

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAM (EMPr) - PROPOSED DALINKOSI PEDESTRIAN BRIDGE, WARD 30, ALFRED DUMA LOCAL MUNICIPALITY, KWAZULU NATAL.



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Acronyms Used

Acronym	Definition
BA	Basic Assessment
EDTEA	Department of Economic Development, Tourisms and Environmental Affairs (Kwa-Zulu Natal)
DW&S	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ECO	Environmental Control Officer
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
I&AP	Interested and Affected party(ies)
IDZ	Industrial Development Zone
NEMA	National Environmental Management Acts
NWA	National Water Acts
PM	Project Manager
SCCs	Species Of Conservation Concern

1. INTRODUCTION

SA SHEQ Consultants (Pty) Ltd have been appointed by Alfred Duma Local Municipality to undertake environmental assessment service for the proposed Dalinkosi pedestrian bridge, as the proposed project triggers listed activities under the National Environmental Management Acts (NEMA) and National Water Acts (NWA).

This Environmental Management Programme (EMPr) has been prepared as part of a Basic Assessment (BA) process to provide specific environmental guidance to the relevant project personnel including, Engineers and Contractor(s) for the planning, construction and rehabilitation of the proposed activities with regard to their roles and responsibilities in terms of accountable environmental management.

This EMPr has been compiled in accordance with Government Notice (GNR) 326, Appendix 4 of the Environmental Impact Assessment (EIA) Regulations (2017). This EMPr must form an integral part of the contract documents between Alfred Duma Local Municipality and the appointed contractor during the planning and construction phase of the development, as it outlines the methodology & duties required such that construction can be achieved in an environmentally sustainable manner.

The competent authority, the KZN Department of Economic Development, Tourism and Environmental Affairs (EDTEA), requires that an EMPr be submitted in accordance with Section 19 of the EIA Regulations published in Government Notice No. R. 982 of 4th December 2014 (as amended) (EIA Regulations). Section 19 should be read in conjunction with Section 24N of the National Environmental Management Act, 1998 (Act 107 of 1998), as amended and hereby referred to as 'NEMA' throughout this document.

2. THE ENVIRONMENTAL MANAGEMENT PROGRAM (EMPr)

The EMPr provides generic and site-specific information on environmental management related to the project in terms of minimising potential negative environmental impacts and enhancing positive environmental impacts during the Project. The EMPr is compiled to form the basis of a management system to implement on this particular project to regulate and control construction-phase activities. An EMPr is a stand-alone document used to prescribe management mechanisms/ methods for the prevention of undue or reasonably avoidable adverse environmental impacts and for the enhancement of the positive environmental benefits of a given project. The EMPr is primarily based on the principles of NEMA, which therefore bestows a 'Duty of Care' on those who cause, have caused or may in future cause pollution or degradation of the environment, as per of Section 28(1) of NEMA.

2.1. Purpose of the EMPr

This EMPr has been compiled to provide recommendations and guidelines for mitigation measures against environmental impacts and the monitoring thereof throughout the duration of the proposed project as to ensure that all relevant impacts are considered for the undertaking of environmentally responsible activities. The purpose of this EMPr is to provide direct specifications for "good environmental practice" for application during the planning, construction and rehabilitation (post-construction) phases of the project.

The EMPr informs the relevant project role-players (the Contractor, Project Engineers, Contractor, Environmental Control Officer (ECO) and all other staff employed at the site) as to their duties in the fulfilment of the environmental legal requirements during the construction and rehabilitation phase with particular reference to the prevention and mitigation of anticipated and potential negative environmental impacts. Furthermore, it aims to organise and coordinate the environmental management and mitigation measures with all construction activities implemented on the project and pragmatically describe these measures in order to prevent, reduce or otherwise manage the potential negative environmental impacts associated with the Project. Where opportunities exist to enhance any favourable impacts of the project, these have also been described in this EMPr. The objectives of an EMPr are to, but not limited to:

- a Ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- b To assign roles and responsibilities to parties involved regarding the implementation of this EMPr;
- c Verify environmental performance through information on impacts as they occur;
- d Outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of negative environmental impacts, and to otherwise manage environmental impacts associated with the proposed project;
- e Detail specific actions deemed necessary to assist in minimising the environmental impact of the project;
- f Identify measures that could optimise beneficial impacts;
- g Create management structures that address the concerns and complaints of I&APs with regards to the Project;
- h Propose mechanisms for monitoring compliance with the EMPr and reporting thereon;
- i Specify time periods within which the measures contemplated in the final EMPr must be implemented, where appropriate.

2.2. Structure of the EMPr

The EMPr is divided into four Project phases. Each phase has specific issues and activities related to that period. The impacts are identified and given a brief description in line with the Project phases outlined in Regulation No. 982, Appendix 4, Section 1(d) highlighted below:

2.2.1 Planning and Design Phase

This section of the EMPr provides management principles for the planning and design phase of the Project prior to the undertaking of any construction activities. The primary environmental objective during this phase is to ensure the best suited environmental option for the Project is selected based on the final design (i.e. plans, drawings, layouts, surveys, environmental assessments and specialist studies) undertaken for the proposed development footprint.

2.2.2 Pre-Construction Phase

This section will provide guidelines on pre-construction activities including site establishment; environmental induction and training and awareness; site access and health and safety. Environmental actions, procedures and responsibilities are specified. Management principles are outlined and the Contractor will be required to follow these specifications to the satisfaction of the Project/Site Manager and ECO.

2.2.3 Construction Phase

This section of the EMPr provides management principles for the construction phase of the Project. Environmental actions, procedures and responsibilities specified. These specifications will to form part of any contractual documentation and the Contractor will therefore be required to comply with these specifications to the satisfaction of the Project/Site Manager and ECO.

2.2.4 Post Construction Phase

This section of the EMPr provides management principles for the rehabilitation phase of the Project. This will include best practice, procedures and responsibilities as required for various associated activities.

This EMPr is a dynamic document which can be, if necessary, updated as required on a continuous basis to ensure environmental best practice prevails. Any substantive EMPr amendments considered necessary must first be submitted to the Site Manager and ECO for consideration. Final amendments to the EMPr must be submitted to the authority (EDTEA) for a final decision.

3. ENVIRONMENTAL ASSESSMENT PRACTITIONER

The EMPr was prepared by SA SHEQ Consultants. The details of the representative EAPs who prepared the report are detailed in Table 1. The Curriculum Vitae and qualifications of the detailed EAPs are provided in Appendix A.

Table 1: Details and Qualifications of EAPs

SA SHEQ Consultants		
EAP	Qualifications and Professional Affiliations	Experience at environmental assessments
Nomthandazo Mkhize	BSc Hons Environmental Management	7 Years

4. ACTIVITY INFORMATION

4.1. Project Description

The Alred Duma Local Municipality proposes to construct the Dalinkosi Pedestrian Bridge. The proposed bridge will serve as a safe and efficient means of crossing the river. The bridge will service communities on both sides of the river by facilitating safer and easier pedestrian mobility, ensuring access to various public facilities including schools and local shops within ward 30. Contemporary, the people of ward 30 use the rocks along the river to cross to the other side, which is a hazardous exercise during the wet season or rainy conditions. The proposed pedestrian bridge will be 60 meters long and 1.5 meters wide, it will be a truss bridge with concrete piers. It will have a total footprint of 145.63 m² including construction corridor.

4.2. Project Location

The development occurs in the Ward 30 in an area called Dalinkosi which is located approximately 65.3km from Ladysmith town. The property details that are affected by the proposed pedestrian bridge include the following.

Table 2: Property Details

Property Details	
Farm Name	Asyn Kraal
ERF	1158
Portion	1
Ward	30
21 Digit SG Code	NOGT00000000115800001
Co-ordinates	Bridge start: 28°31'54.2" S, 30°09'21.0" E Bridge End: 28°31'56.1" S, 30°09'20.0" E

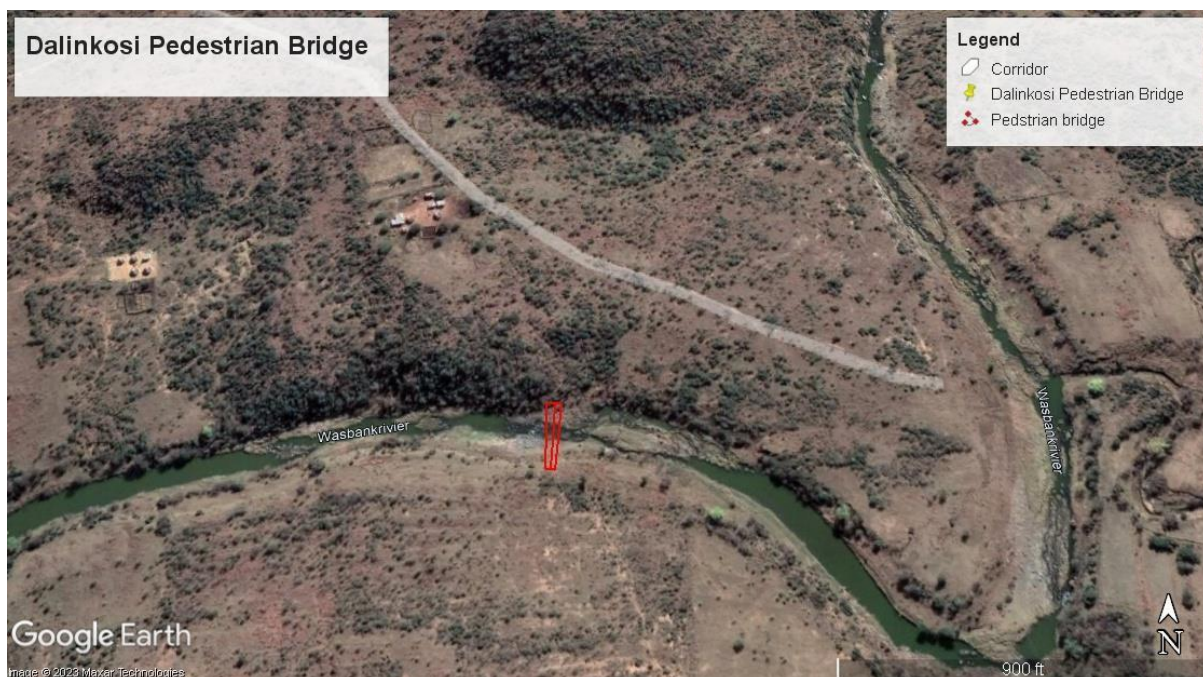


Figure 1: Locality Map of the Proposed Dalinkosi Pedestrian Bridge

4.3. Baseline Environment

The site is located within Quaternary Catchment V60E; falling under the Pongola to Mtamvuna Water Management Area (WMA 4) and the uThungulu waterboard. The proposed bridge sits to the south of Uitval. The Wasbank River is degraded due to the presence of settlements, poor management and invasive plants that have encroached along the edge and impacted upon of this watercourse. Rainfall in the region occurs in the summer months (mostly December to February), with a mean annual precipitation of 743 mm (observed from rainfall station 0300454). The reference potential evaporation (ET_o) is approximately 1 895 mm (A-pan equivalent, after Schulze, 2011) and the mean annual evaporation is between 1400 – 1500 mm, which exceeds the annual rainfall. This suggests a high evaporative demand and a water limited system. Summers are warm to hot and winters are cool. The mean annual temperature is approximately 23.5 °C in summer and 12.2 °C in the winter months (Table 2). The underlying geology of the site is Vryheid Arentite/Shale and the soils overlain are sandy-clay-loam ranging from Mispah, Glenrosa to Oakleaf form in this particular area.

The geology and soils: the landscape is dominated by Sandstones and shale of the Madzaringwe Formation (Ecca Group of Karoo Supergroup) supporting poorly drained sandy soils, mostly of the Glenrosa form. Most important land types Ca, Bb and Fb (Mucina and Rutherford 2006). The highest point of the study site for the proposed Dalinkosi Pedestrian Bridge project site is 2928 ft and the lowest point is 2910 ft.

Income Sandy Grassland is distributed in a large triangle between Newcastle, Vryheid and Dundee and larger polygon in the Wasbank area in northern KwaZulu-Natal. Altitude 880– 1 340 m (mainly 1 120–1 240 m). The vegetation and landscape is very flat extensive areas with generally shallow, poorly drained, sandy soils supporting low, tussock-dominated sourveld forming a mosaic with wooded grasslands (with *Acacia sieberiana* var. *woodii*) and on well drained sites with the trees *A. karroo*, *A. nilotica*, *A. caffra* and *Diospyros lycioides*. (Mucina and Rutherford 2006). There were no plant species of conservation concern (SCCs) recorded as potentially occurring within the project from the DFFE Screening.

4.4. Site Sensitivities

The DFFE (formerly DEA) National Screening Tool was referred to as a basis to determine whether an Industrial Development Zone (IDZ), Environmental Management Framework (EMF) or bio-regional plan applied to the specific area. The site does not fall within any Ecological Support Area (ESA) or Important Birding Area (IBA) and is located within the rural areas of Ladysmith. A number of additional sensitivity maps, compiled and submitted as part of the BAR can be referred to for further detail. There is no intersection with EMF areas found, no intersection with any development zones found, aquatic biodiversity, terrestrial biodiversity and Paleontology theme scored very high sensitivity.

4.5. Potential Environmental Impacts

The construction activities associated with the project and the broad manner in which these may impact on the biophysical and human environment have been summarised in the BAR. In summary, the range of potential impacts (either positive or negative) that may occur or result from the Project's activities if not managed correctly include:

- Surface and/or groundwater pollution;
- Disturbance of the hydrological regime;
- Loss of Aquatic biodiversity;
- Soil compaction / erosion / pollution;
- Terrestrial ecosystem and biodiversity impacts;
- Spread of invasive alien species;
- Landscape change and visual/aesthetic impacts;
- Cultural, historical, archaeological and/or palaeontological impacts.
- Public nuisance including public health and safety, and security;
- Socio-economic impacts;

It is expected that the significance of any negative impacts on the surrounding biophysical and human environment associated with the Project i.e. during Construction will be largely reduced provided this EMP is strictly adhered to. The Environmental Specifications (ES) described in the environmental management program section aim to avoid, reduce and minimise construction related adverse impacts accordingly.

The operations-related benefits can be enhanced through effective management and maintenance planning, as supported by monitoring and auditing programmes. It is recommended that an "Operation Manual/Plan" is developed by the Developer which details the protocols and procedures for relevant management and maintenance actions during the operational phase of the project.

5. RELEVANT LEGISLATION AND GUIDELINES

In terms of the Environmental Impact Assessment (EIA) Regulations (2017), promulgated in terms of the National Environmental Management Act, 1998 (NEMA), certain Listed Activities are specified for either a Basic Assessment (GNR 327 and 324 of 2017) or a full Scoping and EIA (GNR 325 of 2017) is required. The proposed construction of Dalinkosi Pedestrian Bridge, the following listed activities, as per Government Notices No. R. 324, 325 & 327 of 2017 of the National Environmental Management Act (No. 107 of 1998) (NEMA) Environmental Impact Assessment Regulations. The following Listed Activity in Government Notice (GN) GN R327 (Listing Notice 1) of 2017 is triggered (Table 8) and therefore require authorization prior to undertaking.

Table 3: Relevant Activities from EIA Regulations 2017

Regulation Year	Listing Activity NEMA	Description of Activity
2017	LN 1 Act. 12	<p>The development of-</p> <ul style="list-style-type: none"> (i) Dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square meters; or (ii) Infrastructure or structures with a physical footprint of 100 square metres or more; <p>Where such development occurs-</p> <ul style="list-style-type: none"> (a) Within a watercourse; (b) In front of a development setback; or (c) If no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;- <p>Excluding-</p> <ul style="list-style-type: none"> (aa) dams or weirs, where the dam or weir, including infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in listing notice 2 of 2014 or activity 14 in listing notice 3 of 2014, in which case that activity applies. (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, [or] road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of the development and where indigenous vegetation will not be cleared. <p>Applicability</p> <p>The proposed pedestrian bridge will have a footprint of 145.63 Square meters.</p>
2017	LN 1 Act 19	<p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving—</p> <ul style="list-style-type: none"> (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;

		<p>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p> <p><u>Applicability</u></p> <p>The proposed bridge will require an excavation and filling of more than 10 cubic meters of materials from the watercourse.</p>
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Examples of Nation, Provincial and local legislation and/or regulations that should be adhered to where applicable and possible, amongst others, include:

- **The Constitution** of the Republic of South Africa (Act 108 of 1996)
- Environment **Conservation Act** (Act 73 of 1989)
- **National Environmental Management Act** (Act 107 of 1998) (as amended)
- **NEMA EIA Regulations**, 2014 (as amended)
- National Environmental Management: **Waste Management Act** (Act 59 of 2008)
- White Paper on Integrated **Pollution and Waste Management** for South Africa
- National Environmental Management: **Air Quality Act** (Act 39 of 2004)
- National **Road Traffic Act** (Act 93 of 1996) National **Road Traffic Regulations** 2000 (as amended)
- The **White Paper** on Environmental Management Policy for South Africa
- National Environmental Management: **Protected Areas Act** (Act 57 of 2003)
- National **Water Act** (Act 36 of 1998)
- **Water Services Act** (Act 108 1997)
- **Hazardous Substances Act** (Act 15 of 1973)
- **Mineral and Petroleum Resources Development Act** (Act 28 of 2002)
- National **Forest Act** (Act 84 of 1998)
- **Mountain Catchment Areas Act** (Act 63 of 1970)
- National Environmental Management: **Biodiversity Act** (Act 10 of 2004)
- **Alien and Invasive Species Regulations**, 2014
- White Paper on the Conservation and Sustainable Use of South Africa's **Biological Diversity**
- National **Heritage Resources Act** (Act 25 of 1999)
- World **Heritage Convention Act**, 1999
- National **Health Act** (Act 61 of 2003)
- **Health Act** (Act 63 of 1977)
- Occupational **Health and Safety Act** (Act 85 of 1993)
- National Dust Control Regulations, 2013
- **Noise Control Regulations** GN R 154 in GG No. 13717 of 10 January 1992 (published in terms of Section 25 of the Environment Conservation Act 73 of 1989)
- **Hazardous Substances Act** (Act 15 of 1973)
- Kwazulu-Natal Nature Conservation Management Amendment Act 5 of 1999
- Nature Conservation Ordinance No. 15 of 1974
- Nature and Environmental Conservation Ordinance No. 19 of 1974
- Alfred Duma Local municipality municipal bylaws

The EMPr covers legislative requirements derived from the following:

- National Environmental Management Act (2014)
- National Environment Management Act: Biodiversity Act
- National Water Act

6. IMPLEMENTATION, MONITORING AND REVIEW

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different, but vital role to ensure sound environmental management during the construction phase. The project team will consist of the Project Manager from Alfred Duma Local Municipality, the Project Engineer, the Environmental Control Officer (ECO) and the Contractor. The stakeholders are discussed below.

6.1. Roles and Responsibilities

a. Economic Development Tourism and Environmental Affairs

The authorities or regulatory bodies (including various local authorities and provincial government) will be responsible for the timely processing and issuing of necessary permits or approvals if required for the proposed activities. The authorities might conduct inspections to audit compliance to any permits and conditions thereof. In such cases, the DoE, CDC and the Contractor will collaborate with the authorities and ensure compliance.

b. Proponent

Under South African environmental legislation, the Applicant/ Employer is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. The Applicant/ Employer therefore has overall environmental responsibility to ensure that the implementation of this EMPr complies with the relevant legislation and the Conditions of EA. The following fall within the responsibilities of the Alfred Duma Local Municipality:

- Be familiar with the recommendations and mitigation measures of the EMPr and ensure that the contractor and all staff agree to adhere to it.
 - Monitor site activities on an ongoing basis or contract the service out
 - Conduct internal audits of the site
 - Ensure the contractor confines their activities to within the demarcated area
 - Rectify transgressions via communication with the contractor and staff and the ECO
 - Liaise with the ECO with regard to audit reports to be provided to EDTEA

c. Project Manager / Project Engineer

The Project Manager (PM) will firstly regulate, control and manage activities associated with the project, and secondly monitor and minimise project associated impacts on the environment by overseeing the implementation of the EMPr. The PM will ultimately be responsible for implementing or conforming to the environmental management measures by any person acting on their behalf, including but not limited to contractors, sub-contractors or service providers associated with the project. The PM will arrange for a postconstruction meeting to discuss any issues that need immediate corrective or remedial actions, or to ensure preventative actions are implemented to improve the management of the project.

d. Contractor

The Contractor shall appoint an Environmental Officer (EO) or Safety, Health and Environmental (SHE) representative that reports to the Developer for effective implementation and monitoring of the EMPr specifications. The EO shall compile method statements for proposed activities and submit these to the Project Engineer and ECO for approval. Develop and maintain a

daily on-site monitoring system to comply with the EMPr. Implement environmental training and awareness. Report on incidents, public complaints and implement corrective and preventative measures. Maintain all on-site environmental records, including waste disposal records. Ensure internal auditing of the EMPr.

e. Environmental Control Officer (ECO)

The independent ECO appointed is responsible for monitoring and reporting that the contractor and applicant are implementing and following the EMPr during the construction and operational phases (for the timeframe specified in the conditions of the environmental authorisation) and to liaise and report to EDTEA. The following will fall within the ECO responsibilities:

- Have a working knowledge of the recommendations and mitigation measures as provided in this EMPr and of the permits, authorisations and licenses.
- Conduct monthly audits of the construction site according to the EMPr and according to the conditions of the environmental authorisation.
- Provide the contractor with environmental training and a copy of the EMPr and ensure in writing that it is understood.
- Liaise regularly with the contractor and project manager.
- Recommend corrective steps for any non-compliance activity on site with respect to the EMPr.
- Compile a monthly audit report highlighting compliance and non-compliance with the EMPr and submit to EDTEA.
- All agreements between the contractor and the ECO with regard to the EMPr will be in writing and co- signed by the Project Manager.
- The ECO will not be on site on a daily basis and the Contractor is responsible for implementing the EMPr. The Contractor will be provided with a contact number for the ECO.

6.2. Monitoring and Reporting

A monitoring programme must be implemented for the duration of the Project and should include:

- a. A once-off monitoring inspection by the independent ECO prior to site establishment by the Contractor. The establishment of a baseline by taking selective, point-based photographs of identified environmental aspects and potential impact sites, should be done prior to Project commencement. The ECO shall retain the pre-construction photographic record, including any preexisting damaged areas inside and outside the site footprint (construction area).
- b. Daily and weekly monitoring by the Contractor during the Construction phase;
- c. A register of all complaints from landowners or the community must be maintained on site by the Contractor. All complaints / claims shall be handled immediately to ensure timeous rectification / compensation by the responsible party and should be directed to the PM and independent ECO for review and appraisal;
- d. Monthly compliance monitoring, auditing and reporting by the ECO during the Construction phase, focusing on EA and EMPr compliance. The ECO shall obtain additional photographic records during construction of any damaged areas requiring interim protection and/or rehabilitation. An indication of the date, time, type of damage and reason for the damage shall be recorded to ensure the responsible party is held liable. The Contractor shall be held liable for all unnecessary damage to the environment as a result of any negligent behaviour.

- e. A post-rehabilitation inspection three (3) months after rehabilitation activities are complete must be conducted by the ECO and/or terrestrial ecologist to ensure conformance to the rehabilitation requirements, and where necessary, provide recommendations for any required corrective action.
- f. Compilation of a close out audit report by the ECO, focusing on final EA and EMPr compliance and the success of rehabilitation completion.
- g. **The contractor will be liable for damages should it have resulted from non-compliance to the EMPr.**

Note – The EMPr has been prepared during pre-construction and must be regarded as a working document that may be updated if and when necessary. Any amendments made to the proposed construction must be submitted to the Competent Authority as an amendment to the authorisation for approval before being implemented.

6.3. Environmental Emergency Response Plan

The Contractor must compile an Environmental Emergency Response Plan/Method Statement in conjunction with and in alignment with the approved “Health and Safety Specification” for the Project. Emphasis should be placed on environmental aspects such as fire, flood and pollution incidents and prevention and any other Section 30 NEMA incidents and the associated reporting protocol. As far as any mitigation measures to prevent or avoid environmental incident and emergencies from occurring, which are within reasonable parameters for the Contractor to control, such should be specified in a project specific Plan/ Method Statement.

6.4. Documentation and Record Keeping

The following documentation must be kept on site by the Contractor in order to record conformance to the conditions of the EA and EMPr. A site-based environmental file should include:

- Copy of the EA and EMPr;
- Copy of the Rehabilitation Plan/Method Statement;
- Method Statements compiled by the Contractor and approved by the PM / ECO;
- Material Safety Data Sheets (MSDSs) for all hazardous substances;
- A set of environmental registers which include:
 - Complaints register, including details of complaints and actions required/taken (with dates);
 - Incident register, including copies of notification of Emergencies and Incidents (this must be accompanied by dated photographic records);
 - Waste registers and waste manifests;
 - Copies of all waste documentation such as Safe Disposal Certificates (SDCs);
 - Minutes and attendance registers of all progress meetings held;
 - Monitoring results including environmental audit and inspection reports, checklists, register of audits, etc;
 - Copies of any environmental Non-Conformance Reports (NCRs) issued;
 - Copies of any Corrective Action Reports (CARs) in response to NCRs issued;
 - Notifications of Emergencies and Incidents.

6.5. Method Statements

It is a statutory requirement to ensure the wellbeing of employees and the environment. To allow the mitigation measures in this document to be implemented, task-specific Method Statements should be developed for each set of tasks. A Method Statement details how and when an activity will be carried out, detailing possible dangers/risks, and the methods of control required.

The Contractor will be accountable for all actions taken in non-conformance of the approved Method Statements. The Contractor shall keep all the Method Statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation. Determining which activities require a Method Statement involving environmental impacts may be decided upon by The Contractor, the ECO, the Project Manager or the Contractor themselves prior to the said activity commencing.

6.6. Environmental Complaints Incidents

The Contractor, with assistance by the ECO, will establish various Environmental Registers for the Project. The Contractor will ensure that the information is recorded for all complaints/incidents as per the register templates. The Environmental Registers will form an integral part of the Project records to be transferred to the Developer's Agent (CDC) upon Project completion. These records will be kept with the EMPr, and will be made available on requested by the authorities and ECO.

6.7. Communication and Stakeholder Engagement

The Contractor must ensure that relevant authorities and stakeholders are informed and updated throughout the project. Sufficient signage should be erected around the site (including at the entrance), informing the public of the activities taking place. It is suggested that signboards be erected and include the following information:

- The name of the Contractor; and
- The name and contact details of the site representative to be contacted in the event of emergencies or raising a public complaint.

6.8. Non-Conformance Reporting

A Non-Conformance Report (NCR) must be issued to the Contractor as a final step towards rectifying any persistent or intentional failure to comply with requirements of the EMPr. This will be issued by the ECO or Project/Site Manager to the Contractor in writing. Preceding the issuing of an NCR, the Contractor must be given an opportunity to rectify the issue. Should the ECO assess a non-EMPr related incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it must be reported to the relevant authorities and immediately escalated to the level of a NCR.

7. COMPLIANCE AND ENVIRONMENTAL EMERGENCY RESPONSE

7.1. Compliance with the EMPR

The EMPr specifies the requirements to be implemented by the developer in order to minimise and manage any potential environmental impacts. The provisions of this EMPr will be legally binding to the applicant 1or any authority to whom responsibility has been delegated to, for the proposed development, for the duration of the construction phase.

The EMPr is legally binding to the contractors/sub-contractor(s) and must be included in the Contractual Clauses. A copy of the approved EMPr must be kept on site during construction and operation. In terms of the Environmental Conservation Act and the National Environmental Management Act, those parties responsible for damage to the environment must pay the costs to repair and compensate for environmental and/or human health as well as for preventative measures to avoid or reduce further damage. The Contractor must make provisions in the budget for implementation of the EMPr.

Non-compliances may result in the application of penalty(ies) following non-compliance after a written warning by the ECO. Failure to rectify non-compliances within one (1) week of the issue OR a repeat offense will result in a fine issued by the Competent Authority (EDTEA). The following rates will apply for issuing of fines:

Table 4: Fine Rates to be Applied

Offense	Fine Amount
Failure to demarcate working areas	R 1 000
Working or trespassing outside of the demarcated areas	R 3 000
Failure to strip topsoil with intact vegetation	R 5 000
Failure to stockpile topsoil correctly	R 3 000
Failure to stockpile materials in designated areas	R 1 000
Failure to implement dust suppression actions	R 1 000
Washing of vehicles on site	R 1 000
Pollution of surface or ground water	R 2 000
Failure to control Soil erosion & stormwater runoff	R 3 000
Failure to provide adequate sanitation	R 1 000
Failure to erect temporary fencing around trenches/foundation or deep excavations	R 1 000
Failure to provide adequate waste disposal facilities and services	R 5 000
Failure to re-instate disturbed areas within a specified time frame	R 3 000
Removal of protected flora without a permit to do so	Specified by DFFE
Any non-compliance of the project specifications	R 1 000

The fines will be paid by the Contractor to the Developer to be utilized in the landscaping and/or rehabilitation of the site.

7.2. EMPR Layout

The EMPr is presented in five phases namely, the pre-construction, demolition, construction, rehabilitation and operational phases of the project. Each phase has specific mitigation measures that address potential impacts which may be unique to that phase, as explained briefly below:

1. Pre-Construction Phase – This phase includes pre-construction activities including the site handover, site establishment, environmental training and access routing.
2. Construction Phase - The construction phase includes all activities on the site that are required to render. This phase of the EMPr includes. Environmental training must be provided to the contractor before commencement of construction activities.
3. Rehabilitation Phase – This phase of the EMPr provides for the removal of the contractor's camp, rehabilitation of the site and any disturbed areas and handover to the Client.
4. Operational Phase – Operation means that the development is ready to be used for its intended purpose. This phase of the EMPr provides for the Management and Maintenance.

N.B: The specifications of all mitigation measures, the responsibilities and the procedures for each phase must form part of contractual documentation. Hence, the relevant personnel will be required to comply with these phases of the EMPr.

7.3. Environmental Emergency Response Plan

The Contractor is responsible for preparing an Environmental Emergency Response Plan. This is to exhibit the Contractors ability to respond appropriately to incidents that may have detrimental impacts on the environment. Such incidents include the following among others:

- Accidental spillage of hazardous substances (oil, fuels, sewage, etc.) resulting in negative impacts such as; soil contamination, surface and groundwater pollution, habitat and biodiversity loss, etc.
- Accidental toxic air emissions resulting in negative impacts such as; air pollution, habitat and biodiversity loss, etc.
- Accidental discharges to watercourses and onto land resulting in negative impacts such as; contamination, pollution, habitat and biodiversity loss, etc.,

The emergency response plan must include for the following:

- Provide actions to be taken in the event of an emergency, in the appropriate logical sequence of events.
- Emergency contact numbers,
- Roles of designated emergency response team members from the contractor's team,
- Incident recording
- Remediation measures to be implemented,
- Information on hazardous substances, plant and equipment, including warnings and potential risks,
- Proof of emergency response training, including proof of emergency preparedness, as per legal requirements.

Beside the emergency response plan, the Contractor must provide the method statements that will be requested by the ECO

8. PROPOSED MONITORING AND AUDITING

8.1. Site Audits

- The construction and operational activities must be inspected according to the conditions of the environmental authorisation, which is generally once a month during construction.
- The date and time of the inspection may not be available to the contractor and/or developer.
- The audit must be executed by an independent environmental control officer (ECO).

8.2. Audit Methodology

- The inspection will cover all aspects stipulated in the proposed management plan.
- Each action will be assigned according to “Adequately done”, “Inadequately done” and “Not done”.
- The ECO may adjust actions should they not be effective in protecting sensitive elements or mitigating threats. This may require an amendment to the EMPr and EDTEA must be consulted prior to any changes.
- Audits will be well documented in Monthly Audit Reports and submitted to the Competent Authority and the Project Manager.

8.3. Roles And Responsibility

- Ultimately, the client is responsible for the implementation of the environmental management programme.
- Should a concern be raised by an interested and affected party and/or stakeholder, EDTEA will refer to the monthly audit reports from the ECO.
- The ECO is not responsible for the implementation of the EMPr but is responsible for auditing the developer’s and contractor’s compliance to the EMPr.
- Following the rehabilitation of the affected site and the final ECO inspection and report, a site handover to the developer must be scheduled.

9. DETAILED ENVIRONMENTAL MANAGEMENT PROGRAM

The EMPr specifies the minimum requirements to be implemented by the Contractor as per the contractual scope of works, in order to minimise and manage the potential environmental impacts and ensure sound environmental management practices. It also provides the framework for environmental monitoring throughout the Construction and Rehabilitation phases. It is essential that the EMPr requirements be systematically reviewed, understood, implemented and adhered to at all times. This section (Chapter 6) comprises the environmental specifications (ES) for the Project.

9.1. Environmental Specifications (ES)

The approach for ES implementation and the associated monitoring requirements relating to specific measures/aspects of ES implementation (for the duration of the Project) are divided into 3 stages:

- a) Pre-Construction (includes Design and Project Planning)
- b) Construction (included Site Establishment)
- c) Post-Construction (includes Site de-establishment and Rehabilitation)

The implementation of the EMPr and the associated ES are focused primarily on the principal Contractor and all sub-contractors and staff involved in the Project. The entire footprint, including the site camp, site offices, designated working areas, internal access routes and the immediate surrounding areas fall within the scope of the EMPr. Any new personnel, plant, machinery and materials brought to site will need to comply with the EMPr.

9.2. Environmental Principles for Construction Activities

The following core environmental principles apply:

- Construction is a disruptive activity and maximum consideration must be given to minimising disturbances on the surrounding community and natural environment.
- Only the authorised construction 'footprint' approved for development should be utilised and occupied. No site 'creep' or increasing of the footprint to an area beyond which is authorised is permitted.
- All relevant legislation should be adhered to and any relevant permits and permissions, where required, must be obtained and complied with at all times.
- The Contractor should foster a collaborative and cooperative relationship between the applicant staff and all relevant stakeholders including the authorities (i.e. EDTEA, DWS, DFFE, local ward councillor) any other neighbouring landowners/land users and members of the adjacent local communities. Professional and timely communication with these parties as and when required will assist in the successful completion of the Project.
- The Contractor and other project role-players should acknowledge and sign the Letter of confirming their environmental commitments for the duration of the Project.
- Wherever possible, the Contractor should seek to employ local labour and maximise the involvement of small, local business enterprises into the project.

9.3. Pre-Construction Phase

The pre-construction phases include all activities that are required to render the project ready to begin construction.

Authorisations, Permits and Licenses:		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
All legally required authorisations, permits and licenses must be obtained prior to commencement of construction.	Developer	Once
The Developer must appoint an independent EAP and/or ECO.	Developer	Once
All I&AP's and stakeholders must be notified prior to commencement of construction.	Developer/ECO	Once

Appointment of Contractor:		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
An experienced and suitably qualified contractor must be appointed	Developer/Engineer	Once
The EMPr must form part of the contractual agreements with any Contractor which must include any Sub-Contractor(s). The Contractor must take cognisance of this when budgeting during the tender process.	Developer	Once
The Contractor must comply fully with the authorisations, permits and licenses pertaining to the construction phase of the project.	Developer/Contractor	Once
Tender documents must allow for the employment of local community members.	Developer/Contractor	Once
The Contractor must provide Method Statements pertaining to implementation of the EMPr, emergency response plans, stormwater management, hazardous substance handling and storage, spill contingency plans, environmental incidents records file and complaints register.	Developer/Contractor	
The Method Statements must be submitted to the Environmental Control Office (ECO) for record keeping.	Developer/Contractor /ECO	

Appointment of ECO:		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
An independent ECO must be appointed to monitor the implementation of the EMPr. The ECO is not responsible for the health and safety policies of workers on site. The EMPr addresses this issue since the main aim of the EMPr is protection of the environment and surrounds.	Developer	Once
The Appointed ECO must monitor the project from an environmental perspective, as per the conditions of any authorisations, permits and licenses and according to the EMPr. The findings of each inspection must be documented in a monthly report.	ECO	Monthly or as specified in the Authorisation

Environmental Education and Training:		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
The Contractor must receive environmental training to adequately implement the EMPr.	Developer/ECO	Once
All site personnel must have a basic level environmental awareness training session. Topics covered must include: <ul style="list-style-type: none"> o What is meant by “The Environment”? o Why the environment needs to be protected and conserved? o How construction activities can impact on the environment? o What can be done to mitigate against such impacts? o Awareness of emergency and spill response provisions. 	Contractor/ECO	Monthly
The ECO must provide training to the Contractor’s representatives. It is the Contractors responsibility to provide the site foremen with environmental training and to ensure that the foremen have sufficient understanding to pass this information onto the construction staff. Translators may be used to ensure training is thorough.	Developer/ECO	Monthly
The Contractor must relay training received to all staff and sub-contractors, in a language easily understandable to them. All contractor’s representatives, sub-contractors and staff must acknowledge receipt of training in writing.	Developer/ECO	Monthly
The contractor must maintain accurate records of any training undertaken.	Contractor	Monthly
Training must cover all aspects of the EMPr, procedures to be followed, the sensitivity of the site and importance of adhering to “no-go” areas.	Contractor/ECO	Monthly
The ECO shall monitor the contractor’s compliance with the requirement to provide sufficient environmental awareness training to all site staff.		

Toolbox sessions must be scheduled and must include refreshers on environmental responsibilities.	Contractor/SHE Officer	As and when required
Training by the contractor must be provided to the staff members in the use of the appropriate firefighting equipment	Contractor	Once
Environmental awareness posters must be used at construction camps/ sites to further facilitate compliance to the EMPr	Contractor/SHE Officer	As and when required
The need for a clean site policy must be explained to the workers. This includes prohibiting sanitation activities outside of the ablution facilities and toilets provided by the Contractor.	Contractor/ECO	Weekly
Staff operating equipment (e.g. loaders, excavators, etc.) must be adequately trained and sensitised to any potential hazards associated with their tasks	Contractor/ECO	Weekly/ Monthly
Although the Contractor is responsible for ensuring that the environmental awareness training of staff members is put in place, it must be the direct responsibility of the appointed ECO to carry out the training. Each staff member signs a register confirming their attendance at this training. This register must be included in the site Environmental file.	Contractor/ECO	Monthly
The contractor must monitor the performance of the workers to ensure that the training was properly understood and is being followed	Contractor	Monthly

Environmental Planning and Design		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
The ECO must assess and examine the environment for sensitive elements of flora and fauna which must then be demarcated and relocated accordingly.	Developer/ECO	Once
A pre-construction walk down of the entire site must be conducted by the ECO, contractor and/ or engineering representative. This may include geophytes, aloes, discovered animals, etc. This will be used to identify any species of conservation importance that have occupied the site after the compilation of this report.	Developer/ECO	Once
Any erosion control measures must be incorporated, by the engineer, into the design of the of the bridge. These may be sandbags, hessian sheets, retention or replacement of vegetation, gabion walls, etc.	Engineer	Once/ as and when required
Records of relocated flora and fauna must be kept.	Contractor/ECO	as and when required
A set of "before" photographs must be captured for record keeping purposes and to monitor any degradation of the environment	Contractor/ECO	Once
Construction areas must be fenced off or demarcated prior to and during construction.	Developer/Contractor	Once

Site Establishment		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
The construction camp must be defined, secured and limited to authorised contractors only.	Contractor	Monthly
The Contractor shall make all efforts to establish their construction camp, offices, workshops and any other infrastructure on previously disturbed/impacted areas and in a manner that does not adversely affect the environment.	Contractor	Monthly
Prior to the establishment of the site camp/office, the Contractor will produce a site layout plan showing the positions of all equipment storage, waste stockpiling, fuel storage areas and other infrastructure for approval by the ECO and PM.	Contractor	Monthly
The ECO / Contractor must demarcate the construction camp so that the minimal amount of space is occupied.	Contractor	Once
The EO / ECO must approve alien weeds and invader plants that must be removed. The ECO must monitor that no trees are removed unnecessary from the site.	Contractor	Monthly
adequate signage must be placed in the area where construction will take place warning the public of the activities taking place. Areas that are demarcated as 'No-Go' areas must not be accessed by workers.	Contractor/ ECO	Monthly
There must be no trapping of animals on site.	Contractor/ECO	Monthly
Construction camps must be located outside the extent of any watercourse, must be recovered and removed shortly after construction has been completed. The location of the construction camp must be approved by the ECO and Engineer.	Contractor/ECO	Once

9.4. Construction Phase

To simplify the EMPr requirements, each aspect related to the EMPr has been addressed in the tables below under relevant sub-headings. Each action number within the tables is supported by mitigation measures and actions which will need to be adhered to / implemented by the responsible party. The terms used in the tables are briefly described below for ease of reference.

- **Mitigation Measures and Actions**

This section indicates the environmental measures, actions and controls required to either prevent and/or minimize the potential impacts on the environment that is associated with the project.

- **Responsibility**

This section indicates the party responsible for implementing the mitigation measures and actions laid out in the EMPr

General construction activities		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
The contractor must ensure that all employees, including sub-contractors and their employees, attend on-site Environmental Awareness Training prior to commencing work on site.	Contractor	Once or as and when required
Follow-up Environmental Awareness Training must be conducted for new subcontractors or crews prior to commencing work or for specific activities that may potentially impact the environment, or if work is being undertaken in sensitive environments.	Contractor / ECO	Monthly
The contractor must maintain accurate records of any training undertaken.	Contractor/ ECO	Monthly
Training must cover all aspects of the EMPr, procedures to be followed, the sensitivity of the site and importance of adhering to “no-go” areas.	Contractor/ ECO	Monthly
All sensitive areas must be clearly demarcated as no go areas.	Contractor/ ECO	Monthly
The ECO must monitor the contractor’s compliance with the requirement to provide sufficient environmental awareness training to all site staff.	Contractor/ ECO	Monthly
Environmental signage must be displayed on the site including – “no smoking”, “fire hazards”, etc.	Contractor/ ECO	Monthly
Emergency numbers must be clearly displayed.	Contractor/ ECO	Monthly
Access to fuel and other equipment stores must be strictly controlled.	Contractor/ ECO	Monthly
Machinery and equipment must be kept in good working order.	Contractor/ ECO	Monthly

Clearance of Site		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Before any construction takes place the proposed area for the pedestrian bridge and camp laydown areas must be pegged out. All construction activities will be limited to these areas in order to reduce the footprint of the proposed activity and avoid impact on the watercourse, adjacent natural vegetation and aquatic life.	Developer/Contractor	Once
The contractor must draw up a plan for submission to the ECO indicating the locations of construction infrastructure including the paint or cement cleaning pits, “no-go” areas, camp laydown areas, open spaces, excavated and fill material, chemical toilets,	Contractor	Once
All sensitive environments or “no-go” areas must be demarcated with danger-tape or temporary barrier fence. All demarcation must be regularly maintained and remain in place for the duration of the work on site.	Contractor/ECO	Monthly
Site clearing must be limited to only the area necessary for carrying out the specified works.	Contractor/ECO	Monthly
No unauthorized entry, stockpiling, dumping or storage of equipment in “no-go” areas, or outside the site boundary is permitted	Contractor/ECO	Monthly
All construction activities, plant, labour and materials must be restricted within the site boundary.	Contractor/ECO	Monthly
Disturbed areas must be rehabilitated once the construction activities have ended on those areas.	Contractor/ECO	Monthly
Vegetation clearance must be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.	Contractor/ECO	Monthly
All NEMBA category 1a and 1b invasive alien plant species must be removed and disposed of appropriately prior to construction. The construction site must be inspected regularly during construction to identify and remove emerging IAP species.	Contractor/ECO	Monthly
Where possible the existing vegetation on the site must be carefully removed and stored for replacement after the construction has been completed.	Contractor/ECO	Monthly
Care must be taken not to remove indigenous vegetation unnecessarily from the sensitive areas and their associated buffers during all phases of construction.	Contractor/ECO	Monthly
The removal of sensitive vegetation must be undertaken manually by hand. The use of heavy machinery must be kept to minimum.	Contractor/ECO	Monthly
Fauna found within the construction zone must be moved to the closest natural or semi-natural habitat zone away from the construction site.	Contractor/ECO	Monthly

Watercourses and Drainage Lines		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Construction activities should be undertaken in the winter months between the months of April and August.	Contractor/ECO	Monthly
A photographic record of the state of the riparian areas prior to construction must be compiled for reference and rehabilitation purposes.	Contractor/ECO	Monthly
Disturbance to the delineated riparian areas along the bridge should be restricted to a one-way construction right of way corridor. The width ROW of should be as narrow as practical.		
Storm water, surface water, and groundwater inflow into excavations must be limited to prevent collapse and transportation of pollutants. This can be done by the following methods: <ul style="list-style-type: none"> the installation of temporary excavation shoring localized dewatering of excavations waterproofing of natural ground surfaces beneath construction equipment, with suitable sumps 	Contractor/ECO	Monthly
Working areas must have a stormwater management plan compiled to ensure that runoff from the working area does not increase erosion downstream.	Contractor/ECO	Monthly
No chemicals, building materials hydrocarbons or soils must be stockpiled close to identified watercourses/ drainage lines.	Contractor/ECO	Monthly
Rehabilitation of disturbed areas must aim to recreate the same mix of habitats, including stream substrates that were present prior to disturbance.	Contractor/ECO	Monthly
Where necessary and according to slope and risks in terms of bank erosion, disturbed areas must be re-vegetated using either a specified seed mix and/ or appropriate indigenous trees.	Contractor/ECO	Monthly
Vehicles are only allowed to cross the drainage lines around the Dalinkosi Area at designated crossings to avoid disturbances and compaction.	Contractor/ECO	Monthly
Laydown yards, camps and storage areas must be beyond the watercourse areas and associated buffers where applicable.	Contractor/ECO	Monthly
Vehicles and equipment must be kept in good working order and oil or fuel leaks must be repaired immediately upon detection. No vehicle repairs must be undertaken in riparian areas.	Contractor/ECO	Monthly
Immediately clean up any spills and rehabilitate the area, where necessary, as dictated by the type, size and severity of the	Contractor/ECO	Monthly

spill.		
During construction contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly.	Contractor/ECO	Monthly
All machinery and equipment must be inspected regularly for faults and possible leaks, these must be serviced off-site.	Contractor/ECO	Monthly
All contractors and employees must undergo induction which must include a component of environmental awareness. The induction must include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good “housekeeping”.	Contractor/ECO	Monthly
Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.	Contractor/ECO	Monthly
All waste generated during construction must be disposed of as per an Environmental Management Programme (EMPr) and washing of containers, wheelbarrows, spades, picks or any other equipment that has been contaminated with cement or chemicals must occur in a controlled environment.	Contractor/ECO	Monthly
No release of any substance i.e. cements, oil, or any other substance that could be toxic to fauna and flora within the site.	Contractor/ECO	Monthly
Spillages of fuels, oils and other potentially harmful chemicals must be contained and cleaned up immediately. Contaminants must be properly drained and disposed of using proper solid/hazardous waste facilities. Any contaminated soil must be removed, and the affected area rehabilitated immediately.	Contractor/ECO	Monthly
All sites disturbed by construction activities must be monitored for colonization by exotics or invasive plants and must be controlled as they emerge.	Contractor/ECO	Monthly
No processing area or waste piles must be established within 100m of the edge of a watercourse.	Contractor/ECO	Monthly
The chemical toilets must be situated out of the 1:100 year floodline of any watercourse.	Contractor/ECO	Monthly
A maintenance plan for the service of these toilets must be drawn up and strictly adhered to in order to prevent malfunctioning and neglect.	Contractor/ECO	Monthly
The chemical toilet must be situated on a bunded area, away from public view and access.	Contractor/ECO	Monthly

Storage, Mixing, and Disposal of Cement and Concrete		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
No mixing of concrete or cement directly on the ground is permitted. The mixing of concrete must only be done on a mixing tray or on impermeable sheeting.	Contractor/ECO	Monthly
Ready-mix trucks are not permitted to clean chutes on site. Due to the vegetation sensitivity and possible contamination of watercourses no dedicated cleaning pits are allowed under any circumstances on site.	Contractor/ECO	Monthly
There must be a contained area at the construction camp site for washing out and cleaning of concrete mixing equipment, to further prevent pollution. In addition, wash waters from site must be collected and disposed of at the local waste water treatment plant.	Contractor/ECO	Monthly
Workers must minimize any cement spill or runoff in their work area and are to ensure that the work area is cleaned of all cement spillage at the end of each workday.	Contractor/ECO	Monthly
Both used and unused cement bags must be stored in weatherproof containers so as not to be affected by rain or runoff.	Contractor/ECO	Monthly
Contaminated soil resulting from concrete or cement spills must be considered as hazardous waste and must be contained and stored on-site in an appropriate container for no more than 24 hours before being disposed of at a registered waste disposal site.	Contractor/ECO	Monthly
Clean stormwater must be kept away from areas where it could be contaminated and must be directed to the stormwater drainage system.	Contractor/ECO	Monthly

Earthworks		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
All earthworks must be carried out in accordance with SANS 1200 (current version)	Contractor/ ECO	Monthly
All vegetation, topsoil and any unsuitable subgrade materials must be cleared from the area over which fills are to be built.	Contractor/ ECO	Monthly
On-site and evaluations by an experienced geotechnical profession so that any stability problems of embankments or slopes can be identified and rectified in a timeous manner.	Geotechnical engineer/ ECO	As and when required
Earthworks and drainage measures must be designed in such a way as to prevent ponding of, or high concentrations of, stormwater or groundwater anywhere on the site, both during and after the development.	Contractor/ ECO	Monthly
The terrace(s) if any, must be shaped to a gradient to prevent water ponding on the surface and should be graded to direct water away from excavations.	Contractor/ ECO	Monthly
Care must be taken during excavations to avoid damage to existing underground services.	Contractor/ ECO	Monthly

Rocks and excess soil to be reused as fill material if/where possible. Any work undertaken must follow good civil engineering practices. Topsoil must be stripped and stockpiled for later re-use. All stock piles must be covered with suitable material to prevent loss of sediment via wind/ water. Stockpiling of soil etc. must not be on or near slopes and water courses.	Contractor/ ECO	Monthly
No excavations must be left open over weekends and public holidays unless properly protected.	Contractor/ ECO	Monthly
Only orange barricade netting or temporary wire fencing must be used to barricade open trenches/foundations. Open trenches/foundations must be barricaded and maintained at all times.	Contractor/ ECO	Monthly
Employees, contractors, etc. must be made aware of no-go areas (which would include neighboring properties), and boundaries of the activity site. Chevron tape must be used to aid in this regard.	Contractor/ ECO	Monthly

Soil Erosion and Stormwater Management		
Actions and Mitigation Measures	Responsible Peron(s)	Monitoring Frequency
Ensure that work occurs during dry periods and that appropriate erosion protection is used to protect the works during wet periods. Soil erosion measures must be placed on sensitive areas like banks and slopes: <ul style="list-style-type: none"> - In minor cases, sandbags may be used to support banks and slopes; - In more severe cases, steel cased gabion walls can be constructed if deemed necessary by the ECO and Project Engineer 	Contractor/ ECO	Monthly
Clean storm water must be kept away from ablution facilities where it could be contaminated and must be directed to the storm water drainage system.	Contractor/ ECO	Monthly
Project management of construction activities must be done to ensure that only small and/or necessary portions will be disturbed at any given time. Vegetation must not be removed until necessary.	Contractor/ ECO	Monthly
Soil management and rehabilitation is important in order to ensure that vegetative cover establishes over the backfilled trench/ disturbed areas as rapidly as possible.	Contractor/ ECO	Monthly
Erodible material on site must be reinforced with sandbags.	Contractor/ ECO	Monthly
Pumps must be available for dewatering of open excavations.	Contractor/ ECO	Monthly

Stockpiling, Topsoil and Cleared Vegetation		
Actions and Mitigation Measures	Responsible Peron(s)	Monitoring Frequency
Topsoil must be stockpiled within the construction corridor and for future landscaping efforts.	Contractor/ECO	Monthly
Care must be taken to keep soils stabilized when removing vegetation during construction.	Contractor/ECO	Once
Stockpiles must be covered with suitable material to prevent loss of sediment via wind / water.	Contractor/ECO	Monthly
Topsoil must be stockpiled for eventual return during topsoil back-filling and rehabilitation. These must be weed free and must not stand for a prolonged period of time.	Contractor/ECO	Monthly
Topsoil must be stored in heaps of not higher than 2m in a way that prevents damming. Stored topsoil must not be compacted.	Contractor/ECO	Monthly
Topsoil must not be used as fill material for backfilling of excavations on site	Contractor/ECO	Monthly
Stockpiles of vegetation are only to be located in areas approved by the ECO. Methods of stacking must take cognizance of the possible creation of a fire hazard.	Contractor/ECO	Monthly
Cleared indigenous vegetation must be stockpiled separately for possible reuse in later rehabilitation or landscaping, or as a brush pack for erosion prevention.	Contractor/ECO	Monthly
No burning of stockpiled vegetation is permitted.	Contractor/ECO	Monthly
Soil stockpiling areas must be sufficiently situated away from the drainage areas towards the river.	Contractor/ECO	Monthly
Soil stockpiles must be protected from erosion, surrounded by suitable earthen buns and covered by erosion control blanket/hessian cloth/shade cloth.	Contractor/ECO	Monthly
Construction activities must occur during dry periods as far as possible and appropriate erosion protection (sandbags, berms, etc.) must be used to protect the works during wet periods.	Contractor/ECO	Monthly
Earth, stone and rubble must be properly disposed of so as not to obstruct natural water pathways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines.	Contractor/ECO	Monthly
All temporary stockpile areas including litter and dumped material and rubble must be removed on completion of construction.	Contractor/ECO	Monthly
Soil removed from the road reserve banks must be appropriately stored for later use in back-filling.	Contractor/ECO	Monthly

Risk of Alien Invasive Encroachment into Disturbed Areas		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Indigenous vegetation must be protected as much as possible by clearing on portions of vegetation at a time.	Contractor/ECO	Monthly
Ongoing alien plant control must be undertaken particularly in the disturbed areas. Areas which have been disturbed will be quickly colonised by invasive alien species. Ongoing management must be undertaken for the clearing/eradication of alien species.	Contractor/ECO	Monthly
All sites disturbed by construction activities for colonisation by exotics or invasive plants must be monitored and controlled as they emerge.	Contractor/ECO	Monthly

Flora Impacts		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Regular Environmental Toolbox Talks must be implemented by the Contractor on site. These talks should include environmental topics and be used to refresh environmental awareness on site.	Contractor/ ECO	Monthly
Prior to the clearing of sites, the ECO must ensure that all plants of conservation significance (If identified during construction) are removed; these plants can be replanted in nature reserves or otherwise stipulated by the appointed ECO, etc.	Contractor/ ECO	Monthly
Prior to construction and vegetation clearance, a rescue and recovery programme should be initiated to remove any rare or threatened plant species along the proposed upgraded areas.	Contractor/ ECO	Once
Should any species be found that are protected, either provincially or nationally, the correct permit should be applied for in advance and the conditions of those permits must be followed to prevent or offset impacts during construction.	Contractor/ ECO	Once
Care must be taken to keep soils stabilized when removing vegetation during construction and as part of alien plant eradication and strict on-site soil erosion measure must be implemented.	Contractor/ ECO	Monthly
Any removed vegetation must be suitably disposed as soon as possible. Burning of removed vegetation on site is prohibited.	Contractor/ ECO	Monthly
Collection of firewood, traditional medicinal plants and/ or edible plants/ fruit/ seeds/ vegetables is prohibited.	Contractor/ ECO	Monthly

Fauna Impacts		
Actions and Mitigation Measures	Actions and Mitigation	Actions and Mitigation
Sealant, coatings, adhesives and glazing's, can be toxic to flora and fauna, if released in to the environment. Therefore, the products used be stored and used carefully, to save resources as well as protect the environment.	Contractor	Monthly/Weekly
Prior and during vegetation clearance any larger fauna species noted must be given the opportunity to move away from the construction area.	Contractor/ ECO	Monthly
The contractor must ensure that no animals including monkeys, snakes, scorpions, spiders are disturbed, trapped, hunted or killed during the construction phase. Fishing and/or trapping of fish is strictly prohibited.	Contractor/ ECO	Monthly
The contractor must ensure that any animals that are found to be trapped in foundations or open excavations during the construction phase must be returned uninjured back to a suitable habitat by the ECO or a Botanist if applicable.	Contractor/ ECO	Monthly
Safety measures, regarding workers during the construction, against venomous snakes must be taken. The snake expert's number must be easily accessible and displayed.	Contractor/ ECO	Monthly
All trenches/ foundation and deep excavations must be clearly demarcated and barricaded on site at all times.	Contractor/ ECO	Monthly
Any excavation that are left open for extended period must have at least one end that is sloped/tapered, in order to allow animals that fall in, to escape. If this is not possible, then branches must be placed inside the trenches to allow small animals to climb out of the trenches.	Contractor/ ECO	Monthly
Noise levels including vibrations and blasting caused by drilling must be kept to a minimum to prevent animals abandoning nearby habitats.	Contractor/ ECO	Monthly
The duration of the construction must be minimized to as short term as possible, in order to reduce the period of disturbance on fauna.	Contractor/ECO	Monthly
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.	Contractor/ECO	Monthly/Weekly
Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species and nocturnal mammals.	Contractor/ECO	Monthly
Staff must be educated about the sensitivity of faunal species and measures must be put in place to deal with any species that are encountered during the construction process.	Contractor/ECO	Monthly

Air Quality Impacts		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Dust dispersion from construction activities, roads and soil stockpiles must be limited and suppressed to the maximum extent.	Contractor/ECO	Monthly
Water used for suppression must be sourced from an approved water source, approved by Department of Water and Sanitation, or the proof of consent from the water service provider should be always available on site.	Contractor/ECO	Once Off
Dusty roads on dry windy days must be watered to prevent excessive dust generation.	Contractor/ECO	Monthly
Dust must be controlled by wheel washing and damping down of un-surfaced areas. The contractor must use all possible measures to keep dust to a minimum to ensure no nuisance to the local community is caused.	Contractor/ECO	Monthly
Retain vegetation as much as possible to keep dust to a minimum.	Contractor/ECO	Monthly
A speed limit of 20km/hr must not be exceeded to prevent generation of dust.	Contractor/ECO	Monthly
Speed bumps or traffic speed signs must be erected to reduce speeding onsite, which could result in the generation of dust.	Contractor/ECO	Monthly
Odours from the chemicals and paints being used must be minimized by not leaving unused/empty vessels open unnecessarily.	Contractor/ECO	Monthly
The contractor must have operational fire-fighting equipment on hand to stop any errant fires especially in the dry winter months.	Contractor/ECO	Monthly
All machinery, plant and equipment must be in good working order.	Contractor/ECO	Monthly
Regular maintenance of vehicles to address wear of tires and breaks. Optimal engine combustion will allow for 'cleaner' exhaust emissions.	Contractor/ECO	Monthly
Chemical toilets must be cleaned on a regular weekly basis. Servicing receipts must be maintained and kept on site within the site environmental file.	Contractor/ECO	Monthly
Sufficient ablution facilities must be provided – minimum of 1 toilet per 15 workers. Toilets must have properly closing doors and supplied with toilet paper. Under no circumstance should workers make use of the nearby forests or households for ablution and sanitation purposes.	Contractor/ECO	Monthly

Resource Utilisation		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Plant and equipment must be maintained to prevent spillage of oil, diesel, fuel or hydraulic fluid. The Contractor must repair or withdraw equipment or machinery from use if they consider these to be polluting and irreparable.	Contractor/ ECO	Monthly
Bridge must be inspected regularly to ensure that minimal concrete material fall off to the stream during construction.	Contractor	Regularly

Storage, Spillage and Disposal of Hazardous Chemicals		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
<p>The following action must immediately take place in the event of spills:</p> <ul style="list-style-type: none"> ○ Immediately set up a barrier to alert unauthorised personnel to keep out; ○ Eliminate all possible sources of leakages; ○ Immediately begin containment by placing absorbent material on the spill; ○ Setup decontamination zone to ensure proper decontamination procedures. 	Contractor/ECO	Monthly
Proper handling, storage and disposal of hazardous chemicals. All fuels and flammable materials must be handled safely, stored safely and clearly labelled. All liquid fuels (petrol and diesel) must be stored in tanks or containers with lids. All chemical storage areas must be situated on impermeable concrete floors with bunding capable of containing 100% of any spillage.	Contractor/ECO	Monthly
Fuel and flammable materials are to be kept under lock and key at all times and are to be stored at a central, easily accessible location.	Contractor/ECO	Monthly
Drip trays must be used to collect spillage from equipment, vehicles and plant. These must be emptied regularly into secondary containers.	Contractor/ECO	Daily or as and when required
Spill contingency plan must be compile and implemented incase of spillage incidents on site. Spill kits sourced and kept on site all the time.		
If refuelling on site or from drums, the ground must be protected by drip trays, and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel.	Contractor/ECO	Monthly
Vehicles must be well maintained to prevent leakages on site. Vehicle maintenance on site is prohibited unless unavoidable, in which case drip trays must be used to prevent soil contamination.	Contractor/ECO	Monthly
Storage areas for fuels and flammable materials are to comply with standard fire safety regulations.	Contractor/ECO	Monthly

Adequate fire-fighting equipment shall be available close at hand and no smoking is permitted within the vicinity of storage areas.	Contractor/ECO	Monthly
All personnel handling fuels and hazardous materials must be issued with the appropriate Personal Protective Equipment (PPE).	Contractor/ECO	Monthly
Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. Excavation of contaminated soil must involve careful removal of soil using appropriate tools (Spill kit) to storage containers until disposed of at a registered hazardous landfill site. The application of soil absorbent materials as well as oil-digestive powders to the contaminated soil may be required. Contaminated remediation materials must also be removed from spill area, stored and disposed of with due diligence.	Contractor	Monthly/Weekly

Waste Management		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Personnel must be trained in etiquette regarding littering, waste management and sustainable housekeeping measures on site.	Contractor/ECO	Monthly
Refuse bins shall be provided for domestic waste (lunch litter) and placed in designated eating areas and any other areas were deemed necessary to control littering.	Contractor/ECO	Monthly
Closed refuse bins must be provided at strategic points to prevent accumulation of litter on-site and should be stored in sealed refuse bins which must be removed from site on a regular basis. The contractor must supply waste collection bins and skips for all manner of solid waste which must be disposed of at a registered landfill site. A certificate of disposal must be obtained by the contractor and kept on file for audit	Contractor/ECO	Monthly
Refuse bins are not to overflow and are to be emptied regularly. No littering is permitted on site.	Contractor/ECO	Monthly
The contractor is responsible for taking steps to ensure that littering by construction workers does not occur and persons must be employed on site to collect litter from the site and immediate surroundings. A housekeeping team must be appointed to ensure that bins are regularly emptied, and other litter is disposed of in the correct manner.	Contractor/ECO	Monthly
Burning and burying of solid waste on site is strictly prohibited.	Contractor/ECO	Monthly
Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid).	Contractor/ECO	Monthly
Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants.	Contractor/ECO	Monthly
Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow. Oil and diesel spills are considered hazardous. Disposal of such contaminants must be done appropriately.	Contractor/ECO	Monthly
A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal.	Contractor/ECO	Monthly

Equipment and vehicles are to be repaired immediately upon developing leaks. Drip trays shall be supplied for all repair work undertaken on machinery on site.	Contractor/ECO	Monthly
Soil contaminated with hazardous substances, fuel or oil shall be treated as hazardous waste and removed from site.	Contractor/ECO	Monthly
On-site chemical toilets will be provided for sanitation purposes during construction phase. The contractors will be responsible for the maintenance of the chemical toilets.	Contractor/ECO	Monthly/Weekly
Building rubble is to be kept separate from other construction waste. Rubble is to be kept clean of brick ties, plastics, papers and cement bags at all times.	Contractor/ECO	Monthly
Rubble stockpiles and refuse structures shall be positioned to permit easy access by removal trucks.	Contractor/ECO	Monthly
Rubble must be disposed of in a pre-agreed demarcated site in a sufficiently sized skip or vessel. If debris is too large to fit in a vessel or skip,	Contractor/ECO	Monthly
Accumulation of large stockpiles of rubble and waste is not permitted. Waste is to be removed at regular intervals at a minimum frequency of once a week.	Contractor/ECO	Monthly/Weekly
Should small volumes of wastewater be generated during the construction phase: <ul style="list-style-type: none"> • Water containing waste must not be discharged into the watercourse or natural environment. • Measures to contain the water containing waste and safely dispose of it must be implemented. 	Contractor/ECO	Monthly/Weekly

Noise Impacts		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Personnel must be trained in etiquette regarding noise and trespassing, as well as in health issues and occupational safety.	Contractor/ECO	Monthly
As per Regulations provided in the National Building Regulations and Building Standards Act (Act No. 103 of 1977) No. R574 of 2008, no person shall during the course of any construction use any machinery, machine, engine, apparatus, tool or contrivance, which in the opinion of the local authority may unreasonably disturb or interfere with the amenity of the neighborhood: <ul style="list-style-type: none"> ○ On a public holiday or after 16:00 on any Saturday; and ○ Before 06:00 or after 17:00 on any day Noisy operations are not to be conducted at night	Contractor/ECO	Monthly
Site inductions must cover the importance of noise control and available noise reduction measures.	Contractor/ECO	Monthly
All complaints against noise must be recorded and dealt with immediately by the contractor by adjusting schedules and/or noisy equipment or workers.	Contractor/ECO	Monthly

Noise from labourers must be controlled. No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site.	Contractor/ECO	Monthly
Workers must not loiter around after work hours should their shift be complete. Where possible labour must be transported to and from the site by the contractor.	Contractor/ECO	Monthly
All vehicles and equipment must be regularly serviced to prevent the presence of noisy devices.	Contractor/ECO	Monthly
All plant and machinery must be fitted with adequate silencers.	Contractor/ECO	Monthly
Electrically-powered equipment instead of pneumatic or internal combustion powered equipment must be used, where feasible;	Contractor/ECO	Monthly
Where noise from equipment is highly directional, equipment must be directed in such a way that noise is minimised at sensitive receptors;	Contractor/ECO	Monthly
Shut down equipment which are not required (no unnecessary idling for extended periods);	Contractor/ECO	Monthly
Construction site speed limits must be established and enforced during the construction period;	Contractor/ECO	Monthly
The use of noise-producing signals, including horns, whistles, alarms, and bells shall be for safety warning purposes only;	Contractor/ECO	Monthly
Construction staff working in an area where the 8-hour ambient noise levels exceed 85 dBA must have appropriate Personal Protective Equipment (PPE).	Contractor/ECO	Monthly
Where necessary, according to the Occupational Health and Safety Act, workers must be provided with ear protection gear.	Contractor/ECO	Monthly
If work is to be undertaken outside of normal work hours permission must be obtained from the Project Engineer and ECO.	Contractor/ECO	Monthly
No noisy work must be conducted over the weekends or on religious public holidays.	Contractor/ECO	Monthly
Route construction related traffic along roadways that will cause least disturbance.	Contractor/ECO	Monthly
A registered contractor providing a project schedule must be employed. Penalties for extending the timeline could be enforced to try and minimise the period of impact.	Contractor/ECO	Monthly
The on-site construction supervisor shall have the responsibility and authority to receive and resolve noise complaints. A clear appeal process shall be established prior to construction commencement that will allow for resolution of noise problems that cannot be immediately solved by the site supervisor.	Contractor/ECO	Monthly
Where complaints are received, noise monitoring must be undertaken. Measures for reducing the noise levels must be identified as part of the complaint resolution process. must be employed. Penalties for extending the timeline could be enforced to try and minimise the period of impact.	Contractor/ECO	Monthly

Visual Quality		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
The site must be well maintained and neat through proper housekeeping measures.	Contractor/ECO	Monthly
The contractor must adhere to project schedule in order to minimize the length of the construction period.	Contractor/ECO	Monthly
Minimise vegetation clearing and use a phased approach, only clearing vegetation when required.	Contractor/ECO	Monthly
All stockpiles of buildings materials must be protected against dispersion into the surrounding terrain.	Contractor/ECO	Monthly
All builders' rubble must be removed from the site timeously and dumped at a registered dump site.	Contractor/ECO	Monthly
Construction camp and storage areas must be situated in zones of low visibility i.e. behind dense bush or in lower lying areas.	Contractor/ECO	Monthly

Health and Safety of construction workers and general public		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Unskilled labour must be trained relevantly including environmental training. Workers must receive thorough training in using potentially dangerous equipment or chemicals.	Contractor	Monthly
Safety measures, work procedures and first aid must be implemented on site. First aid facilities must be available on site at all times. Compliance with the Occupational Health and Safety Act is the responsibility of the contractor.	Contractor	Once
The contractor is responsible for ensuring that all equipment is maintained in a safe operating condition. The engineer shall have the right to order the immediate removal from the site of any plant which he may deem to be unsatisfactory for the proper execution of the work.	Contractor/ ECO	Monthly/ As and when required
A safety officer must be appointed and keep records of health and safety incidents on site. Any incidents must be reported to the project manager immediately.	Contractor	Once
The wearing of Personal Protective Equipment (PPE) on site is mandatory for all personnel and construction team members. Minimum Requirements must include the wearing of an approved safety helmet, safety boots, safety eyewear, safety reflective jackets, dust masks, ear plugs, etc. where appropriate.	Contractor/ ECO	Monthly
The contractor must ensure that workers are educated about HIV/AIDS and its risks	Contractor	Monthly
Eating and resting areas must be regularly serviced and cleaned to ensure hygiene	Contractor/ ECO	Monthly
Hazardous working areas must be marked.	Contractor/ ECO	Monthly

Emergency numbers for local police and emergency personnel/units must be placed in a prominent area	Contractor/ ECO	Monthly
Trespassing and/or utilising the site as a thorough fare is prohibited by unauthorised persons. Contractor staff are prohibited from trespassing over the site boundaries	Contractor/ ECO	Monthly
Interaction with neighbours and objecting parties at the site must be well documented. A complaints register must be readily available on site. Interaction with external parties must be courteous.	Contractor/ ECO	Monthly
Supervisors must be vigilant particularly of children who may come close to the construction works without realizing the danger to themselves.	Contractor/ ECO	Daily
First Aid contents must be on hand at all times as well as an incident records file.	Contractor/ ECO	Monthly
Construction related vehicles must adhere to speed limits of the surrounding roads and a limit of 20km/hr on site.	Contractor/ ECO	Daily

Fire Management

Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Fire safety equipment must be provided on site during construction. Basic fire-fighting equipment (such as fire extinguishers) is to be placed at strategic locations on site (e.g. at the site office, flammable material store and watchman's container).	Contractor/ECO	Monthly
Equipment must be maintained in good working order to the satisfaction of local fire authorities.	Contractor/ECO	Monthly
No open fires are permitted. Cooking must be restricted to bottled gas facilities in designated areas approved by the ECO. This facility must be supervised and strictly controlled.	Contractor/ECO	Monthly
A dedicated braai facility may be permitted in an area approved by the ECO, if the campsite is in close proximity to firefighting equipment. At no time is a braai fire to be left unattended.	Contractor/ECO	Monthly
Smoking is prohibited near places where any readily combustible or flammable materials are present. Notices are to be prominently displayed prohibiting smoking in such areas.	Contractor/ECO	Monthly
Welding, flame cutting and other hot work is only to be undertaken in places where the necessary safety precautions are in place (i.e. not near potential sources of combustion and with a fire extinguisher immediately accessible).	Contractor/ECO	Monthly
All flammable materials must be stored in a suitable, lockable storage area.	Contractor/ECO	Monthly
Combustible materials must not accumulate on the construction site.	Contractor/ECO	Monthly
Fire extinguishers must be readily available.	Contractor/ECO	Monthly

Disturbance / Damage to Heritage Finds		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
For any chance heritage finds, all work must cease in the area affected and the Contractor must immediately inform the Project Manager. The provincial heritage agency, the KwaZulu-Natal Amafa and Research Institute (hereafter referred to as the Institute) must also be informed.	Contractor/ECO	Monthly
A heritage specialist must be called to site to assess the significance of the find.	Contractor/ECO/Specialist	Monthly
Permits must be obtained from the Institute if heritage resources must be removed, destroyed or altered.	Contractor/ECO	Monthly
Only once the heritage specialist gives the go-ahead can work in the area of the find re-commence.	Contractor/ECO	Monthly
Under no circumstance's heritage material be destroyed or removed from site unless under direction of a heritage specialist.	Contractor/ECO	Monthly
If recent remains be found on site that could potentially be human remains, then the South African Police Service must be contacted. No SAPS official must remove remains until the correct permit/s have been obtained.	Contractor/ECO	Monthly
<p>In terms of chance fossil finds, the following must be adhered to:</p> <ul style="list-style-type: none"> ○ When excavation takes place for the construction of the bridge, any rocks disturbed during this process must be inspected by the environmental officer or designated ECO. Any fossiliferous material (trace fossils, plants, insects, bone, and coal) must be put aside in a suitably protected place. ○ Photographs of possible fossils must be sent to a palaeontologist for preliminary assessment. ○ If there are concerns regarding any fossil finds, then a palaeontologist must visit the site to inspect the selected material and check dumps where necessary. ○ Fossil plants or vertebrates that are deemed to be of good quality scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a permit must be obtained from the Institute. Annual reports must be submitted to the Institute as required by the relevant permits. 	Contractor/ECO	Monthly

Socio Economic Impacts		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Local community members must be employed where possible.	Contractor/ECO	Monthly
Strict penalties must be built into tenders to deal with issues such as petty crime, fence cutting, trespassing etc.	Contractor/ECO	Monthly
Community members and leaders must be notified as soon as possible by posting notice boards with illustrations on site.	Contractor/ECO	Monthly
Employment of local labour must follow appropriate employment procedures in discussion with the municipality and traditional leadership in the area.	Contractor/ECO	Monthly
Where possible, priority must be given to job seekers from the local area.	Contractor/ECO	Monthly
local procurement policy must be adopted to maximise the benefit to the local economy.	Contractor/ECO	Monthly
Security guards must be appointed as a security measure and a security fence must be erected around the property boundary and construction camp laydown areas to prevent the possibility of theft.	Contractor/ECO	Monthly

Closure of Construction Camp Site		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Once construction has been completed and all excess material has been removed, the camp site must be rehabilitated.	Contractor/ECO	Monthly
Any spilled concrete must be removed, and any soil compacted during the construction phase must be ripped, levelled and re-vegetated or surfaced.	Contractor/ECO	Monthly
All structures comprising the camp site must be removed from the site.	Contractor/ECO	Monthly
The camp, storage and waste storage areas must be inspected for spills of substances such as paint, oil, etc and these must be cleaned up.	Contractor/ECO	Monthly
All temporary worker facilities must be removed or decommissioned.	Contractor/ECO	Monthly
Copies of all certificates from any waste disposals must be provided to the ECO.	Contractor/ECO	Monthly
The contractor must repair any damage that the construction works have caused to neighbouring sites.	Contractor/ECO	Monthly
The ECO must be notified of the complete decommissioning of the site camp after which the ECO will perform a final audit of the site.	Contractor/ECO	Monthly

9.5. Rehabilitation/ Maintenance Phase

The Rehabilitation Phase refers to the closing of the camp site and site handover to the Developer.

General		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
The Developer is responsible for compliance with the provisions for Duty of Care and Remediation of Damage in accordance with Section 28 of National Environmental Management Act (NEMA), Act No. 107 of 1998.	Developer/Contractor/ECO/Engineer	Monthly
A meeting must be held on site between the Engineer, Site Environmental Officer, ECO and the Contractor to approve all remediation activities and monitor that the site has been restored to a condition approved by the Engineer.	Developer/Contractor/ECO/Engineer	Once
All areas where temporary services were installed must be rehabilitated to the satisfaction of the Engineer.	Developer/Contractor/ECO/Engineer	Once
Once rehabilitation has been carried out, a post-construction audit must take place for final compliance. The contractor must rectify any non-compliance found by this audit, prior to vacating the site.	Developer/Contractor/ECO/Engineer	Once

Site De-establishment and Clean-Up		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
The Contractor must arrange the cancellation and removal of all temporary services.	Developer/Contractor/ECO/Engineer	Monthly
All temporary chemical toilets must be removed from the construction camp and be disposed in a manner approved by the Contract/ ECO.	Developer/Contractor/ECO/Engineer	Monthly
On completion of the Project, the Contractor shall ensure that all temporary structures, equipment, materials, waste, litter, rubble, notice boards and structures fences used during construction are removed with minimum damage to the surrounding area.	Developer/Contractor/ECO/Engineer	Monthly
After construction completion, any remaining disturbed/exposed soil surfaces on the site footprint which do not constitute permanent hard surface infrastructure shall be rehabilitated by scarifying the surface and allowing areas to rehabilitate	Developer/Contractor/ECO/Engineer	Monthly
Rehabilitation of disturbed areas must be undertaken within a month after construction activities have concluded.	Developer/Contractor/ECO/Engineer	Monthly

Upon completion of the project or decommissioning of the construction camp, the sites must be rehabilitated to the pre-use or determined purpose for the areas. If required, the surface must be ripped and re-vegetated.	Developer/Contractor/ECO/Engineer	Monthly
Final rehabilitation must be completed within a period specified by the Engineer.	Engineer	Monthly

Erosion control measures		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Precautions should be taken to prevent soil erosion during the Rehabilitation Phase. Erosion control measures (e.g. application of straw mulches or soil binders to exposed soil) shall be put in place in all rehabilitated areas, including access roads, stockpiles and any other disturbed areas associated with the affected area operations.	Developer/Contractor/ECO/Engineer	As and when required
if necessary, wind protection measures such as shade cloth screens shall be erected to protect the soil and vegetation.	Developer/Contractor/ECO/Engineer	As and when required

Revegetation and Alien Invasive Control Measures		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
All disturbed surfaces compacted by maintenance activities including ablutions and storage areas must be deep ripped to a minimum depth of 30cm to allow organic contaminants to breakdown and promote vegetation establishment.	Developer/Contractor/ECO/Engineer	Monthly
All surfaces hardened due to construction activities are to be ripped and imported materials removed, this must be done in consultation with the Contractor/s and the ECO. The ECO is to ensure that these areas are adequately rehabilitated and re-vegetated.	Developer/Contractor/ECO/Engineer	Monthly
Any erosion channels developed during the construction period or during the vegetation establishment period must be backfilled and compacted, and the areas restored to a proper condition. The Contractor must ensure that cleared areas are effectively stabilised to prevent and control erosion.	Developer/Contractor/ECO/Engineer	Monthly
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 have been lost during construction.	Developer/Contractor/ECO/Engineer	Once
All NEMBA category 1a and 1b invasive alien plant species must be removed and disposed of appropriately prior to rehabilitation. Alien vegetation must be removed through manual clearing on regular basis and must not be introduced	Developer/Contractor/ECO/Engineer	Monthly

or encouraged on site. Thereafter, all cuttings must be removed and legally disposed of at a landfill site. Cut stumps must then be treated with an appropriate herbicide to prevent further growth. Appropriate herbicides must be prescribed by the contractor.		
The vegetation removed during the clearing phase must be replanted to rehabilitate the site. Preferably vegetation be planted at the start of the wet season.	Developer/Contractor/ECO/Engineer	Once
Prior to re-vegetation the soil must be prepared accordingly. Where there is significant compaction, the soils in these areas must be loosened to encourage the establishment of planted vegetation. Where there is good topsoil, these areas must remain un-disturbed.	Developer/Contractor/ECO/Engineer	Once
Under No circumstances should there be a use of herbicide within 30m of the riparian areas, preferably, the use of herbicides should be strictly prohibited or unless the herbicide is specifically designed for the application and will not harm an aquatic environment and is highly selective.	Developer/Contractor/ECO/Engineer	Monthly
The correct Personal Protective Equipment (PPE) must be used at all times.	Developer/Contractor/ECO/Engineer	Monthly
All residual stockpiles must be removed to spoil or spread on site as directed by the ECO and the Engineer.	Developer/Contractor/ECO/Engineer	Monthly
Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion. Indigenous grass species must be used for the rehabilitation purpose.	Developer/Contractor/ECO/Engineer	Monthly

Management and Monitoring		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Monitoring will be the most effective measure in identifying possible damages on the bridge.	Developer/Contractor/ECO/Engineer	As and when required
Immediate repair operation for any damaged portion of the bridge must be taken.	Developer/Contractor/ECO/Engineer	As and when required

9.6. Operational Phase

The Operational Phase is addressed in terms of the environment. Although it refers to the Management and Maintenance of the proposed Dalinkosi Pedestrian Bridge, it is not to be used as an operational guideline for this task. The measures below are purely to ensure protection of the environment during the operational phase of the facility.

Management and Monitoring		
Actions and Mitigation Measures	Responsible Person(s)	Monitoring Frequency
Any long-term (future) environmental monitoring and management required during the Operational Phase of the pedestrian bridge (primarily erosion and deposition management, water management and alien vegetation management) should be via written agreement between the Developer and the Alfred Duma Local Municipality. It should include any financial, servicing and long-term monitoring and maintenance requirements.	Developer	As and when required
If there are any potential (future) maintenance requirements which are deemed necessary beyond the contractual Project timeframe, a specific Method Statement should be developed by each and any appointed Maintenance Contractor prior to performing any required maintenance on the bridge.	Developer	As and when required

10. CONFORMANCE WITH THE ENVIRONMENTAL SPECIFICATIONS

It is necessary for the Contractor to make provisions as part of their budgets for the implementation of the EMPr. In terms of NEMA, every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment and is liable to pay costs both to the environment and human health and the preventative measures to reduce or prevent additional pollution and/or environmental damage from occurring. This is referred to as the Polluter Pays Principle. Section 28 of NEMA embodies the Polluter Pays Principle.

The Contractor is deemed not to have adhered with the Environmental Specifications/EMPr if:

- There is evidence of contravention of clauses within and beyond the boundaries of the site footprint;
- Environmental damage is caused due to negligence;
- The Contractor ignores or fails to comply with corrective or other instructions issued by the PM or ECO within a specified time;
- The Contractor fails to respond to and adequately resolve reasonable complaints from members of the public or project stakeholders; and
- The Contractor fails to conform with corrective or other instructions issued by the PM or ECO within a specific time period.

The Developer (holder of the EA) and/or the Contractor will be deemed not to have adhered with the Environmental Specifications/EMPr/EA if:

- Any unauthorised construction activities or unauthorised NEMA EIA listed activities knowingly take place in the context of those activities that are authorised for the Project.

10.1. Non-conformance

The Contractor shall act immediately when any notice of non-conformance (NCR) is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and any actions of resolution taken. The ECO should be made aware of any complaints received.

Any non-conformance to the procedures of this EMPr may also be deemed a transgression of the various statutes and laws that define the manner in which the biophysical (natural) and socio-economic environment is managed. Any chronic or persistent negligence or failure to redress serious transgressions or contraventions shall be reported to the relevant authority for them to consider, mediate and officially advise upon on a basis that the authority deems to be environmentally fair, reasonable and justifiable.

It is recommended that the application of a penalty clause on the Project is implemented for incidents of major legal non-compliance or persistent negligence which significantly negatively impacts the environment. The Contractor will be allowed one offence and a

written warning issued by the ECO or PM. Failure to rectify the offence within two (2) working weeks of the issue of the warning or a repeat offence should result in a fine, as decided by the PM or ECO. The principle of any fines or penalties should be consistent with any clauses in the contractual documentation for the Project where fines or penalties may be issued to the Contractor for any time delays/extensions or material or workmanship defects relating to the Project which are not allowed for in the contract and the associated budget

It is recommended that the PM in collaboration with the ECO implement an integrated system of financial penalties and/or conditions for dismissal for less serious transgressions, and any others determined during the course of the Project, such as those listed below:

- Littering on site;
- Any vehicles being driven in excess of designated speed limits;
- Persistent or un-repaired fuel and oil leaks;
- Excess dust or excess noise emanating from site;
- Unlawful lighting of fires on site;
- Theft/removal and/or damage to any fauna, flora or cultural or heritage objects on site;
- Urination and defecation anywhere except at designated facilities;
- Any persons, vehicles or equipment related to the Project found within any designated "No-go" areas.

11. CONCLUDING COMMENTS

An EMPr is a dynamic document, any major environmental issues not covered in the EMPr as submitted must be addressed as an addendum to the EMPr, submitted for approval prior to implementation on site.