender documentation and ensure that environmental requirements for the construction are adequately budgeted for by all contractors and sub-contractors.	Project Developer/ Project Engineer	During design and prior to, construction
Roles Responsibilities for Environmental Management and Environmental Awareness	1. The overall responsibility for ensuring the implementation of this environmental management plan rests with the Project Developer (KZN DoT).	Project Developer	Prior to, during and after construction
	2. Responsibility for on-site implementation of environmental management as well as the associated cost with the implementation of the EMPr rests with all appointed contractors, sub-contractors and suppliers.	Project Developer/ Project Engineer/ Project Manager	Prior to, during and after construction
	3. KZN DoT and appointed contractors shall ensure that all permanent and temporary staff, sub-contractors and suppliers adhere to this EMPr.	Project Developer/ Project Manager/ Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	4. Prior to the commencement of construction as well as during construction, appropriate signage must be erected along the roads warning both pedestrians and motorists of earthworks.	Project Manager/ Contractors	Prior to, during and after construction
	5. KZN DoT / Project Engineer / Main Contractor shall appoint a senior staff member directly involved in the site construction activities as the **Environmental Site Officer (ESO)**. This person shall ensure the implementation of and adherence to the EMPr in the contractor's execution of the day-to-day construction activities.	Project Developer/ Project Engineer/ Contractor	Prior to construction
	6. The environmental responsibility of the ESO shall be specified in this person's duties, which will also include: a. Liaison with the appointed ECO; b. Ensuring environmental awareness among members of the workforce; c. Ensuring that the Contractor/s and members of the construction workforce are aware of the requirements of the EMPr; d. Ensuring the on-site implementation of the EMPr; e. Monitoring inappropriate behaviour, environmental impacts, including pollution and environmental incidents; and f. The implementation of corrective action.	Project Developer/ ESO	Prior to construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	Environmental Control Officer (ECO) 7. DOT shall ensure the appointment of a person with a qualification in environmental management as the ECO. The ECO shall be the responsible person for monitoring and reporting on compliance in respect of the implementation of the EMPr. Requirements include: a. Monthly monitoring of activities to ensure compliance with the EMPr; b. Liaison and ongoing communication with the Environmental Site Officer; c. Ensuring the implementation of preventative and corrective actions in accordance with the requirements of the EMPr and outcomes of environmental monitoring / auditing; d. Reporting of environmental incidents that may occur on site in accordance with the requirements of the EMPr and environmental legislation; e. Monitoring and reporting on compliance with this EMP to DOT, the Engineer and the DAEA.	Project Developer/ Project Engineer/ ECO	Prior to and during construction
	8. The contractor and ESO must inform the ECO prior to the commencement of any significant construction activity.	Contractors / ESO	Prior to construction
Compliance	1. All persons appointed / employed by DOT or their contractors for the project shall abide by the requirements of the EMPr.	Project Manager / Contractors	Prior to and during construction
	2. KZN DoT, RHDHV or contractors shall not direct a person to undertake any activity which would place them in contravention of the specifications contained within the EMPr.	Project Developer/ Project Engineer/ Project Manager / Contractors	Prior to and during construction
	3. Any member of the construction, operation or maintenance workforce found to be in breach of any of the specifications contained within the EMPr may be ordered to leave the site. The order may be given orally or in writing. Confirmation of an oral order in writing will be provided as soon as practically possible, but the absence of a written order shall not be cause for an offender to remain on site. No extension of time will be granted for any delay or disadvantage to DOT brought about by an offender ordered to leave the site.	Project Developer/ Project Engineer/ Project Manager / Contractor / ECO	Prior to and during construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	4. Should a contractor be in breach of any of the specifications contained in the EMPr, DOT / ECO / Engineer shall, verbally or in writing, instruct the responsible Contractor regarding corrective and/or remedial action required, specify a timeframe for implementation of these actions, and/or indicate that work shall be suspended should non-compliance continue. Contractors shall be responsible and shall bear the cost of any delays, corrective or remedial actions required as a result of non-compliance with the specifications and clauses of the EMPr.	Project Developer / ECO / Engineer	During construction
Environmental Training and Induction	1. In terms of section 2(h) and (j) of the NEMA, the contractor has the responsibility to ensure **all** personnel involved in the project are aware of, and familiar with, the EMPr, the key environmental issues and consequences of non-compliance to the EMPr.	Contractors / ESO	Prior to and during construction
	2. To ensure compliance to the EMPr by contractors, sub-contractors and employees, DOT / Main Contractor shall ensure that the EMPr forms part of the formal site induction for all contractors, sub-contractors and casual labourers. The main contractor/ESO must prepare and submit the training material to the ECO for approval. The induction training shall, as a minimum, include the following: a. The environmental impacts, actual or potential, of their work activities; b. Why the environment needs to be protected; c. Their roles and responsibilities in achieving compliance with the EMP, including emergency preparedness and response requirements; and d. The potential consequences of departure from specified operating procedures.	Project Manager / Contractors / ESO	Prior to construction
	3. The use of pictures and real-life examples should be incorporated in the training and awareness material.	Project Manager / Engineer	Prior to construction
	4. All contractors, sub-contractors and casual labourers must acknowledge their understanding of the EMPr and environmental responsibilities by signing an induction attendance record.	Contractors / ESO	Prior to construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
Worker Conduct on Site	1. A general regard for the social and ecological well-being of the site and community is expected of the site staff. Workers need to be made aware of the following general rules: a. No alcohol / drugs to be present on site; b. No firearms allowed on site or in vehicles transporting staff to / from site, (unless used by security personnel); c. Unsocial behaviour should be prevented; d. No harvesting of firewood from the site or from the areas adjacent to it; e. Construction staff shall make use of the facilities provided for them, as opposed to ad-hoc alternatives. (e.g.: fires for cooking); f. Driving under the influence of alcohol is prohibited.	Contractors/ ESO	Prior to construction
4.2.2. No-Go Areas			
No-go areas	1. No-go areas shall be agreed to in consultation between the ECO, Engineer and DOT prior to construction. These will include but not be limited to riverine and drainage areas excluded from the development footprint, adjacent properties and other sensitive environments.	Project Manager / Engineer / ECO	Prior to construction
	2. Unauthorised access onto/into private properties shall be strictly prohibited.	Contractors	Prior to, during and after construction
	3. Due to the partial location of the site within an environmentally sensitive area (river and riverine environment on either bank of the river), the Contractor shall not cause any physical damage to the natural vegetation, other than that necessary to complete the works	Contractors	Prior to, during and after construction
	4. Special features identified by the Engineer and / or the ECO shall be marked on a site layout plan prior to any works commencing on site, including any historical features identified by the heritage specialist study. These areas shall be designated as “No-go areas”;	Project Manager / Engineer / ECO	Prior to construction
	5. The 15 m road reserve, on either side of the river within the riverine environment, should be demarcated and all areas outside of this shall be designated as No-go areas. Any work required to take place outside of these areas shall only be undertaken once the Engineer and ECO has approved such work.	Project Manager / Engineer / ECO	Prior to construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
4.2.3. Site Establishment			
Planning	1. Natural features must be taken into consideration during design and impacts minimised and/or avoided where feasible.	Project Developer / Project Engineer	During design and prior to, construction
	2. Ensure that materials to be used during construction are sourced from legal operators / suppliers e.g. sand-mining permit licenses from DMR. It is recommended that filling and levelling material be sourced from the local businesses.	Project Developer / Project Engineer	During design and prior to, construction
Site Layout	1. The construction camp should be of sufficient size to accommodate the needs of all Sub Contractors that may work on the project.	Project Engineer/ Project Manager / Contractor / ECO	During design and prior to, construction
	2. Submit to the engineer for his approval a site layout plan at least 7 days before construction commences: ▪ The extent of the Contractors site camp, and other required areas if not located within the site camp; ▪ All Contractor's buildings, and/or offices; ▪ Lay down areas; ▪ Vehicle and plant storage areas, including wash areas; ▪ Workshops; ▪ Fuel storage areas (including filling and dispensing from storage tanks); ▪ Cement/concrete batching areas (including the methods employed for the mixing of concrete and particularly the containment of runoff water from such areas and the method of transportation of concrete); ▪ Other infrastructure required for the effective implementation of the project.	Project Engineer/ Project Manager / Contractor / ECO	During design and prior to, construction
Site Access	1. Access to the site for site establishment and construction shall be from the existing road only.	Project Manager / Contractor	During design and prior to, construction
Siting of Construction Camp Site	2. Authorisation for the siting of the camp will be obtained from the landowner and ECO, if the landowner, prior to establishment of the site.	Project Developer/ Project Engineer	During design and prior to, construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	3. Determine the site for the construction camp in collaboration with the PM and ECO before moving onto site, such that it is effectively isolated from the surrounding environment and takes into consideration: ▪ potential negative impacts on the biophysical environment to be kept to a minimum; ▪ The need to be further than 50 meters away from a water body in a location that will prevent storm water runoff from the site from entering a water body; ▪ The risk of public nuisance through, for example, noise generation, visual intrusion, light pollution or disruption to access; ▪ Security implications.	Project Developer/ Project Engineer	During design and prior to, construction
	4. The construction site must be defined, fenced off and limited to authorised contractors only.	Project Manager / Contractors	During design and prior to, construction
	5. Vegetation removal at the construction camp shall to be kept to a minimum. No trees are to be removed with the exception of alien weeds and invader plants identified and approved by DOT, The Engineer and ECO.	Project Developer/ Project Engineer / Contractor / ECO	During design and prior to, construction
Design of Construction Camp Site	1. The construction camp may comprise of: a. site office; b. ablution facilities; c. designated first aid area; d. eating areas; e. staff lockers; f. storage areas; maintenance and refuelling areas (if required).	Contractors	During Camp Establishment, prior to construction
	2. The footprint of the construction camp shall be kept to a minimum.	Contractors	During Camp Establishment
	3. Adequate parking must be provided for site staff and visitors at the construction camp.	Contractors	During Camp Establishment
	4. Drainage from the site must be planned to prevent standing water and erosion occurring from run-off.	Contractors	During design and prior to, construction
	5. Temporary cut-off drains may be required to capture storm water and promote infiltration.	Contractors	During design and prior to, construction
	6. Water for construction purposes shall be obtained from the registered borehole located on site. No abstraction from the drainage areas will be obtained without the necessary authorisations from DWA.	Contractors	During design and prior to, construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
Eating Areas	1. Eating areas should be established, as agreed with the engineer. These areas shall provide adequate temporary shade to ensure that employees do not move off site to eat.	Project Manager / Project Engineer	During design and prior to, construction
	2. Adequate refuse bins must be provided at all eating areas to the satisfaction of the engineer and shall ensure that all eating areas are cleaned up on a daily basis.	Contractors	During design and prior to, construction
	3. Any cooking of food on site shall be done using gas cookers.	Contractors	During design and prior to, construction
	4. The Nseleni River shall not be used for washing of pots, plates, clothing, etc.	Contractors	During design and prior to, construction
Sanitation / Ablutions at Camp Site	1. Chemical toilets shall be used as ablution facilities during the construction period by all contractors.	Contractors	Prior to construction
	2. Chemical toilets shall however not be located closer than 100m from the wetland area.	Contractors	Prior to construction
	3. The construction of “long drop” toilets is forbidden.	Contractors	During construction
	4. Chemical waste from the toilets may under no circumstances be disposed via a septic tank system, but shall be disposed to a reputable waste disposal company.	Contractors	During construction
	5. Toilet(s) must be easily accessible and shall be secured in order to prevent them from blowing over.	Contractors	During construction
	6. Ensure that there is no spillage when the chemical toilets are cleaned or during normal operation and that the contents are properly removed from site.	Contractors	During construction
Waste Management at Camp Site	1. Bins and / or skips shall be provided at convenient intervals for disposal of waste at the construction area and construction camp.	Contractors	During site set-up
	2. Skips should be colour coded or labelled. The choice of location for storage areas must take into account prevailing winds, distance to water bodies and general onsite topography.	Contractors	During site set-up
	3. Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged.	Contractors	During site set-up
	4. The excavation and use of rubbish pits on site is forbidden.	Project Manager / Project Engineer / ECO	During design and prior to, construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
4.2.4. Transport, Equipment, Vehicle Maintenance Yard and Secured Storage Areas			
Establishing Equipment, Vehicle and Storage Areas	1. The equipment and vehicle maintenance yard shall be situated within the boundaries of the construction camp only.	Contractors	Prior to construction
	2. The choice of location must take into account prevailing winds, distance to water bodies and general on-site topography.	Contractors	Prior to construction
	3. Storage areas must be designated, demarcated and within a fenced / secured area.	Contractors	Prior to construction
	4. Fire prevention facilities must be present at all storage areas and fire breaks shall be planned and implemented where required.	Contractors	Prior to and during construction
Hazardous substances and material	1. Refuelling areas, if required, must be bunded with an impermeable liner to prevent potential pollution from spillage.	Contractors	Prior to construction
	2. Material Safety Data Sheets (MSDS's) shall be readily available on site for all chemicals and hazardous substances to be used on site. MSDS's shall include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.	Contractors	Prior to construction
	3. A procedure for the management of oils spills shall be introduced. This shall address the cleaning of spillage from hard surfaces, utilising environmental friendly cleaning materials as well as the removal and disposal of polluted soil or bioremediation thereof.	Contractors	Prior to construction
	4. Contractors shall submit a method statement / procedure for the storage and handling of hazardous materials and relevant emergency procedures.	Contractors	Prior to construction
	5. Fuel shall be stored in closed drums within a secondary containment facility or bowsers with pollution prevention measures.	Contractors	Prior to and during construction
	6. Fuel tanks must meet relevant specifications and be elevated to provide for the early detection of leaks.	Contractors	Prior to Construction
	7. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.	Contractors	Prior to and During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	8. Fuel storage areas shall be at least 3.5 m from any buildings, boundaries or combustible / flammable material(s) and at least 10 m from storm water drains.	Contractors	Prior to Construction
	9. Symbolic safety signs (in accordance with SABS 1186) shall be erected at storage facilities and tank capacities shall be clearly indicated (in accordance with SABS 0232).	Contractors	Prior to Construction
Transport of Materials/Components	1. Secure and ensure safe passage for components and materials between destinations. Loads including, but not limited to sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent it from spilling over the side of the vehicle during transit.	Contractors	Prior to Construction
	2. Be responsible for any clean-up resulting from the failure by staff or supplier to properly secure materials to be transported.	Contractors	Prior to Construction
4.2.5. Materials Management – Sourcing			
Source of Materials	1. Ensure that materials to be used during construction are legally sourced. Source materials locally where possible.	Contractors	Prior to construction
	2. Only commercial sources will be used. No borrow-pits will be created or used for source material.	Contractors	Prior to construction
	3. Contractors shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners etc) and submit these to the project manager, engineer and ECO for approval prior to commencement of any work. Where applicable, a signed document from the supplier of natural materials should be obtained confirming that they have been obtained in a sustainable manner and in compliance with the relevant legislation.	Contractors	Prior to construction
4.2.6. Water Management, Drainage Areas and Geotechnical Aspects			
Storm water and Drainage	1. To prevent storm water damage, the increase in storm water run-off resulting from construction activities must be estimated and the drainage system assessed accordingly.	Project Manager / Project Engineer /	During design and prior to, construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	2. Storm water disposal shall be designed and implemented in such a manner that ponding, soil saturation, erosion, and/or sloughing are prevented.	Project Manager / Project Engineer /	During design and construction
	3. Storm water design should ensure that all storm water is carried off site.	Project Manager / Project Engineer /	During design and construction
	4. All surface water is suitably channelled through effectively engineering drainage control flow lines to prevent potential pollution of this water flow.	Project Manager / Project Engineer /	During design and construction
	5. Temporary cut off drains and berms may be required to capture storm water and promote infiltration.	Project Manager / Project Engineer /	During design and construction
	6. Storm water outfalls should be designed to reduce flow velocity in order to reduce and avoid soil erosion.	Project Manager / Project Engineer /	During design and construction
	7. On any areas where the risk of erosion is evident, special measures may be necessary to stabilise the areas and prevent erosion. These may include, but not be restricted to: ▪ Confining construction activities ▪ Using cut-off berms ▪ Using mechanical cover or packing structures such as geo-fabric to stabilise steep slopes or hessian, gabions and mattress and retaining walls ▪ Straw stabilising ▪ Brush cut packing ▪ Constructing anti-erosion berms.	Project Manager / Project Engineer /	During design and construction
	8. The following areas will require appropriate erosion control measures and re-vegetation methods as these are regarded as being of high erosion risk: ▪ Slopes > 20° ▪ Slopes with convergent sub-surface drainage (percolines) ▪ Road culverts ▪ Cut and fill slopes in areas of slope instability or erodable geology.	Project Manager / Project Engineer /	During design and construction
Water Quality	1. Storage areas that contain liquids that could be hazardous to the environment must be bunded with an approved impermeable liner. Bunds must have the capacity to hold 110% of the quantity of liquid stored.	Contractors	During set-up
	2. Spill contingency plan must be compiled and utilized.	Contractors	During design and construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
4.2.7. Safety, Security and Lighting			
Security	1. The site shall be secured to ensure the safety and security of the site and infrastructure as well as the safety of the general public.	Contractors	During set-up
Lighting	2. Lighting on site is to be set out to provide maximum security and to enable easier policing of the site, without creating an unnecessary visual nuisance to the adjacent residential areas.	Project Manager / Project Engineer / ECO	During design and construction
Safety Considerations	3. Provide details identifying what safety precautions will be implemented to ensure the safety of all staff, and the general public, on site during the construction period. This will include protective clothing requirements for all types of construction activities on site, e.g. protection against dust, noise, falling objects, work in trenches, work at heights, etc.	Contractors/ ESO	Prior to construction

4.3. Construction Phase Activities

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
4.3.1. Administrative and Legal Requirements			
Legal Requirements and Roles and Responsibilities for Environmental Management	1. The construction activities must comply with applicable SANS noise standards.	Contractors	During construction
	2. All procedures must comply with and equipment must be used in accordance with the Occupational Health and Safety Act Regulations (OHSA) of South Africa, Act no. 85 of 1993.	Contractors	During construction
	3. The KwaZulu-Natal Conservation Management Act No 9 of 1997, which applies to all fish, game, birds and other wildlife as well as plants and other living resources, must be complied with.	Contractors	During construction
	4. All contractors, sub-contractors or agents and their employees shall be responsible for the implementation of the EMPr and adherence to the conditions of the EMPr and Environmental Authorisations.	Contractors	During construction
	5. The ECO shall be the responsible person for monitoring and reporting on compliance in respect of the implementation of the EMPr.	Project Manager / ECO	During construction
	6. The ESO shall be responsible for on-site implementation and daily monitoring of implementation of the EMPr and Environmental Authorisation. The ESO shall provide evidence to the ECO that the EMPr is being implemented and adhered to (either through inspections sheets or audit reports).	ESO	During construction
Compliance	1. A fine may be issued by Mfolozi/uMhlathuze for wilful negligence or non-compliance resulting in environmental degradation or pollution. The fine will be determined the municipalities based on the severity of the incident and potential action by DAEA. These costs will not be recoverable from the project.	Project Manager / Contractors	During construction
Monitoring / Auditing and Reporting	1. Monthly monitoring, auditing must be conducted and reporting to DAEA must be done by the ECO in accordance with the conditions. The ESO must assist the ECO during the audit.	ECO/ESO	During construction, rehabilitation and closure
	2. ECO must submit monthly audit reports to DAEA; Compliance section.	ECO	During construction, rehabilitation and closure

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
Review	1. The ECO, ESO and Engineer must consult and review compliance and performance against the environmental authorisation and EMPr and resolve inter alia environmental concerns, non-compliance (including environmental incidents) and I&AP issues raised.	ECO / ESO/ Main Contractor / Project Engineer	During construction
4.3.2. No-Go Areas			
General	1. Unauthorised entry, stockpiling, dumping or storage of equipment, material or waste outside the project boundaries or within private property areas shall be strictly prohibited.	Contractors	During construction
	2. Gathering of firewood, fruit, plants or any other natural material on site or in areas adjacent to construction sites is prohibited.	Contractors	During construction
	3. Unauthorised access onto/into private properties shall be strictly prohibited.	Contractors	During construction
	4. Activities in the surrounding open areas must be strictly regulated and managed.	Contractors	During construction
Drainage lines/ Water courses	1. No entry or dumping into / onto the demarcated area and buffer zone, excluded from the development footprint, is allowed.	Contractors	During construction
4.3.3. Camp Site, Equipment, Vehicle Maintenance Yard and Secured Storage Areas			
Construction Camp Site	1. On-site accommodation will not be allowed. No persons, other than a night-watchman / security guard, may stay overnight at the construction camp.	Contractors	During construction
	2. The Contractor must monitor and manage drainage of the camp site to avoid standing water and soil erosion.	Contractors / ESO	During construction
	3. Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	Contractors	During construction
	4. The Contractor shall ensure that his camp and working areas are kept clean and tidy at all times, in line with good housekeeping practices.	Contractors / ESO	During construction
Sanitation	1. Chemical toilets shall be maintained in a clean state. Provide portable chemical toilets at the ratio of 1 toilet per 15 workers. All temporary/portable toilets shall be secured to the ground to the satisfaction of the PM to prevent them from toppling over or being blown over by wind.	Contractors	During construction
	2. Ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the site to an appropriate location/facility. The contractor/service provider is to provide proof that the toilets contents are disposed off at an appropriate facility.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	3. Under no circumstances may open areas or the surrounding bush be used as a toilet facility.	Contractors	During construction
	4. Temporary toilet facilities and sanitation facilities should be serviced weekly and locked from casual access by local communities and general public.	Contractors	During construction
Waste Management	1. Bins and / or skips shall be provided at convenient intervals for disposal of waste at the construction area and construction camp. Skips should be Colour coded or labelled.	Contractors	During construction
	2. The Contractor shall ensure that all litter is collected from the work and camp areas daily.	Contractors	During construction
	3. Bins and/or skips should be emptied regularly and waste should be disposed of at a registered landfill site. Waybills for all such disposals are to be kept by the Contractor for review by the ECO.	Contractors / ECO	During construction
	4. A registered chemical waste company shall be used to remove waste from chemical toilets on site.	Contractors	During construction
	5. Any effluent containing oil, grease or other industrial substances must be collected in a suitable containment facility and removed from the site, either for recycling or for appropriate disposal at a recognised facility.	Contractors	During construction
	6. Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged.	Contractors	During construction
	7. No grey water runoff or uncontrolled discharges from the site/working areas (including wash down areas) to adjacent or nearby water bodies shall be permitted.	Contractors	During construction
	8. Prevent runoff loaded with sediment and other suspended materials from the site/working areas from discharging to adjacent watercourses and/or stormwater infrastructure.	Contractors	During construction
Equipment, vehicles & storage	1. All hazardous substances shall be stored within a secured storage area, with impervious lining and bunding. Drip trays shall be used where appropriate.	Contractors	During construction
	2. The choice of location for storage areas must take into consideration prevailing winds, distance to water bodies and general onsite topography. Storage areas must be on level ground.	Contractors	During construction
	2. Plant and equipment shall be adequately maintained to prevent spillage of oil, diesel, fuel or hydraulic fluid. The Contractor shall repair or withdraw equipment or machinery from use if they consider these to be polluting and irreparable.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	3. Suitably covered receptacles shall be available at all times and conveniently placed for the disposal of waste oils and greases. All used oils, grease or hydraulic fluids shall be placed therein and these receptacles shall be removed on a regular basis for recycling.	Contractors	During construction
	4. No smoking shall be allowed in the vicinity of storage or dispensing areas.	Contractors	During construction
	5. Fuel decanting and refuelling shall take place within the construction camp only. 50kg of hydrocarbon absorbent shall be placed at the construction camp for the handling of accidental spillage.	Contractors	During Construction
Handling of Hazardous Materials	1. All concrete mixing shall take place at designated areas with an impermeable surface e.g. concrete, tarpaulin.	Contractors	During construction
	2. Hazardous storage areas must be 110% banded with an impermeable liner to protect groundwater quality.	Contractors	During construction
	3. Excess concrete, bituminous product, etc may not be dumped on site in within vacant areas. These must be disposed to a licensed waste disposal site or re-used where feasible.	Contractors	During construction
	4. No vehicles transporting concrete to or compacting asphalt or any other bituminous product on the site may be washed on site without appropriate waste water management.	Contractors	During construction
	5. Lime and other powders must not be mixed during excessively windy conditions without appropriate containment measures.	Contractors	During construction
	6. All hazardous substances required for vehicle maintenance and repair must be stored in sealed containers for appropriate disposal to a registered waste disposal site.	Contractors	During construction
	7. Hazardous substances / materials are to be transported in closed / sealed containers.	Contractors	During construction
	8. Stone chip/gravel excess shall not be left on road/paved area verges. This shall be swept /raked into piles and removed to an area approved by the PM.	Contractors	During construction
	9. Water quality from runoff from newly / fresh bitumen surfaces shall be monitored by the PM and remedial actions taken where necessary.	Contractors	During construction
	10. Drums / tanks shall be safely and securely stored in the construction camp.	Contractors	During construction
	11. Loads including, but not limited to sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	12. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.	Contractors	During construction
	13. The Contractor (and suppliers) shall ensure that all materials are appropriately secured to ensure safe passage between destinations.	Contractors	During construction
	14. The Contractor shall ensure the supervision of the delivery drivers during offloading.	Contractors	During construction
Stockpile Management	1. Stockpiles should not be located where natural drainage pathways will be obstructed / impeded.	Contractors	During construction
	2. Stockpiles should not exceed 2m in height unless otherwise permitted by uMhlathuze/Mfolozi Municipalities.	Contractors	During construction
	3. Stockpiles exposed to windy conditions or heavy rain should be wetted to prevent windblown particles or covered / provided with containment to prevent contaminated run-off.	Contractors	During construction
	4. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.	Contractors	During construction
	5. Rocks can be stacked as walls to prevent the loss of top and subsoil on cut or fill banks.	Contractors	During construction
	6. Do not allow stockpiling of any material within the 100 m of any residential areas or 20 m of any “no go” area.	Contractors	During construction
4.3.4. Access to Construction Site			
Maintenance of Site Access and Impacts from Haulage	1. The liberation of dust into the surrounding environment must be effectively controlled by the use of water sprays, fabric containment or curtains, where required.	Contractors	During construction
	2. The speed of haul trucks and other vehicles shall be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used. All National and Provincial road speed limits must be strictly adhered to.	Contractor / ECO	During construction
	3. Contractors shall ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damage.	Contractors	During construction
	4. If necessary, staff must be employed to clean material spilt onto the access roads.	Contractors	During construction
	5. Person and vehicle access should be restricted during construction so as to control access to otherwise potential dangerous excavations and materials.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	6. Adequate signage and warnings must be erected to control traffic at the construction site. Erect appropriate signage indicating construction works ahead of strategic day and night. Warning signs must comply with the applicable municipal or DOT specifications governing roadworks.	Contractors	During construction
4.3.5. Earthworks, including Demolition, Construction and Black Topping			
Earthworks	1. All earthworks shall be undertaken in such a manner as to minimize the extent of any impacts caused by such activities.	Contractors	During construction
	2. Earthworks shall be completed in accordance with the scope of works and designs.	Contractors	During construction
	3. Construction areas shall be secured and demarcated to prevent incidental public access.	Contractors	During construction
Asphalt, Bitumen and Paving	1. Overspray of bitumen products outside of the road surface and onto roadside vegetation shall be prevented using a method approved by the PM.	Contractors	During construction
	2. When heating bitumen products, only LPG or a similar zero emission fuel shall be used and the Contractor shall take cognisance of appropriate fire risk controls	Contractors	During construction
	3. Stone chip/gravel excess shall not be left on road/paved area verges. This shall be swept / raked into piles and removed to the stockpiles.	Contractors	During construction
	4. Milled or cut out bitumen shall be removed to an area approved by the PM.	Contractors	During construction
Cement and Concrete on-site mixing	1. If ready-mix cement is not brought to site, concrete batching activities and / or mixing shall be located within the construction camp in areas of low environmental sensitivity to be identified and accepted by the Engineer and ECO.	Contractors	During construction
	2. Concrete mixing directly on the ground shall not be allowed and shall only take place on impermeable surfaces to the satisfaction of the Engineer.	Contractors	During construction
	3. Concrete mixing shall not take place on the banks of the river.	Contractors	During construction
	4. No washing out of concrete mixers shall occur on site. All cement-contaminated runoff from mixing areas shall be strictly controlled.	Contractors	During construction
	5. Unused (full) cement bags shall be stored out of the rain and where runoff will not affect them. Used (empty) cement bags shall be collected and stored in weatherproof containers to prevent windblown cement dust and water contamination;	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	6. All excess concrete and aggregate shall be removed from site on completion of concrete works and disposed of.	Contractors	During construction
Work within the Watercourse	1. As far as reasonably possible, work in the river shall take place during the low flow period.	Contractors	During construction
	2. The Contractor shall only use access routes to the river accepted by the Engineer and ECO. As far as possible, the Contractor shall use existing access paths, tracks and roads to access the river area.	Contractors / ECO/Project Manager	During construction
	3. The Contractor, Engineer and ECO shall agree on how and where to access the river. In determining the location of the access into the river, cognisance must be taken of sensitive areas (e.g. natural vegetation, surface water, steep banks, etc.)	Contractors / ECO/Project Manager	During construction
	4. The Contractor shall ensure that minimal damage is caused to the river and riparian zone.	Contractors	During construction
	5. All workers are to be advised of a crocodile population within the water course. Workers are to be alert and weary. Workers are not to provoke any wildlife to ensure their safety.	Contractors	During construction
	6. The required area for the low level crossing and associated works within the river shall be demarcated prior to any work within the river. No work shall take place outside of this demarcated area, unless prior approval has been obtained from the Engineer and ECO.	Contractors / ECO/Project Manager	During construction
	7. The Contractor shall not divert or dam the river without the approval of the Engineer and ECO.	Contractors	During construction
4.3.6. Fire Management			
Fires Prevention & Control	1. No open fires shall be allowed on site	Contractors	During construction
	2. Take all reasonable and precautionary steps to ensure that fires are not started as a consequence of construction activities.	Contractors	During construction
	3. Ensure that there is basic fire fighting equipment available on-site. Fire fighting equipment must be in working order and serviced to-date.	Contractors	During construction
	4. The Contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire.	Contractors	During construction
	5. Flammable materials should be stored under conditions that will limit the potential for ignition and the spread of fire.	Contractors	During construction
	6. Set smoking areas must be designated. Smoking outside these areas within the construction area will not be allowed.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	7. The Contractor shall ensure that the telephone number of the local Fire and Emergency Service are displayed at the site offices.	Contractors	During construction
4.3.7. Conservation of Resource and Natural Environment			
Conservation of resources	1. Necessary measures shall be taken to prevent the wastage of natural resources. These shall include: closing taps and valves, switching off lights during daytime and preventing spillages of consumables. Borehole water shall be used in preference to potable water, where feasible.	Contractors	During construction
Topsoil	2. The topsoil obtained (i.e. the top 30-50 cm of soil) from site clearing must be stored in stockpiles no higher than 1m and used during rehabilitation.	Contractors	During construction
	3. Topsoil can only be stripped from the following areas in or adjacent to the construction site or site camp: ▪ Areas which is to be used for temporary storage of soil and/or materials ▪ Areas which could be polluted by any aspect of the construction activity ▪ Areas within the footprint of the proposed infrastructure to be constructed.	Contractors	During construction
	4. Undertake the stripping of topsoil in a manner that minimises erosion by wind or runoff.	Contractors	During construction
	5. Ensure that subsoil and topsoil are not mixed during stripping, excavation, reinstatement and rehabilitation.	Contractors	During construction
	6. Topsoil must not be stockpiled on drainage lines or near watercourses without proper risk assessment conducted and prior consent from the PM and ECO.	Contractors	During construction
Vegetation Clearing	1. Ensure that the road reserve and actual road width is clearly marked and pegged before vegetation clearing, to prevent additional vegetation from being removed.	Contractors	During construction
	2. All cut vegetation shall be disposed of off-site at an approved disposal site. Stockpiling of cut vegetation shall only be permitted in areas indicated by the Engineer and / or the ECO.	Contractors	During construction
	3. No cut vegetation shall be burnt on site, unless the necessary approvals have been obtained from the local authority.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
4.3.8. Pollution Control Measures			
Pollution control measures	1. Material Safety Data Sheets (MSDS) for on-site chemicals, hydrocarbon materials and / or waste and hazardous substances shall be readily available.	Contractors	During construction
	2. The Contractor shall prepare an emergency procedure and a procedure for the management e.g. storage, decanting and disposal of hazardous substances.	Contractors	Prior to and during construction
	3. Rain water collected within containment facilities can be released, if not contaminated. If the contents of containment facilities are contaminated, the material shall be removed and disposed of as hazardous waste.	Contractors	During construction
	4. The contractor shall exercise suitable precautions with the storage, handling and transport of all materials that could adversely affect the environment.	Contractors	During construction
	5. In the case of a spill of hydrocarbons, chemicals or bituminous material the spill shall be contained and the material together with any contaminated soil collected and disposed of as hazardous waste.	Contractors	During construction
	6. Should a pollution incident occur on site the ESO and ECO shall: a. Ensure the immediate implementation of reasonable measures to contain and minimise the impacts of the incident; b. Notify all persons as per legal requirements (NEMA, NEMWA & NWA) if applicable and approved communication / incident procedure; c. Undertake clean up procedures immediately; d. Record the incident in the Environmental Incident Register; and e. Implement measures to prevent similar incidents from occurring in the future.	ESO / ECO / Contractors	During construction
	7. All general waste shall be removed from the work areas on a regular basis and disposed to suitable waste receptacles for disposal to the registered waste disposal site.	Contractors	During construction
	8. The contractor shall ensure that there is always a supply of absorbent material readily available to absorb / breakdown spills and where possible is designed to encapsulate minor hydrocarbon spillage. This material must be accepted by the re prior to any refuelling or maintenance activities.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
4.3.9. Solid Waste Management			
General Waste	1. Waste shall be dealt with in accordance with the National Waste Management Strategy namely reduce, re-use and recycling, with disposal to landfill being a last resort.	Contractors	During construction
	2. Solid waste generated must be disposed of at the nearest registered landfill site.	Contractor	During construction
	3. Recyclable waste shall be separated, reused and recycled at approved facilities.	Contractors	During construction
	4. Different waste bins, for different waste streams, shall be provided to ensure correct waste separation.	Contractors	During construction
	5. All non-recyclable solid waste shall be disposed of at a permitted landfill site, and proof shall be available and presented to the ECO during site visits.	Contractors	During construction
	6. Inert building rubble used for levelling and infilling purposes may not exceed the NEM: WA Regulation 718 threshold of 25 tons.	Contractors	During construction
	7. Littering is prohibited and dumping of any waste shall not be allowed in undeveloped or open areas.	Contractors	During construction
	8. No waste material shall be burned, buried or disposed of in any area that is not a licensed landfill site.	Contractors	During construction
	9. An adequate number of waste receptacles shall be available for waste disposal and prevention of littering.	Contractors	During construction
	10. Hazardous waste shall not to be mixed or combined with general waste earmarked for recycling or disposal at a licensed landfill site.	Contractors	During construction
	11. Waste bins shall be cleaned out on a regular basis to prevent windblown waste and/or visual or odour disturbance.	Contractors	During construction
Sewage / Waste Water and Infrastructure	1. Discharge of waste from temporary chemical toilets into the environment shall be strictly prohibited.	Contractors	During construction
	2. The contractor(s) shall prevent pollution of surface or groundwater, including the Nseleni river, from the release, accidental or otherwise of contaminated water (including contamination with chemicals, oils, fuels, cement, sewage, construction water, water carrying products, etc.) As a result of construction activities.	Contractors	During construction
	3. No wastewater shall be disposed of directly into any surface water bodies or the Nseleni river.	Contractors	During construction
	4. The contractor shall be responsible for the construction and operation of necessary collection facilities in order to prevent such pollution and / or settlement of suspended matter, and shall dispose of the collected waste as approved by the engineer.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
Hazardous Waste	1. Hazardous waste is to be disposed at a Permitted Hazardous Waste Landfill Site. The contractor shall provide proof of disposal.	Contractors / ECO	During construction
	2. Hazardous storage areas must be 110% banded with an impermeable liner to protect groundwater quality.	Contractors / ECO	During construction
	3. Hazardous waste bins shall be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the container shall be covered with a lid).	Contractors	During construction
	4. Transportation of hazardous materials shall be in accordance with the National Road Traffic Act and relevant SANS Codes of Practice.	Contractors	During construction
	5. No hydrocarbon (e.g. fuel, oils and contaminated soil / materials) and hazardous waste shall be burnt or buried on site.	Contractors	During construction
	6. The Contractor shall provide disposal certificates issued by the hazardous waste disposal facility to the Engineer. Such disposal certificates shall be kept at the site office for inspection by any relevant authority.	Contractors	During construction
4.3.10.	***Erosion, Sedimentation Management, Excavations and Geotechnical Aspects***		
Erosion	1. Suitable erosion control measures shall be implemented in areas sensitive to erosion i.e. storm water discharge points, exposed areas and embankments. These measures could include: a. The suitable use of sand bags or soil saver; b. The prompt rehabilitation of exposed embankment areas (e.g. with indigenous vegetation); c. The removal of vegetation, only as it becomes necessary for work to proceed; d. Taking necessary precautions in terms of design, construction and earthworks.	Contractors	Prior to and during construction
	2. Soil stockpiling areas must be sufficiently situated away from the drainage areas.	Contractors	During construction
	3. Soil stockpiles must not be placed adjacent to any water bodies preventing possible siltation and sedimentation.	Contractors	During construction
	4. Repair identified leaks and address issues of water wastage as soon as these are identified.	Contractors	During construction
	5. Avoid over-wetting, saturation and unnecessary runoff during dust control activities and irrigation.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	6. Do not allow surface water or storm water to be concentrated, or to flow down cut or fill slopes without erosion protection measures being in place.	Contractors	During construction
	7. Line overflows and scours channels with stone pitching along their length and at their points of discharge to prevent soil erosion.	Contractors	During construction
	8. Ensure that channels do not discharge straight down the contours. These must be aligned at such an angle to the contours that they have the least possible gradient.	Contractors	During construction
	9. All runoff to be collected and channelled to discharge via surface spreaders into drainage lines.	Contractors	During construction
	10. Platforms and roads to be graded to ensure free surface drainage.	Contractors	During construction
	11. All natural trees, shrubbery and grass species should be retained wherever possible.	Contractors	During construction
	12. In order to limit sediment input, the use of hay bales packed in rows across diversions and active flow areas or the use of sediment fences are recommended. The bales / fences will need to be removed and disposed of after construction.	Contractors	During construction
	13. Stabilisation of cleared areas to prevent and control erosion and / or sedimentation shall be actively managed. The method of stabilisation shall be determined in consultation with the engineer and ECO;	Project Engineer / ECO/ Contractors	During construction
	14. Consideration and provision shall be made for the following methods (or combination thereof): a. Brushcut packing (although no alien plant material may be used for this purpose); b. Mulch or chip cover (although no alien plant material may be used for this purpose); c. Straw stabilising (at a rate of one bale / m^2 rotated into the top 100 mm of the completed earthworks – only straw bales held with string (not wire) may be used); d. Watering; e. Planting / sodding; f. Hand seeding / sowing; g. Application of soil binders and anti-erosion compounds; and / or h. Mechanical cover / packing structures (including the use of Geofabric, hessian cover, log / pole fencing).	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	15. Traffic and movement over stabilised areas shall be restricted and controlled , and damage to stabilised areas shall be repaired and maintained by the Contractor to the satisfaction of the Engineer and ECO.	Project Engineer / ECO/ Contractors	During construction
Excavations	1. Excavations should be undertaken carefully incorporating appropriate drainage.	Contractors	During construction
	2. Ensure that no excavated material enters the Nseleni River.	Contractors	During construction
4.3.11. Water Management			
Storm water and Surface Water	1. Open storm water culverts and drains are to be covered, where required, during demolition and construction activities to prevent blockages	Contractors	Prior to construction
	2. Temporary cut off drains and berms must be implemented where required to capture storm water and promote infiltration.	Contractors	During construction
	3. There should be a periodic checking of the site drainage system to ensure that the water flow is unobstructed.	Contractors	During construction
	4. Storm water pipelines shall be consolidated where possible to reduce the number of discharge points within an area.	Contractors	During construction
	5. The Contractor shall not in any way modify nor damage the banks or bed of any water body or drainage lines adjacent to or within the designated area, unless required as part of the construction project specification. Where such disturbance is unavoidable, modification of water courses should be kept to a minimum in terms o the removal of riparian vegetation.	Contractors	During construction
	6. Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site. i.e.: these materials must not be placed in storm water channels or drainage lines.	Contractors	During construction
	7. During construction unchannelled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw / hay or bundles of cut vegetation should be dug into the soil in contours to slow surface wash and capture eroded soil. The spacing between rows will be dependent on slope.	Contractor	During construction
Water Quality	1. All polluted run-off shall be prevented or treated to acceptable water quality before being discharged into the storm water system.	Contractor	During construction
	2. Washing of clothes, equipment or machinery within any watercourse is prohibited.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	3. Site staff shall not be permitted to use any stream, open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities.	Contractors	During construction
	4. Spillages within bunds containing hazardous liquids shall be cleared by an approved specialist waste contractor. The ESO shall inform the ECO of all spillages as well as the means used to clean them up.	Contractors / ESO	During construction
4.3.12. Air Quality			
Air Quality	1. Removal of vegetation shall be avoided until such time as construction is required.	Contractors	During construction
	2. All exposed surfaces shall be re-vegetated and/or stabilised as soon as is practically possible.	Contractors	During and after construction
	3. No burning of waste, such as plastic bags, cement bags and litter, shall be permitted.	Contractors	During construction
	4. Excessive dust generation will be minimised by inter alia controlling vehicle speed, stockpiles and the mixing of chemicals by wetting exposed areas or using screening where required.	Contractors	During construction
	5. The location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors, such as the Nseleni River, cultivated crops, etc.	Contractors	During construction
	6. Material loads shall be suitably covered and secured during transportation.		
	7. Should excessive vehicle emissions be observed, the required maintenance must be done or the equipment removed from site.	Contractors	During construction
	8. A complaints register shall be provided to report any excessive dust incidents.	Contractors	During construction
	9. Contractors must make alternative arrangements (other than fires) for cooking and / or heating requirements. LPG gas cookers may be used provided that all safety regulations are followed.	Contractors	During construction
	10. Avoid the excavation, handling and transport of erodible materials under high wind conditions.	Contractors	During construction
4.3.13. Noise			
Noise	1. Construction activities may not exceed the working hours of the Uhlathuze and Mfolozi Municipalities and their by-laws, without the required approval.	Contractors	During construction
	2. Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	3. Construction vehicles and equipment generating excessive noise shall be fitted with appropriate noise abatement measures.	Contractors	During construction
	4. Construction workers shall be provided with the appropriate PPE i.e. ear plugs at activity areas where excessive noise is generated.	Contractors	During construction
	5. A complaints register shall be provided to record any complaints regarding excessive noise.	Contractors	During construction
	6. The Contractor shall be held responsible for any complaints received from the authority and / or public with respect to any contravention of the agreed conditions.	Contractors	During construction
4.3.14. Protection of Fauna and Flora, Vegetation			
Fauna and Flora	1. Contractors shall ensure that no protected trees are removed without the required authorisation from the Department of Agriculture, Forestry and Fisheries.	Contractors	During Construction
	2. Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas.	Contractors	During Construction
	3. All large indigenous plant and sedge species should be conserved wherever possible.	Contractors	During Construction
	4. Disturbance to birds, animals and reptiles and their habitats should be minimised wherever possible.	Contractors	During Construction
	5. No natural vegetation is to be collected for use as firewood.	Contractors	During Construction
	6. No animals are to be disturbed unnecessarily and no animals are allowed to be shot, trapped or caught for any reason.	Contractors	During Construction
	7. The Contractor shall not deface, paint, damage or mark any natural features situated in or around the site for survey or other purposes unless agreed beforehand with the RE. Any features affected by the Contractor in contravention of this clause shall be restored / rehabilitated to the satisfaction of the RE and ECO.	Contractors	During Construction
	8. The Contractor shall not permit his employees to make use of any natural water sources (e.g. Nseleni River) for the purposes of swimming, personal washing and the washing of machinery or clothes.	Contractors	During Construction
	9. A precautionary approach to ensure that no barriers to the migration of the aquatic biota are created when conducting work at the bridge site, and if possible, conduct the proposed activities during times when biota are not likely to utilise migratory route (i.e. during winter).	Project Manager / Contractors	During Construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
Invader Plant Control	1. Invader species and weeds must be removed and disposed of in accordance with existing legislation.	Contractors	Prior to and during construction
	2. Although removal of alien species will mostly require removal by hand and the use of saws, the use of herbicides and pesticides may be required. Only specified and approved herbicides and pesticides should be used for control of alien and invasive species. Manufacturer's instructions must be followed when using chemical methods, especially in terms of quantities, time of application etc.	Contractors	Prior to and during construction
	3. Once construction of each section is completed, the new and open roadsides should be weeded by hand. If spraying is to take place, it should be done using the 'cut and spray' system where each team member uses a small hand operated (not pressurised) spray.	Contractors	During construction
	4. No alien vegetation may be buried on site.	Contractors	During construction
4.3.15. Areas of Specific Importance			
Archaeological Sites	1. If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately.	Contractors	During construction
	2. Contractors shall take reasonable precautions to prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the Applicant or ECO of such discovery.	Contractors	During Construction
	3. Approval must be obtained from Amafa-aKwaZulu-Natali should there be the need to demolish any sites of archaeological and cultural significance during the detailed design phase of the development. Demolition/construction work may only commence once Amafa's approval has being obtained.	Contractors	During Construction
	4. Work may only resume once clearance is given in writing by an archaeologist.	Contractors	During Construction
	5. If a grave is uncovered on site all work in the immediate vicinity of the graves must be stopped and uMhlathuze/Mfolozi Municipalies and ECO informed of the discovery.	Contractors	Prior to and during construction
	6. Amafa should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	7. The project proponent will, in the case of graves, together with the National Monuments Council, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.	Contractors	During Construction
4.3.16. Public and Workforce Safety			
General	1. Construction activities must ensure the safety of the passing pedestrians and vehicles, as this is an existing and active road.	Contractors	Prior to construction
	2. Dedicated pathways (temporary) for pedestrians shall be developed to ensure safe passage around construction activities	Contractors	Prior to construction
	3. Construction activities may not exceed the working hours specified by uMlathuze Local Municipality's by-laws, without the required approval.	Contractors	During construction
	4. A safety officer shall be appointed who will continuously monitor safety conditions during demolition and construction activities.	Contractors	During construction
	5. Flag men shall be appointed and provide ample warning of road hazards, as and when required.	Contractors	During construction
	6. All members of the construction workforce working on the site or near the roads shall be provided with the appropriate high visibility clothing.	Contractors	Prior to and during construction
	7. All construction workers handling chemical or hazardous substances shall be trained in the use of such substances and the environmental, health and safety consequences of incidents.	Contractors	During construction
	8. The workforce shall be provided with sufficient potable water and under no circumstances are they to use untreated water from local watercourses for drinking.	Contractors	During construction
	9. Care shall be taken with electrical connections. All connections shall be treated as live until confirmed / locked-out.		
Unprotected areas	1. Potentially dangerous / hazardous areas such as open pits and elevated unprotected areas shall be demarcated and clearly marked.	Contractors	During construction
4.3.17. Social Impacts			
Disruption of Infrastructure and Services	1. Contractor's activities and movement of staff is to be restricted to designated construction areas.	Contractors	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	2. Should construction staff be approached by members of the public or other stakeholders, they should assist them in locating the Project Manager / Royal HaskoningDHV / Contractor or ECO, or provide a number on which they may contact the relevant contact person.	Contractors	During construction
	3. The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by theContractor.	Contractors	During construction
	4. Local communities or local community organisations shall be given preference in supplying services and labour to the construction activities.	Contractor	Prior to construction
	5. Cognisance must be taken of the position of existing services and infrastructure (e.g. roads, pipelines, power lines and telephone services) that may get damaged due to construction activities and it must be ensured that existing services are not damaged or disrupted unless required by the contract.	Contractors	During construction
	6. Local communities will be provided adequate warning via the community structures of disruption to services e.g. water and electricity.	Contractors	During construction
	7. Alternative access will be provided to properties or suitable arrangements will be made with property owners in the event that access will be impaired.	Contractors	During construction
Damage to community facilities and infrastructures	1. In the event of damage occurring to private properties e.g. access ways and fencing, arrangements for the re-instatement or re-imbursement of damage will be made.	Contractors	During and after construction
	2. The repair and reinstatement of any infrastructure that is damaged or services that are interrupted during construction will be done at the expense of the Contractor and shall receive top priority.	Contractors	During and after construction
Visual	1. Lighting on the construction site should take into consideration neighbours and the general public and be located to cause the least distraction, without compromising safety and security.	Contractors	During construction
Environmental Monitoring and Record Keeping	1. Environmental monitoring shall be undertaken by the ESO on a daily basis and by the ECO on a monthly basis.	ESO / ECO	During construction
	2. This monitoring shall be undertaken in order to ensure compliance with all aspects or requirements of the EMPr and Environmental Authorisation.	ESO /ECO	During construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	3. Environmental Authorisation must be kept onsite at all times. Complains register must be always on site.	ESO/ECO	During construction
	4. Contractors shall provide proof of disposal of building rubble, domestic waste, industrial waste and hazardous waste to licensed waste disposal or recycling facilities.	Contractors	During construction
	5. The ECO shall review and update the EMPr, as required.	ECO	During construction
Complaints register and environmental incident book	1. Complaints received from the community or other I&AP's shall be registered and recorded by the ESO and brought to the attention of the ECO and contractors. All relevant parties shall respond accordingly. The following information shall be recorded in the case of any complaint/incident: a. Time, date and nature of complaint; b. Response and investigation undertaken; and c. Corrective and preventative actions taken and by whom.	Site Environmental Officer / ECO / Contractors	During construction
	2. All complaints received shall be investigated and a response given to the complainant within 14 days.	ECO / Contractor	During construction

4.4. Post Construction Phase and Rehabilitation Activities

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
4.4.1. Construction Camp and Construction Areas			
Camp Deconstruction and Rehabilitation of Construction Areas and Accesses	1. All remaining construction infrastructure and material / consumables shall be removed.	Contractors	After construction
	2. The construction camp area shall be rehabilitated / re-instated once all plant work has been completed to rectify any damage that may have been caused by plant or vehicles.	Contractors	After construction
	3. All spillage areas shall be cleaned and/or remediated.	Contractors	After construction
	4. All remaining waste and litter shall be collected and recycled and /or disposed to reputable contractors / licensed facilities.	Contractors	After construction
	5. The Contractor must arrange for the cancellation of all temporary services, including but not limited to chemical toilets and waste removal and disposal services.	Contractors	After construction
	6. Temporary fences, barriers and demarcations associated with the construction phase are to be removed from the site, unless stipulated otherwise by the Project Manager / Engineer.	Contractors	After construction
	7. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.	Contractors	After construction
	8. The Contractor must repair any damage that the construction works has caused to neighbouring properties.	Contractors	After construction
	9. The Contractor is to check that all drainage courses are free from building rubble, spoil materials, debris and waste materials.	Contractors	After construction
	10. No temporary works, stockpiles or other circumstances may remain that could impede natural water movements or act to concentrate run-off.	Contractors	After construction
Contaminated Substrates and Pollution Control Structures	1. Excavate all areas of contaminated substrate, transfer the contaminated material to a permitted disposal site and treat the affected areas with appropriate ameliorants.	Contractors	After construction
	2. Remove all plastic linings used for pollution control and transfer to a permitted disposal site.	Contractors	After construction
	3. Break up all temporary concrete structures that have been created (e.g. temporary working and parking surfaces) and remove concrete waste to a permitted disposal site.	Contractors	After construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
4.4.2.	***Vegetation, Rehabilitation of Land, and Drainage Areas and Geotechnical Aspects***		
Rehabilitation	1. Rehabilitation of vegetation and land areas shall be undertaken concurrently with construction activities where possible. Where concurrent rehabilitation is not possible, rehabilitation of relevant areas shall be commenced with immediately on completion of construction activities and deconstruction of the construction contractor's camp.	Contractors	After construction
	2. Rehabilitation shall ensure that all specified areas disturbed by the works are returned to a similar or better state than before the construction works commenced.	Contractors	After construction
	3. On completion of all operations, the construction site shall be cleared of any contaminated soil accordance with the soil management procedure.	Contractors	After construction
	4. Topsoil that has been stockpiled during construction must be applied to the area to undergo rehabilitation. The depth of the topsoil layer to be applied depends on the natural depth of topsoil in the area, and the amount of topsoil that may have been lost during construction.	Project Manager / Project Engineer / ECO	After construction
	5. Indigenous vegetation rescued during the site establishment must be re-established where feasible.	Project Manager / Project Engineer / ECO	After construction
	6. Exposed areas should be rehabilitated with a grass mix that blends in with the surrounding vegetation. The grass mix should consist of a mix of quick covering grasses (pioneer species), mat-forming grasses (e.g. Digitaria eriantha, Cynodon dactylon, Chloris gayana) and tufted grasses (e.g. Eragrostis curvula, Themeda triandra), shrubs and trees adapted to the local environmental conditions.	Project Manager / Project Engineer / ECO	After construction
	7. Re-vegetated areas should be monitored every 3 months for the first 12 months and twice a year thereafter.	Project Manager / Project Engineer / ECO	After construction
	8. All excavations and test pits must be backfilled with in-situ material and the areas monitored for subsidence, which should be addressed if detected.	Contractors	After construction
	9. The areas which have been seeded must be regularly watered directly after seeding until the grass cover becomes established. Watering is to be done in a manner that ensures that no erosion of the topsoil and seed mix takes place.	Contractors	After construction
	10. Regular monitoring of the rehabilitated areas must be conducted. Areas that show signs of erosion or where the vegetation has not established successfully must be repaired and / or re-vegetated.	Project Manager / Project Engineer / ECO	After construction

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
	11. Areas compacted by vehicles during construction must be scarified to allow penetration of plant roots and the regrowth of natural vegetation.	Project Manager / Project Engineer / ECO	After construction
	12. All disturbed areas within the riparian zone on either side of the low level crossing shall be restored by planting suitable indigenous vegetation on both banks of the river.	Project Manager / Project Engineer / ECO	After construction
Environmental Monitoring and Reporting	1. Environmental monitoring shall be undertaken by the ESO on a daily basis and by the ECO on a monthly basis.	ESO / ECO	After construction and prior to operation of the site
	2. This monitoring shall be undertaken in order to ensure compliance with all aspects or requirements of the EMP and Environmental Authorisation.	Site Environmental Officer /ECO	After construction and prior to operation of the site
Audit and Sign-off	1. A close-out audit shall be conducted by the ECO following the post-construction and rehabilitation activities.	ESO / ECO	After construction and prior to operation of the site
	2. The close out audit report must be compiled and submitted to DAEA – Compliance section	ECO	After construction and prior to operation of the site
	3. The Department of Transport shall not sign-off on the project and make payment of the final invoice to contractors until the compliance audit was conducted by the ECO and 100% compliance to the environmental authorisation has been achieved.	Project Manager / ECO	After construction and prior to operation of the site

4.5. Operational Phase and Related Activities

ENVIRONMENTAL ASPECT	ENVIRONMENTAL MEASURES AND ACTION PLANS	RESPONSIBILITY	TIMEFRAMES
4.5.1. Maintenance/ Management and Operation of the Infrastructure and Facilities			
Vegetation	1. A contract needs to be in place to check on the rehabilitated roadsides. Any die-offs or slippage of plant material and mulch should be repaired or replanted as soon as possible.	Project Developer	Ongoing
	2. Erosion of rehabilitated surfaces will need to be repaired as soon as possible until the vegetation has grown sufficiently to secure exposed soil.	Project Developer	Ongoing
Maintenance Construction Activities	1. All road maintenance activities on P425 during operation must comply with the construction measures detailed in the construction phase of the EMPr.	Project Developer	Ongoing
Erosion Control	1. The various protective measures that were installed during the construction phase to prevent or minimise erosion, must be properly maintained.	Project Developer	Ongoing
	2. All side drains and culverts must be regularly checked for blockages and soil deposition and cleared if necessary.	Project Developer	Ongoing
	3. All stormwater discharge points must be regularly checked for damage and erosion. Where evidence of erosion exists, maintenance and repair must be immediate.	Project Developer	Ongoing
Road Safety	1. The bridge and road must be maintained at the required road construction standards once operational to ensure the positive road safety impacts remain in place. Poor or irregular maintenance will result in the positive impact reversal.	DOT	Ongoing
Environmental Management	1. Environmental parameters for monitoring shall be determined and monitored as per criteria. These could include waste generation and disposal, water management and energy management. Actions shall be determined and implemented where a decline in performance is detected e.g. increase in water usage may indicate reticulation failures.	DOT	Ongoing

Closure Phase and Related Activities

The lifespan of the new bridge cannot be defined at this stage. Due to its function as the link between Empangeni and Nseleni, as well as an emergency alternative to the N2 that is frequently used by commuters and heavy duty vehicles transporting goods, no tangible specifications can be made during this time in terms of decommissioning. It is therefore recommended that prior to decommissioning of the bridge at some future date, a comprehensive decommissioning EMPr be prepared that can reassess the potential environmental and socio-economic impacts at the time. This decommissioning EMPr should be based on the construction EMPr as the impacts and mitigation measures will be very similar with significant focus on remediation and rehabilitation. Specifications applicable to the Developer and the Contractor would need to be defined in the decommissioning EMPr based on the environmental, social and economic considerations at the time.

5. ENVIRONMENTAL CODE OF CONDUCT

One of the objectives of the EMPr is to ensure that all the workforce, contractors, sub-contractors and construction staff have an understanding of environmental issues and potential impacts on site activities. This environmental code of conduct provides the basic rules that should be strictly adhered to. It is the responsibility of the Site Environmental Officer and ECO to ensure that each contractor, sub-contractor and workforce understand and adhere to the Code of Conduct.

ALL PERSONS ARE OBLIGED TO KEEP TO THE RULES OF THIS CODE OF CONDUCT

ENVIRONMENTAL CODE OF CONDUCT

- Do not waste electricity, water or consumables;
- Only use the authorised access;
- Do not litter;
- Dispose of solid waste to the correct waste containers provided;
- Prevent pollution;
- Use the toilet facilities provided;
- Do not dispose contaminated waste water to the storm water or the environment;
- Immediately report any spillage from containers, plant or vehicles;
- Do not burn or bury any waste;
- Do not trespass onto private properties;
- Strictly leave all animals alone. Never tease, catch or set devices to trap or kill any animal;
- Never damage or remove any trees, shrubs or branches unless it forms part of working instructions;
- Do not deface, draw or cut lettering or any other markings on trees, rocks or buildings in the area;
- Know the fire fighting procedure and locations of fire fighting equipment; and
- Know the environmental incident procedures.

Appendix A: Sensitivity Map

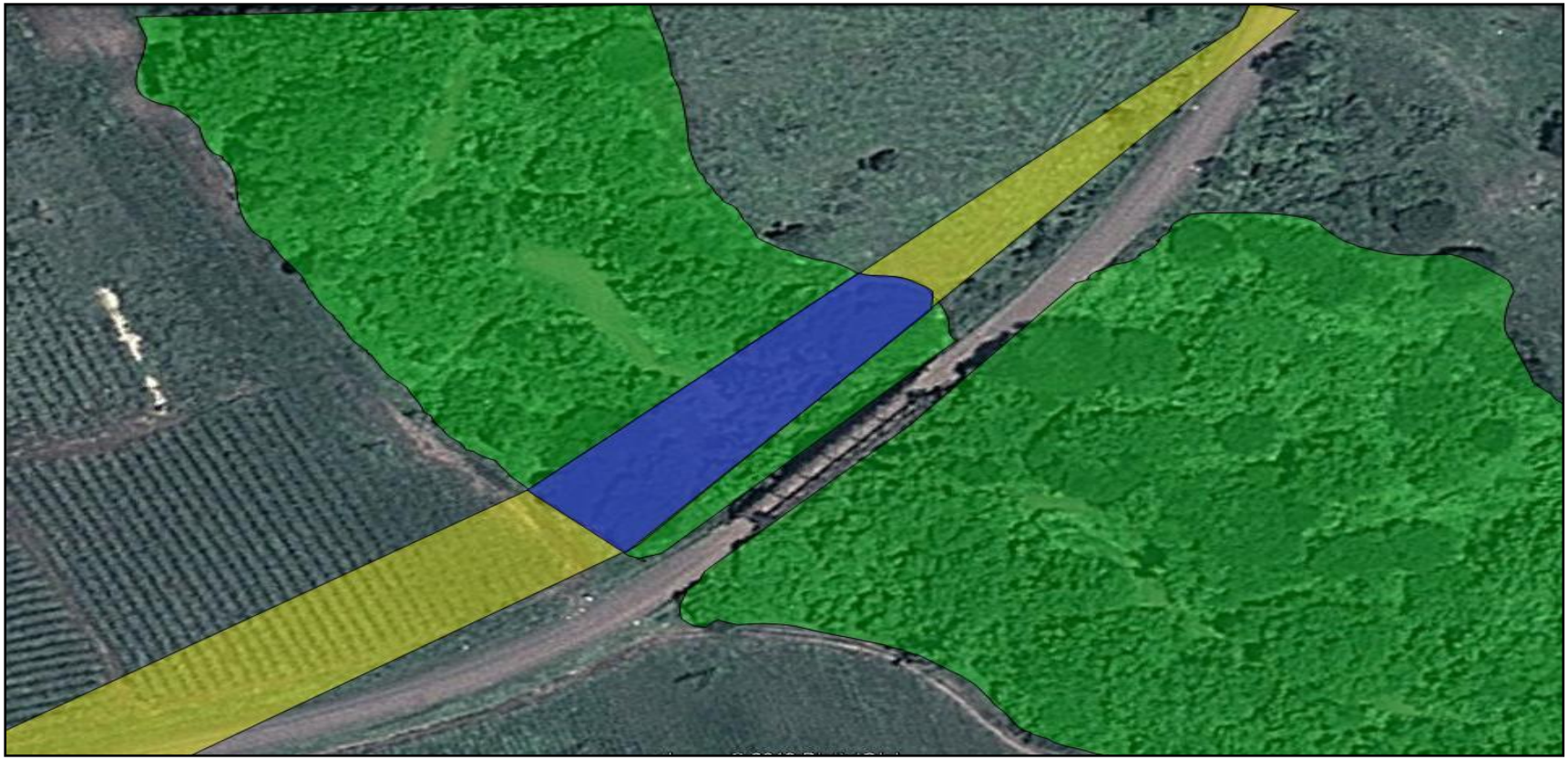


Fig: 1 Preliminary sensitivity map for the proposed replacement of the Nseleni River Bridge at (11.3 km) on the P425 highlighting sensitive habitats along the proposed alignment. The Yellow area indicates transformed habitats of the proposed re-aligned P425 (Low Sensitivity). The Blue area indicates the proposed new Nseleni bridge alignment (High Sensitivity) and the Green area indicates the riparian zone of the reach of the Nseleni River (High sensitivity).

STEP	METHOD	EQUIPMENT
1	Remove all construction material from the area where construction has been completed.	To be undertaken by hand.
2	Topsoil that has been stockpiled during construction must be applied to the area to undergo rehabilitation. The depth of the topsoil layer to be applied depends on the natural depth of topsoil in the area, and the amount of topsoil that may have been lost during construction.	Topsoil must be applied from the topsoil stockpiled during construction.
3	The naked ground should be seeded with a stabilising grass mix, suited to the conditions. The quantity of seed used will depend on the slope, with a steeper slope requiring a heavier application of seed. For slopes: • >15º: 25-50 kg/ha • <15º: 15-25 kg/ha The natural seed bank in the topsoil will supplement the seed mix applied	The seed mix should consist of pioneer grass species of the area, and will also depend on what species are commercially available during the season required. A standard seed mix would consist of the following species (in decreasing order of proportion constituting the seed mix)□: • Themeda triandra • Andropogon chinensis • Aristida congesta • Cynodon dactylon • Cymbopogon plurinodes • Eragrostis curvula • Eragrostis gummiflua • Setaria spp. • Imperata cylindrica • *Sporobolus fimbriatus* and sedges such as *Schoenoplectus* spp. and *Juncus spp.* should be used
4	The areas which have been seeded must be regularly watered directly after seeding until the grass cover becomes established. Watering is to be done in a manner that ensures that no erosion of the topsoil and seed mix takes place.	A hosepipe must be available on site.
5	If the grasses have not established after a period of two months after seeding, the areas should be reseeded. If necessary, another dressing of topsoil should be applied prior to seeding.	As above.
6	Slope stabilisation measures may be necessary in places where grass has not been able to establish and there is an erosion risk. The measures implemented depend on the situation, and can be varied as necessary.	Various slope stabilisation measures are available and vary in effectiveness according to the situation including • Logs/bark held in place with pegs • Rows of *Cynodon dactylon*, *Panicum maximum*, *Imperata cylindrica*, *Hyparrhenia filipendula* held in place with pegs.
7	All alien vegetation is to be appropriately removed and disposed of. Alien species that have been encountered along the proposed	Removal will to a large extent be done by hand. Saws may be necessary in certain cases and

	Nseleni River bridge included Syringa *Melia azedarach,* Brazilian Glory Pea *or* Red Sesbania *Sesbania punicea*, Castor-Oil Plant (*Ricinus communis*), Lantana (*Lantana camara*), Bugweed (*Solanum mauritianum*), Peanut Butter Cassia (*Senna diymobotrya*), Morning Glory (*Ipomoea purpurea*), Paraffin Bush (*Chromolaena odorata*), Yellow Oleander (*Thevetia peruviana*), Montanoa (*Montanoa hibiscifolia*), *Ageratum conyzoides*, *Caesalpinia decapetala*, *Leucaena leucocephala*, *Psidium guajava*, *Mimosa pigra, Tithonia diversifolia*.	specific herbicides may be required (if used, the use of these must be strictly controlled)
8	The P425 road and Nseleni River Bridge servitude must be regularly inspected during the operational phase and alien vegetation that had re-emerged; must be removed and follow-up treatment applied.	On-going alien vegetation removal programme (beyond the scope of the project)