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[Our Ref: En21.02.429]

PROPOSED CONSTRUCTION OF GUMEDE BRIDGE, UMDONI LOCAL MUNICIPALITY

Environmental Management Programme (EMPR)

COMPILED FOR VUBA IMAGINEERS, ON BEHALF OF UMDONI LOCAL MUNICIPALITY

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August 2021

EIA REFERENCE NUMBER: DC21/0020/2021
NEAS: KZN/EIA/0001607/2021

CONTENTS:

1. IMPLEMENTATION OF THE EMPr

1.1. Introduction

This Environmental Management Programme Report (EMPR) will serve as an action plan for the implementation of mitigation measures and will govern the pre-construction, construction and post-construction phases of the ***"PROPOSED CONSTRUCTION OF GUMEDE BRIDGE, UMDONI LOCAL MUNICIPALITY"*** will also ensure efficient lines of communication between the Project Manager, Project Engineer, Supervisor, Contractor and Environmental Control Officer. A copy of the EMPR is to be maintained on site at all times.

The key purpose of the EMPR will be to ensure environmental best practice during the life cycle of the said project. ***This EMPR is a legal document.***

1.2. Objectives of the EMPR

The objectives of this EMPR are as below:

- Ensure that the pre-construction, construction and post-construction phases of the ***"PROPOSED CONSTRUCTION OF GUMEDE BRIDGE, UMDONI LOCAL MUNICIPALITY"*** occurs within the principles of Integrated Environmental Management (IEM).
- Detail specific actions deemed necessary to mitigate the environmental impact of the project.
- To ensure that identified activities which are undertaken do not have a substantial detrimental effect on the environment.
- To promote sustainable development.
- Assist in ensuring continuing compliance with South African legislation
- Provide a mechanism for ensuring that measures identified in the EIR designed to mitigate potentially adverse impacts, are implemented;
- Provide a framework for mitigating impacts that may be unforeseen or unidentified until construction is underway;
- Provide assurance to regulators and stakeholders that their requirements with respect to environmental and socio-economic performance will be met; and
- Provide a framework for compliance auditing and inspection programs.

1.3. Reporting Procedures and Compliance

This EMPR will regulate the Contractor's conduct on site or method of working. Non-compliance with the conditions set out in this document constitutes a failure in compliance.

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

A listing of those issues that qualify as environmental *non-compliance* issues have been outlined to inform the Contractor, Project Manager, Supervisor and Project Engineer on environmental issues of environmental significance for the project site.

1.4. Penalty for non-compliance with EMPR

The Contractor is regarded as NOT to have complied with the EMPR if:

- Environmental damage ensues due to negligence
- The Contractor fails to comply with corrective actions or other instructions issued by the Dept. of Agriculture Environmental Affairs and Rural Development, Project Manager or Environmental Control Officer within a specified time.

- The contractor fails to respond timeously to complaints from the public.
- The Applicant, the Contractor and subcontractor are responsible for all environmental and anthropogenic damage that may ensue during the instatement of this project, i.e. will have to comply with the provisions for Duty of Care and Remediation of Damage, as per section 28 of NEMA No.107.

Incidents of non-compliance include the following listed below:

- Sourcing of water other than from a municipal supply
- Failure to provide mobile ablution at working area
- Rivers/streams being used for waste disposal
- Failure to provide adequate waste disposal facilities and services
- Failure to minimize the effects of erosion.
- Failure to reinstate and rehabilitate disturbed areas.
- Any other contravention of general environmental specification as identified by the Environmental Control Officer.

1.5. Contract Conditions-Responsibilities and tasks

The most pertinent tasks and responsibilities have been outlined below.

1.5.1 Project Manager

- Responsible for the overall co-ordination between the Project Engineer, Supervisor, Environmental Control Officer (ECO) and Contractor.
- Monitor progress and environmental issues
- Ensure that damages to property/land are addressed adequately and compensation is paid where appropriate.
- Ensures protection of water bodies
- Ensures that chances for erosion are minimised, and remedies possible erosion timeously.
- Ensures that alien vegetation/weeds that have established during post-construction are removed completely.
- Has to ensure that all disturbed areas are rehabilitated to mimic their original state.
- Ensures that all waste material is removed and disposed of in a landfill.
- Ensures that all impacted areas are rehabilitated, and that all general waste/litter is removed.
- Ensures that all complaints by residents are dealt with promptly.
- Ensures that polluted/eroded areas are mitigated and rehabilitated
- Is responsible for any contravention/s by construction staff of any non-compliance with the EMPR

1.5.2 Project Engineers (Civil, Structural & Electrical)

- Ensures Contractor complies with the EMPR.
- Liaises with the ECO.

1.5.3 Environmental Consultant/ECO

  - Provides advice to the Project Engineer/Supervisor/Contractor when requested
  - Will be responsible environmental management plan.
- Discuss content of EMPR with Supervisor and Contractor

1.5.4. Independent Environmental Auditor

- Client must appoint an independent Environmental Professional to conduct environmental audits on site.
- Independent Environmental Professional must have the following criteria:
  - post graduate degree in environmental studies
  - minimum of five years relevant experience to act as the independent environmental

auditor for the site.

1.5.5 Supervisor

- Ensures Contractor complies with the EMPR.
- Provides advice to the Contractor when deemed necessary.
- Ensures adherence to safety standards and procedures.
- Liaise with ECO on compliance and completion of rehabilitation tasks

1.5.6 Construction Contractor

- Complies with the stipulations of the EMPR
- Reports to Project Manager
- Ensures that construction staff is made aware of the need to conduct activities in an environmentally responsible manner.
- Ensure staff don't work outside demarcated site areas.
- Ensures protection of water bodies.
- Ensures that chances for erosion are minimized, and remedies possible erosion timeously.
- Ensures that alien vegetation/weeds that have established during post-construction are removed completely.
- Has to ensure that all disturbed areas are rehabilitated to mimic their original state.
- Ensures that all waste material is removed and disposed of in a landfill.
- Ensures that all impacted areas are rehabilitated, and that all general waste/litter is removed.
- Ensures that all complaints by residents are dealt with promptly.
- Ensures that polluted/eroded areas are mitigated and rehabilitated
- Is responsible for any contravention/s by construction staff of any non-compliance with the EMPR

1.6. Environmental Awareness and Compliance

In line with the National Environmental Management Act (No. 107 of 1998), the development must be socially, economically and environmentally sustainable with the implications that:

- Surface and groundwater pollution is avoided
- Pollution and degradation of the environment are avoided
- Waste is avoided/minimised and re-used or re-cycled where possible

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

- Waste management
- Pollution control
- Storm water management
- Erosion protection

1.7. Responsibility for Environmental Management

The Proponent and the contractor will be responsible for environmental control on site during the construction and post-construction phases of the project.

1.8. Mitigation Measures

The environmental management programme report (EMPR) will guide the planning, construction and post-construction phases of the development.

Potential impacts, frequency, responsible person/s and management measures are specified. These measures must be adhered to.

2. KEY ROLE PLAYERS

2.1 EAP

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2.2. SPECIALIST DETAILS

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2.3. PROJECT PROPONENT

Trading name (if any):	Umdoni Local Municipality		
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2.4. PROJECT ENGINEER

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3. BACKGROUND TO PROJECT

3.1. Site Co-ordinates

Project Locality

Local Municipality	Ward	Catchments	Co-ordinates (approximate centre of project area)	
			Longitude	Latitude
Umdoni Municipality in Scottburgh	Ward 16	Mvoti-Mzimkhukulu water management area. Amhlongwa Catchment	30º43′59.66″E	30º14′00.59″S

3.2. Project Description

The project is situated within Ugu District Municipality under the administration of Umdoni Municipality in Scottburgh. The project site can be accessed by proceeding from Scottburgh take Dududu road and head north west for about 7.5km and taking the right turn onto a gravel road for about 1.6km to arrive at the bridge. The respective site co-ordinates are as follows: 30º14'00.59"S; 30º43'59.66"E. The site falls within sparsely built up communal lands. No alternative location could be considered at this stage for the following reasons. The construction of the new bridge has to occur at the location where the existing portal culvert bridge was damaged and then collapsed.

The Umdoni Local Municipality is located within Ugu District Municipality about 50km from the city of Durban and 65km from Port Shepstone along the South Coast. Umdoni Municipality is strategically located along major route N2, R612 and R102. It serves as the gateway of Ugu District Municipality from the North. The Umdoni Local Municipality is a Category B (which refers to a local municipality that shares municipal executive and legislative authority in its area with a Category C municipality within whose area it falls in i.e. Ugu District Municipality). It is the smallest of four municipalities in the district, accounting for just under a quarter of its geographical area. The Gumede Bridge Project will entail, demolishing of existing collapsed portal culvert bridge and construction of a new portal culvert bridge

that measures approximately 7.12m long and 6.1m wide. Construction Bridge approaches with a total length of about 240m and width matching a standard 5m wide road with gravel wearing course finish. Adequate storm water management system and earth retaining structures in the form of gabions are to be provided as necessary. Specialist support services such as topographical survey also form part of the works.

Based upon the design developed, the works can be summarized as follows:

- The bridge to measure 6.1m wide × 7.12m long × 1.8m high.
- To comprise: 2no. × 6.1m long × 1.8m high × 1.8m wide portals + 1no. × 6.1m long × 1.8m high × 2.4m wide portals, 200mm thick deck slab and 200mm thick base slab on micro piles, Gabion wing walls, 200mm thick approach slabs and 300mm high × 1m long guide block.
- 5m wide × 0.24km long approach road finished by 150mm layer of Gravel wearing course on at least 150mm layer of G7 selected subgrade/fill material.
- Associated storm water management by means of side drains, mitre drains and culverts.
- Fill protection and slope stability mechanisms by use of gabions baskets.

3.3. Need/Desirability and other Factors

The objectives of the project are:

During the site visit, it was observed that there is an existing portal culvert bridge structure that has been damaged and collapsed due to floods at Gumede River crossing. The stream is currently impassable by vehicular traffic and the villagers are currently using alternative routes to access their homes. It is therefore proposed to construct a new bridge to enable easy access to the either side of the stream in all weather conditions.

- *To address public safety concerns in the village, the Umdoni Municipality intends to construct an appropriate river crossing in the form of a bridge.*
- *To construct a new bridge to enable easy, safe, adequate access to the either side of the stream in all weather conditions.*
- *To choose and design a bridge structure that underpins the factors of durability, safety, economy, constructability and aesthetics.*
- *To accommodate light-medium traffic across Gumede River.*

Benefits include:

- *To provide a new bridge to enable easy, safe, adequate access to the either side of the stream in all weather conditions.*
- *To create temporary employment during the construction of the works.*
  Community participation and governance in the provision of the improved infrastructure
- *Progressive developments of this nature serve to address social responsibilities, generating societal pride that is derived from the enhancement of the lives of communities from the roots upward*
- *There will be a significant requirement for unskilled labor from the community.*
- *It is a requirement in the contract documents that maximum use be made of local labor and sub-contractors.*

- *It will also be a requirement that more experienced and established contractors train and mentor labor and emerging subcontractors, during implementation.*
- *This project supports the employment of women.*

3.4 Directions to Site

The project is situated within Ugu District Municipality under the administration of Umdoni Municipality in Scottburgh. The project site can be accessed by proceeding from Scottburgh take Dududu road and head north west for about 7.5km and taking the right turn onto a gravel road for about 1.6km to arrive at the bridge.

3.5. Site Description

The Umdoni Local Municipality is divided into three major land use zones, that is, commercial agriculture dominated by sugar cane fields, the traditional authority areas located to the North of the Municipal area and the Coastal urban nodes forming part of the ribbon development stretching from Amanzimtoti down the South Coast. The land cover in rural areas of Umdoni comprises predominantly of sugar cane, bananas and commercial forestry. The majority of the remaining area is under formal urban development. There are limited areas of indigenous vegetation interspersed in the commercial crop lands. The majority of the rural areas of Umdoni Municipality appear to be under sugar cane production. There are relatively small areas of commercial forestry or plantation, particularly in the south of the Municipality. Banana production also occupies a relatively small area of the municipality.

3.5.1. Current and surrounding Land use

Current landuse includes open space, grazing and sparse informal residential.

The proposed bridge location crosses a river/stream that is approximately 5m wide. A collapsed concrete bridge which restricts bi-directional traffic flow occurs at the site along the existing gravel road alignment.

The Kwahluzingqondo Secondary School arises about some 450m to the west of the site.

The road and associated bridge is in the lower portion of the landscape which is predominantly the midslope to valley bottom landscape positions. The dominant hydrological response is generally runoff.

3.5.2. Topography

The proposed bridge lies within a low point, with gently undulating terrain with gentle to moderate gradients surrounding it. Generally, the site drains towards the east.

3.5.3. Water Courses

Implications/Impacts

- During construction, pollutants may find their way into the stream on site, impacting on the estuarine system and habitats downstream. Typical sources of pollution include oils and fuels from construction vehicles and construction materials such as cement, detergents, paints, and other chemicals. These may result in the increase in alien aquatic species, resulting in biodiversity losses and impacting on the recreational use of the river. It is therefore necessary that all storage areas, cement-mixing areas, parking areas and ablution facilities are contained in a stable, waterproof receptacle, and underlain by an impermeable base. Construction phase activities will be managed as per EMPR, compiled for the project.

- Materials sourcing and management
- Soil erosion, compaction, and contamination
- Surface/ground water pollution
- Hardened surfaces
- Spill contingency during the construction phase to avoid chances of polluting water sources.

Land Disturbance:
- Soil disturbance must be minimised during construction.
- Movement of vehicles and heavy machinery must be limited to narrow construction servitude.
- Construction camp position and stockpiling sites must not be located within the wetland.
- Disturbed areas must be rehabilitated and monitored to ensure successful reestablishment of natural/desirable vegetation.
- Storage of sand and any other material must not be within 32 meters of a water body.
- There must be no spills or leaks from vehicles/machinery/ablution facilities and all waste disposal facilities must be lined by impermeable materials to prevent seepage into ground water.
- All wastewater from general activities of the construction process must be collected and removed from the site for appropriate disposal at a licensed facility.
- No concrete must be disposed of where there is a possibility that it can find its way into a water body, either directly or via runoff.
- Neither vehicles nor equipment must be washed in streams or rivers.
- Chemical toilets must be provided at convenient localities to prevent water contamination.
- Strategically placed bins must be provided for the disposal of litter, and workers must be encouraged/ forced to use these to prevent any littering.
- The accidental or negligent spillage of any fuels or potentially hazardous substances must be cleaned up immediately using the most appropriate methodologies, equipment and materials.
- The Contractor must ensure that the necessary materials, equipment and chemicals are available on the site to deal with spills of any hazardous materials present.
- All wastewater and polluted runoff from contaminated areas must be channelled into an appropriately sized, designed and located collection sump.

Diversions:
- The Contractor must ensure that natural flows within water bodies are not impeded.
- The slopes of any river diversion must be protected (e.g. sandbags or coarse rock).
- Natural channels must be restored as soon as possible after construction.
- There must be no sedimentation of watercourses.
- Sediment loads downstream of the crossing must be constantly monitored during construction.

3.5.4.Geology and Soils

According to the Council for Geoscience's regional geological sheet "*3030 Port Shepstone*", the general area of the site is underlain by tillite of the Dwyka Group, as shown below in Plate 5. The site was observed to be underlain by fill, colluvial and alluvial soils that overlie residual soils that grade with depth into weathered tillite rock.

Implications/Impacts
- To prevent soil erosion, surface run-off must be controlled to prevent soil loss from the site during the site establishment / construction phases.
- Clearing of ground cover only as it becomes necessary for work front to proceed.

3.5.5.Flora & Fauna

The development footprint is situated within the KwaZulu-Natal Coastal Belt Grassland. The KwaZulu-Natal Coastal Belt Grassland threat status is 'Critically Endangered' and protection status is 'Normally Protected'. The proposed activity footprint overlaps with transformed land-cover and is regarded as possessing low sensitivity, albeit the surrounding landscape comprises of sensitive habitats, including

Irreplaceable Critical Biodiversity Areas. These sensitive habitats possess flora SCC, as well as provide an array of ecosystem services. *Sideroxylon inerme* specimen adjacent to the road within the wetland must be relocated as prescribed.

Implications/Impacts:

- Areas rated as Verhy High and High sensitivity in proximity to the development area, must be declared as 'no-go' areas during the construction phase, and all efforts must be made to prevent access to this area from construction workers and machinery. This excludes the bridge portion of the wetlands that the road currently traverses.
- The areas to be developed must be specifically demarcated to prevent movement of workers into sensitive surrounding environments
- Continuous monitoring and removal of invasive species
- No unnecessary removal of vegetation to be removed.
- Chemical toilets, stockpiles to be sited away from drainage channels
- No fires to be allowed on private property
- No poaching or destruction of any vegetation to be allowed while on site.
- No littering to be allowed anywhere on the camp-site area.
- Proper solid waste collection and disposal to be undertaken
- Proper weed control to be undertaken
- No vehicle access to be allowed through any drainage channel.

3.5.6. Air Quality, Noise and Dust Control

Noise and dust can be controlled as long as the labor and contractor makes a conscious effort to be aware and resolve issues as soon as they are established. Noise levels around the project site are mainly as a result of the very little traffic and some pedestrian activity around the site.

The levels of dust pollution generated by grading vehicles/machinery on the stripped areas would return to current levels once construction is complete. Should dust pollution become a problem during the construction phase, dust amelioration measures (such as the periodic wetting of exposed surfaces and use of Hessian mats) will have to be put in place to control dust generation. This will include periodic wetting of exposed surfaces by an established sprinkler system or mechanically.

Construction will take place in close proximity of local residents and school children, Consideration must be taken for these issues, and noise must be kept at a minimum, dust must be controlled by wetting stockpiles and using shade netting or shade cloth.

Access roads created by the contractor must be limited and the originally selected routes, confirmed with the Engineer, and must be follow the route of LEAST DISTURBANCE TO THE ENVIRONMENT. It is unacceptable for the contractor to use any other route that has not been allocated as an access road.

Implications/Impacts

- In terms of air quality, generation of dust during construction could occur, increased dust pollution could arise during construction as a result of construction traffic on the gravel roads, earthworks, grading and building processes.
- The levels of dust pollution generated by traffic on the gravel roads would return to current levels once construction is complete. Should dust pollution become a problem during the construction phase, dust amelioration measures will have to be put in place to control dust generation this will include periodic wetting of exposed surfaces by a water cart.
- Vehicles travelling along the access roads must adhere to speed limits to avoid creating excessive dust.
- Noisy activities must be restricted to the terms given in the Project Specification or General Conditions of Contract
- It is unlikely that noise levels in the area will increase significantly as a result of the development during its operational phase.

- Noise may increase slightly during construction as a result of construction vehicles, grading of internal road, building processes, earthworks and trench excavations. This negative impact during construction would be short term and very localised. Noise impacts on surrounding residents will therefore not be of major consequence.
- Working hours to be in accordance with national and local bylaws;
- Exits and entrances must be placed in such a way that it forces people to drive slowly when they enter and exit
- Vehicles travelling along the access roads must adhere to speed limits to avoid creating excessive dust.

3.5.7. Visual Aspects

The site is located within a rural area, and is visible to residents. During construction phase, the majority development will be visible to the local residents of the area.

Implications/Impacts:

- Lighting on the construction site
- Sites are to be maintained in good and clean conditions.

3.6. Socio-economic

The majority of people who are of working age in Umdoni are not economically active. This means that 54% are neither employed nor unemployed. The Municipality is dominated by young people, who are the main driving force behind economic activity in terms of the labour force composition.

Implications/Impacts

- The proposed development will result in the provision of local Employment opportunities. Some new jobs will be created directly and indirectly particularly in the construction sector/industry.

3.7. Cultural resources

Description

Given the location of the project, the potential of encountering any significant archaeological materials *insitu* during development are considered limited. Should any chance of findings of artefacts of possible historical/paleontological value be discovered during earth moving activities then AMAFA will be notified.

Implications/Impacts

- If any heritage objects or artefacts are found construction must stop and AMAFA must be contacted immediately.
- AMAFA is to be contacted if any graves are identified during earthmoving activities
- AMAFA to be contacted if heritage objects are identified during earthmoving activities.
- The proposed development is acceptable for the area earmarked for this development given that the area is already surrounded by related infrastructure and premises.

3.8. Safety and Security

Description

This project entails the decommissioning and then construction of a portal culvert bridge. The location is a rural setting and the structure will be in the vicinity of residential housing. Therefore, construction will take place in close proximity to people ,children and livestock. These issues must be taken into consideration.

The contractor must fence off the site camp appropriately (in accordance with BOQ requirements), and must demarcate the working area. All materials and machinery must be stored within fenced areas and these areas must have 24-hour security. During construction, appropriate signage and demarcations

must be in place, and the labour must be aware of the presence of animals and people and take the necessary precautions to ensure they come to no harm.

Implications/Impacts

- Campsites to be fenced.
- Burning at campsite area to be prohibited
- Proper mobile toilet facilities to be provided
- No firearms to be allowed on camp site areas
- No hunting or poaching to be allowed at any time
- Construction camps must be cited properly, and away from properties of landowners
- Notification to be given to landowners in advance before accessing land.

4. GREEN BUILDINGS/INFRASTRUCTURE AND CARBON FOOTPRINT

With today's evolving world more concentration is emphasised on constructing efficient buildings which has become a high priority, other building alternatives have been suggested like green building; the concept of sustainable building incorporates and integrates a variety of strategies during the design, construction and operation of building projects. The use of green building materials and products represents one important strategy in the design of a building.

Green building materials offer specific benefits to the building owner and building occupants:

- Reduced maintenance/replacement costs over the life of the building.
- Energy conservation.
- Improved occupant health and productivity.
- Lower costs associated with changing space configurations.
- Greater design flexibility.

Integrating green building materials into building projects can help reduce the environmental impacts associated with the extraction, transport, processing, fabrication, installation, reuse, recycling, and disposal of these building industry source materials.

With this proposed project, it would be highly beneficial to incorporate green building materials in order to protect the environment and preserve it. Green building materials are composed of renewable, rather than non-renewable resources. Green materials are environmentally responsible because impacts are considered over the life of the product.

In making green buildings a success, different aspects have to be taken into consideration. Materials sourced for this project would be advantageous if recycled content were to be used preferably with resource efficient manufacturing process including reducing energy consumption, minimizing waste in order to reduce greenhouse gases.

Locally sourced materials must also be high priority on the list in order to cut down transportation and high costs pertaining to the project, in this way it is easier to re-use selected materials which can be easily dismantled at the end of the project for further use elsewhere.

When purchasing materials it is always wise to choose durable materials as they are longer lasting and have higher life expectancies as compared to conventional products.

As a result of incorporating green materials into the proposed project, this will help by reducing the overall carbon footprint; there are many ways to reduce carbon emissions. Here are just a few:

- Enacting a recycling policy.
- Educating employees in the need to reduce carbon emissions.
- Reducing the use of electricity.

- Developing new methods of work and manufacturing that are less harmful to the environment.

5. ENVIRONMENTAL FILE

The environmental file is a hardcover file that remains on site throughout the project. This file must not be removed from site and it is the ECO's and contractors responsibility to ensure that this file is always in order. This file is subject to auditing by the necessary authorities and if found non-compliant the project may be stopped or the contractor fined by the relevant authority. This file must consist of the following documents:

5.1. Environmental Audit Reports

The appointed, independent Environmental Consultant will conduct Environmental Audits subject to the discretion of the competent authority. An Environmental Audit Report will be compiled by the said auditor, a copy of this report will be sent to the Department of Economic development, Tourism and Environmental Affairs, while another will be issued to the contractor to file as a record, in the environmental file. The Site Manager and Environmental Control Officer (ECO) must be aware of the non-compliance listed in each report, the non-compliance must be seen as a site instruction to be resolve issues immediately

5.2. Complaints Register

The Contractor must record any complaints received from the residents within the affected areas. The complaint/s must be communicated to the Site Manager and Environmental Control Officer (ECO) who will respond accordingly. Information as below must be noted:

- Time, date and nature of complaint
- Name of Complainant
- Response and investigation undertaken by whom and date

5.3. Incident Register

All environmental incidents (non-compliance with EMPR) must be recorded: Information as below:

- Time, date, location and nature of incident
- Actions taken , by whom and date
- Incidents to be reported to Foreman, Project Manager and ECO.

5.4. Disposal Slips

Disposal slips are records of all disposals of construction material, or waste production from construction activity (ie. Oil spills). These slips must be obtained from the owner of the site in which the waste is being disposed of: Information recorded on slips is as below:

- Time, date, location and nature of waste
- Disposed of by whom (Name, date, signature)
- Received by whom (Name of site, name of person, address, date, and signature)

5.5. Environmental Management Plan (EMP)

The Environmental Management programme (EMPr) is a legal and binding document. It records the environmental summary of the project and the surrounding area, and provides recommendations on environmental management and the required monitoring programme essential for the commencement of the project, throughout the different phases of the project, as per the environmental requirements in terms of the National Environmental Management Act (NEMA), 1998 (Act no. 107, 1998). All audits will be conducted against the EMPr, therefore it is imperative that the Contractor becomes familiar with this document, to avoid any occurrence of non-compliance. The EMPr issued at the start of the project must be filed in the environmental file and must NOT leave the site camp, under any circumstances, until project completion.

A Generic EMPr (Table 1), and a Site Specific EMPr (Table 2).has been done for the Proposed Project.

6. POTENTIAL LISTED ACTIVITIES - TRIGGERS

List relevant activities according to the 2014 EIA Regulations that may be triggered due to the proposed project activity.

Legislation	Listed Activity Reference	Description as per Regulation	Relevance/Applicability to this Project
Listing Notice 1 of 2014 (GNR 327)	31 (i)	the decommissioning of existing facilities, structures or infrastructure for: any development and related operation activity or activities listed in this notice, listing notice 2 of 2014 or listing notice 3 if 2014	*The existing damaged bridge structure will be decommissioned.* **geographical co-ordinates for triggered area:** start: 30°14'00.65" S | 30°43'59.67" E end: 30°14'00.43" S | 30°43'59.62" E
Listing Notice 1 of 2014 (GNR 327)	12(ii)(a)	The development of- (ii) infrastructure or structures with a physical footprint of 100 square meters or more; Where such development occurs- (a) Within a watercourse	- *Construction Bridge approaches with a total length of 240m.* - *There is an existing stream crossing where the existing Gumede Bridge is located.* - *Therefore, a system of concrete portal culverts shall be used to construct a new low level bridge at the river crossing. (Mahlongwa River passes through here)* **geographical co-ordinates for triggered area:** start: 30°14'00.65" S | 30°43'59.67" E end: 30°14'00.43" S | 30°43'59.62" E

Listing Notice 1 of 2014 (GNR 327)	19(i)	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from- (i) a watercourse	- *There is a stream where the existing Gumede Bridge is located. (Mahlongwa River passes through here).* - *Approximately 25m3 will be excavated* **geographical co-ordinates for triggered area:** start: 30°14'00.65" S | 30°43'59.67" E end: 30°14'00.43" S | 30°43'59.62" E
Listing Notice 3 of 2014 (GNR 324)	14(ii)(a)(d)(vii)	The development of- (iii) bridges exceeding 10 square meters in size; (xii) infrastructure or structures with a physical footprint of 10 square meters or more; Where such development occurs- (a) within a watercourse	- *the area is a classified as a CBA area. Bridge will exceed 10m2, and will occur within the watercourse* **geographical co-ordinates for triggered area:** start: 30°14'00.65" S | 30°43'59.67" E end: 30°14'00.43" S | 30°43'59.62" E
Listing Notice 3 of 2014 (GNR 324):	23 (ii) (a)(d)(vii)	the expansion of infrastructure…where the physical footprint is expanded by 10m2 or more…where such expansion occurs in a watercourse	The footprint of the new portal bridge structure MAY be expanded by more than 10m2. The structure is within a watercourse. start: 30°14'00.65" S | 30°43'59.67" E end: 30°14'00.43" S | 30°43'59.62" E
Listing Notice 3 of 2014 (GNR 324):	23 (ii) (a)(d)(x)(aa)	the expansion of infrastructure…where the physical footprint is expanded by 10m2 or more…where such expansion occurs in a watercourse…outside	The footprint of the new portal bridge structure MAY be expanded by more than 10m2. The project site occurs within a "normal" protected area, as per ecological report. start:

		urban areas…	30°14'00.65" S	30°43'59.67" E
			end:	
			30°14'00.43" S	30°43'59.62" E

Please note that any authorization that may result from this application will only cover activities specifically applied for.

7. METHOD STATEMENT

A written submission by the Contractor to the Engineer and ECO in response to the Specifications or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

The Method Statement shall cover applicable details with regard to:

- *construction procedures;*
- *transport of materials and plant to and from site;*
- *how the plant/ material will be moved while on site;*
- *how and where material will be stored;*
- *the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;*
- *timing and location of activities;*
- *compliance/ non-compliance with the Specifications; and*
- *any other information deemed necessary by the Engineer.*

8. Compliance and Penalties

The Contractor shall put in place procedures to motivate staff members to comply with the EMPr and to deal with acts of non - compliance, or malicious damage to the environment..The Contractor and Sub-contractors are believed not to have complied with the EMPr if:

- ❖ Within the boundaries of the site, there is evidence of contravention of the EMP specifications.
- ❖ if environmental damage ensues due to negligence;
- ❖ the contractor fails to comply with corrective or other instructions issued by the Project manager or Engineer within a specified time,
- ❖ the Contractor fails to respond adequately to complaints from the public.

Penalties of non – compliance with the EMPr will be at the discretion of compliance and monitoring department of EDTEA.

9. ENVIRONMENTAL MANAGEMENT SPECIFICATIONS

Table 1: Generic EMPr

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
DECOMISSIONING PHASE	Increased sediment loads in stream due to dismantling activities	- Erosion controls must be implemented to prevent the expansion of existing gulleys or the formation of new erosion points where demolition has arisen. - Priority areas for erosion control are areas where there is an obvious gradient and the flow of water can be expected. - Measures must include at least, the use of sand bags and silt curtains. - Limit the extent of disturbance.	Comply with any prescribed environmental management standards and practices	Visual Inspection Audit Reports and Induction	Project Engineer/ Contractor/ ECO	DEMOLITION PHASE	Pre-construction induction

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		- The proposed foot print must be limited to as proximal to existing footprint and road reserves.					
	Dust Creation due to excavation activity and trenching as well as activity of construction vehicles	- Dust amelioration methods need to be considered and implemented, where significant quantities of dust are anticipated, methods may be wetting of surfaces or wind screening and residents may need to be notified. - The stockpiles may be protected via use of a covering, such as Hessian mats. - Construction vehicles traveling	- Comply with any prescribed environmental management standards and practices	Visual Inspection Audit Reports and Induction	Project Engineer/ Contractor/ ECO	DEMOLITION PHASE	Pre-construction induction

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		along the access road must adhere to speed limits to avoid creating excessive dust, especially during dry and windy conditions. - Where dust nuisance is unavoidable, screening to be provided					
	Generating of noise from deconstruction activity	- Restriction of noisy activity as per Project Specifications or General Conditions of Contract, and notification of residents of the activities. - Equipping construction vehicles and machinery with silencers and ensuring their	- Comply with any prescribed environmental management standards and practices	Visual Inspection Audit Reports and Induction	Project Engineer/ Contractor/ ECO	DEMOLITION PHASE	Pre-construction induction

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		maintenance and that the construction vehicles adhere to speed limits at all times. - Make use of noise mufflers as required during removal of concreted surfaces. - In any instance Noise levels are not to exceed SABS 0130 specified noise thresholds. - Construction vehicles to adhere to speed limits, fitted with silencers if need be. - Equipment that is fitted with noise reduction facilities (e.g. Side flaps, silencers etc.) will be used as per operating instructions and					

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		maintained properly during site operations					
PRE-CONSTRUCTION PHASE Stakeholder engagement	Inform all registered Interested and Affected Parties of Environmental Authorisation (EA).	- Inform all registered I&APs and key stakeholders of the opportunity for appeal of the Environmental Authorisation.	Comply with any prescribed environmental management standards and practices	Notices sent to related parties on the stakeholder database. List of those to whom it was sent on file.	Environmental Consultant	Within the number of EDTEA-required days from the issuing of the Environmental Authorisation.	Pre-construction induction
Permit Requirements	Ensure compliance with legal and other permitting requirements.	- Ensure that all relevant legal requirements have been adhered to.	Comply with any prescribed environmental management standards and	Permits	*Client*	Prior to construction	Pre-construction induction

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
			practices				
Completion of EMPr and Contractor Compliance Standards	Update EMPr with EA conditions and other mitigation measures from monitoring.	- Include further mitigation methods indicated by EDTEA in the EA into the EMPr and Contractor Compliance Standards.	Comply with any prescribed environmental management standards and practices	EMPr and Contractor Compliance Standards	*Client*	Prior to construction	Pre-construction induction
Notification to EDTEA: Director of Compliance Monitoring	Ensure that EDTEA are notified of commencement date.	- Inform EDTEA prior to initiation of construction.	Comply with any prescribed environmental management standards and practices	Proof of communication	Client	As specified by Environmental Authorization	Pre-construction induction
	Ensure EDTEA is informed of any aspects of non-compliance	- Notify EDTEA with reasons if any requirements of the EMPr or EA cannot	Comply with any prescribed environmental management	EDTEA notification	Client	Prior to construction	Pre-construction induction

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
	with EMPr or EA	be implemented, and provide alternative	standards and practices				
	Ensure EDTEA is informed of current contact details of applicant.	- Submit the name and contact details of the appointed ECO prior to construction	Comply with any prescribed environmental management standards and practices	EDTEA notification	Client	Prior to construction	Pre-construction induction
	Ensure EDTEA is informed of contact details of ECO	- Submit the name and contact details of the appointed ECO prior to construction	Comply with any prescribed environmental management standards and practices	EDTEA notification	Client	Prior to construction	Pre-construction induction
Site Establishment	⇒ Planning	- Natural features must be taken into consideration during design and retained. - Ensure that materials to be used during construction are legally sourced, and that water	Comply with any prescribed environmental management standards and practices		Project Engineer/ Contractor/ ECO	Site Establishment	Pre-construction induction

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
	⇒ Site Survey	or sand is not extracted from streams or rivers; should this be a requirement then the necessary permits and approvals have to be obtained from authorities before construction is to commence. - Fence the construction camp site if feasible. - Marking of survey points must be done with the Engineer's approval.	Comply with any prescribed environmental management standards and practices		Project Engineer/ Contractor/ ECO	Site Establishment	Pre-construction induction
Access to site	⇒ Routing	- The location of all underground services and servitude (if any) must be identified and confirmed. - Choice of access routes must take into account minimum	Comply with any prescribed environmental management standards and practices		Project Engineer/ Contractor/ ECO	Site Establishment	Pre-construction induction

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
	⇒ Haulage roads	disturbance to other road users. - All roads for construction access must be planned and approved by the Engineer ahead of construction activities. They must not be created on an ad-hoc basis. - Roads must follow natural contours to reduce storm water erosion. - Roads must have as little cut and fill as possible. - Agreed turning areas for haulage vehicles are to be formalized and used by the Contractor. No turning manoeuvres other			Project Engineer/ Contractor/	During preliminary investigations On the construction of haulage roads.	

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		than at the designated places shall be permitted. - Haulage roads must allow for the natural flow of water where required. - Contractors shall construct formal drainage on all temporary roads in the form of side drains and mitre drains to prevent erosion and point source discharge runoff. **Survey Points** - Roads or trails that are cut to provide temporary access for survey work must be minimised. - Marking of survey points must be done with the				During surveys and preliminary investigations.	

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		Engineer's approval. - Vegetation clearing must be kept to a minimum during survey points.					
Construction camp	⇒ Layout	- Choice of site for the Contractor's camp requires the Engineer's permission and must take into account location of businesses. A site plan must be submitted to the Engineer for approval. - If the Contractor chooses to locate the campsite on land close to, but not on the site, he must get prior permission from Engineer. - Cut and fill must be avoided where possible during the	Comply with any prescribed environmental management standards and practices		Project Engineer/ Contractor/ ECO	Site Establishment	Pre-construction induction

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		setup of the construction camp. - The size of the construction camp must be minimized (especially where natural vegetation or grassland has had to be cleared for its construction. **Ablutions** - Where water-borne sewage is not available, a reputable company must provide temporary chemical toilets. A registered chemical waste company is to be used to remove waste from chemical toilets on site. - The construction of	Avoid, modify, remedy, control or stop any action, activity or process		Project Engineer/ Contractor/	During Site Establishment and Preliminary Investigations	

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		long drop toilets is forbidden. - The proposed means of treatment and disposal of sewage from the ablution facilities on site must be clearly indicated. - Under no circumstances may open areas or the surrounding bush be used as a toilet facility. ❖ **Provision for Camp Waste Disposal** - Bins/skips shall be provided at convenient intervals for disposal of waste. - Bins must have liner bags for efficient control and safe	which causes pollution or environmental degradation				

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		disposal of waste. - Waste receptacles for different types of recyclable waste must be provided i.e. glass, paper, plastic and a general waste skip.					
Cultural Environment	Archaeological and Historical objects	– Prior to the commencement of construction, all staff need to know what possible archaeological or historical objects of value may look like, and to notify the Engineer/ Contractor should such an item be uncovered.	Comply with any prescribed environmental management standards and practices		Project Engineer/ Contractor/ ECO	During site surveys and preliminary investigations and site set up.	Pre-construction induction

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
Safety and Security	Fencing	– Secure the site in order to reduce the opportunity for criminal activity in the locality of the construction site. – Potentially hazardous areas such as trenches are to be demarcated and clearly marked.	Comply with any prescribed environmental management standards and practices	Audit reports Visual inspection	ECO	During site surveys and preliminary investigations and site set up.	Pre-construction induction
	⇒ Lighting	– Lighting on site is to be set out to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local residence or businesses.		Audit reports Visual inspection	Project Engineer/ Contractor/ ECO	During site surveys and preliminary investigations and site set up.	Pre-construction induction

*(i) avoid, modify, remedy, or stop any action, activity or process which causes pollution or environmental degradation. (ii) Comply with any prescribed environmental management standards or practise.(iii) comply with any applicable provisions of the Act regarding closure and (iv) comply with any provisions of the act regarding financial provisions for rehabilitation.

ENVIRON ASPECTS: IMPACT MGT OBJECTIVE & STATEMENT	IMPACTS & RISK TO BE AVOIDED/ MANAGED/ MITIGATED	IMPACT MANAGEMENT OUTCOME	PROPOSED MANAGEMENT ACTIONS	PARAMETERS FOR MONITORING and method &program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
CONSTRUCTION PHASE							
Compliance with EMPr	Confirm Contractors commitment to EMPr and Contractor Compliance Standards	– Ensure that the EMPr is available at the site throughout construction and implemented by the contractor.	Comply with any prescribed environmental management standards and practices	Copy of signed EMPr with Contractor	Contractor / Engineer	Prior to construction	Induction
	Auditing of compliance with EMPr	– Audit frequency to be as per EA	Comply with any prescribed environmental management standards and practices	Audit report and proof of submission to EDTEA	ECO	Auditing of compliance with EMPr and EA	Induction
Access to site	Maintenance of Access	– Contractors must ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damage as soon as these develop. – Construction vehicles must be restricted to demarcated access, haulage routes and turning areas.	Comply with any prescribed environmental management standards and practices	Audit report Maintenance records	Project Engineer/ Contractor/ECO	Weekly and after heavy rains.	Induction
Maintenance of site	Workers conduct on site	**Eating areas**	Comply with any prescribed	Audit report	Project Engineer/	Ongoing as necessary	Staff induction

		– Eating areas must be regularly serviced, and cleaned to ensure the highest possible hygiene and cleanliness. – All litter throughout the site must be picked up and placed in bins provided. **Housekeeping** – The contractor shall ensure that his camp and working areas are kept clean and tidy at all times. – A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: No alcohol/drugs to be present on site. No firearms allowed on site or in vehicles transporting staff to/from site (unless used by security personnel) Prevent excessive noise. Prevent unsocial behavior. Construction staffs are to make use of the facilities provided for them, as opposed to alternatives.	environmental management standards and practices	Maintenance records	Contractor/ ECO Project Engineer/ Contractor/ ECO Project Engineer/ Contractor/ ECO	followed by monitoring. Ongoing as necessary followed by monitoring. Ongoing as necessary followed by monitoring	Staff induction Staff induction.

		– Other than pre-approved security staff, no workers shall be permitted to live on site.					
	Haulage Roads	– contractors shall construct formal drainage on all temporary haulage roads in the form of side drains and mitre drains to prevent erosion and point source discharge of run-off. – Contractors must ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damage as soon as these develop. – Vehicles travelling to and from construction site must adhere to speed limits. – Access and other cleared surfaces must be dampened whenever possible and especially in dry/windy conditions. **Surfaces** – The Contractor must monitor and manage drainage of the campsite to avoid standing water and soil erosion. – Run-off from the campsite must not discharge into neighbors' properties & business properties.	Comply with any prescribed environmental management standards and practices	Audit report Maintenance records	Project Engineer/ Contractor/ ECO Project Engineer/ Contractor/ ECO	Construction Phase Ongoing Weekly	Induction

		Ablutions – Chemical toilets are to be maintained in a clean state and must be moved to ensure that they adequately service the work area. – The Contractor is to ensure that open areas or the surrounding bush are not being used as a toilet facility or washing purposes. **Camp Waste disposal** – If chemical toilets are used then the waste must be disposed of regularly. Care must be taken to avoid contamination of soils and water, pollution and nuisance to adjoining areas. – A registered chemical waste company is to be used to remove waste from chemical toilets. – Bins and/or skips must be emptied regularly and waste must be disposed of at a registered landfill site.			ECO ECO	Inspection. Ongoing	

	Waste Water Management	– A designated, bunded area is to be set aside for vehicle washing and maintenance. – Provision must be made during set up for all polluted run-off to be treated to the Engineer's approval before being discharged into the storm water system. – No form of secondary pollution must arise from the disposal of sewage and refuse. If any problems must arise, the Developer must address these immediately.	Comply with any prescribed environmental management standards and practices	Audit report Maintenance records	Project Engineer/ECO Contractor	As directed by the Engineer.	Induction
	Storm Water	– All storm water to be carried off site. – Discharge points must be small and numerous. – Stormwater to be collected and suitably discharged into the nearest municipal stream. – Ensure that no stormwater is allowed to enter any drainage installation for the purposed of sewage. – Water may only be discharged into a stormwater system with the permission of the local authority. – Temporary cut off drains and berms	Comply with any prescribed environmental management standards and practices	Audit report Maintenance records	Project Engineer/ Contractor/ ECO	Ongoing-more frequently during dry and windy conditions. As directed by Engineer	Induction

		may be required to capture stormwater and promote infiltration. – Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site. i.e. These materials must not be placed in stormwater channels, drainage lines or rivers. – No temporary works, stockpiles or other circumstances may exist that impede natural water movements or act to concentrate run-off. – There must be periodic checking of the site's drainage system to ensure that the water flow is unobstructed. – Stormwater outfalls must be designed to reduce flow velocity in order to reduce and avoid soil erosion. – Refuse must be placed in designated skips. These must remain in demarcated areas. – Littering on site is forbidden and the site must be cleared of all litter at the end of each working day.				Regular monitoring Throughout the duration of the project.	

	⇒ Waste Management	– Collect waste paper, glass and metal waste separately and arrange for collection by recycling contractors. – Litter bins must be equipped with a closing mechanism to prevent their contents from blowing out. – Litter bins must be emptied on a weekly basis. – All waste must be removed from the site and transported to a Registered, permitted landfill site. – Ensure that solid waste disposal is transported properly in order to avoid waste spills en-route. – Where solid waste disposal is to take place on site, ensure that only non-toxic materials which have no risk of polluting the groundwater, are designated approved areas at acceptable depths below ground level. (The necessary approvals and permits are to be in place before any such disposal takes place) – Construction rubble shall be disposed off in a pre-agreed demarcated spoil dumps that have been approved by the Engineer. – A sump (earth or other) must be created for concrete waste. This is to	Comply with any prescribed environmental management standards and practices	Audit report Maintenance records	Project Engineer/ECO/ Contractor		Induction

		be de-sludged regularly and the cement waste is to be removed to a tip site as approved be the local solid waste company that is in charge of that particular area. – No form of secondary pollution must arise from the disposal of sewage and refuse. If any problems should arise, the Developer should address these immediately. – In the case of rubble and waste rock, subject to the approval by the Project Engineer, certain borrow pits and / or quarries may be utilised for the disposal of waste rock and inert building rubble. No solid waste may be burned on site. – The excavation and use of rubbish pits on site is forbidden.					
	⇒ Surface water	– Care must be taken to ensure that run-off from vehicle or plant washing does not enter the stream. – Strict drainage control must be carried out both during and after development of the area, to ensure			Project Engineer/ECO/ Contractor	Throughout the duration of the project	

		storm-water runoff onto the roads in the area and to prevent ponding of storm-water. - Temporary cut-off drains and berms may be required to capture stormwater and promote infiltration. - The most important factor in stable development of the site is the control and removal of both surface and groundwater from the site.			Contractor	Throughout the duration of the project.	
	⇒ Dust / Air Pollution	- Vehicles traveling along the access roads must adhere to speed limits to avoid creating excessive dust. - Camp construction / haulage road construction areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust. - Ash disposal areas are to be promptly rehabilitated to minimize potential for dust pollution.	Comply with any prescribed environmental management standards and practices	Audit report Maintenance records			Induction

Storage areas	General substances and materials ⇒ Hazardous storage areas ⇒ Accidental Spills and Leaks	- Choice of location for storage areas must take into account prevailing winds, distance to water bodies and general on-site topography. - Storage areas must be designated, demarcated and fenced. - Fire prevention facilities must be present at all storage areas. - Where materials are borrowed (mined) proof must be provided of authorisation to utilise these materials from the landowner and the Dept. of Mineral Resources. - Hazardous storage areas must be bunded with an impermeable liner to protect groundwater quality. - Storage areas containing hazardous substances/materials must be clearly signed. - Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental spill releases or escapes.	Comply with any prescribed environmental management standards and practices Comply with any prescribed environmental management standards and practices	Audit report Maintenance records Audit report Maintenance records	Project Engineer/ECO/ Contractor Project Engineer/ECO/ Contractor Project	Construction phase Construction phase	Induction Induction

		- Emergency numbers must be put up on site and consulted should any accidents / spillages of hazardous substances and / or materials take place. The Contractor is to outline a method statement for the dealing of accidents / spillages of hazardous materials or substances. This statement must be handed to the Engineer as well as to DWS should the incident occur near a body of water. - Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded areas as soon as possible after detection in order to minimise the risk of pollution and reduced bunding capacity. **Chemical spills** a. Contain chemical spills and arrange for clean-up / control by the supplier or by professional pollution control personnel. **<u>Oil and Fuel spills</u>** - The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint etc. and these must be cleaned up. - Immediately clean up any accidental oil or fuel spills or			Engineer/ECO/ Contractor	Construction phase Construction phase Construction phase	

		leakages. - Do not hose oil or fuel spills into a stormwater drain or sewer, or into the surrounding natural environment. - Clean small oil or fuel spills with an approved absorbent material, such as 'Drizit' or 'Spill-sorb'. - Contain oil or fuel spills in water using an approved oil absorbent fibre. - Treat soil contaminated by oil or fuel using one of the following approved methods, as per instruction of the RE or Project Engineer: - *Remove the soil to the depth of the contamination and dispose of it at a registered Hazardous Waste Disposal Site.* - *Remove the soil to the depth of the contamination, and regenerate it by using approved bio-remediation methods.* - Report all major oil or fuel spills to the provincial Department of Water Affairs, as well as to					

		the relevant Local Authority.					
Visual aspects	Lighting on site	- Lighting is to be set out to provide maximum security, without creating a visual nuisance to surrounding residents.	Comply with any prescribed environmental management standards and practices	Visual inspection	Project Engineer/ Contractor	Construction phase	Induction
Vegetation	Conservation of natural environment	- Care to be taken not to introduce alien plant species to site - Do not remove any large indigenous tree without the permission of the Project Engineer/ECO. - Ensure that permits from DAFF are in place before removing any protected plant/tree, and that licences have been obtained for the damage or removal of trees/plants protected under the National Forest Act. - No open fires are permitted under any tree. - No vegetative matter may be removed for firewood.	Comply with any prescribed environmental management standards and practices	Audit report Visual inspection	RE/Contractor ECO	Ongoing monitoring Ongoing	Induction

		- No material storage or lay down is permitted under trees. - No heavy equipment, machinery and vehicles may be parked under any tree unless authorised by the Project Engineer. - Utilise the method of mechanical de-bushing rather than chemical. - Wherever possible, store removed indigenous vegetation in a nursery for replanting during rehabilitation.				monitoring	
	⇒ Alien Vegetation Control	- Control exotics and invasive plants to be eradicated. Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. - All sites disturbed by construction activities must be monitored for colonisation of exotics or invasive plants and control these as they emerge. - Follow manufacturer's instructions when using chemical methods, especially in terms of quantities, time of application etc. - Ensure that only properly trained people handle and make use of	Comply with any prescribed environmental management standards and practices	Audit report Visual inspection	Project Engineer/ Contractor	Ongoing monitoring	Induction

		chemicals. - Dispose of the eradicated plant material at an approved solid waste disposal site. - Immediate re-vegetation of stripped areas and the removal of alien plant species by regular weeding must take place. This significantly reduces the amount of time and money that must be spent on alien plant management during rehabilitation. - Care must be taken to avoid the introduction of alien plant species onto the site and surrounding areas. Particular attention must be paid to imported material. - Topsoil that is suspected to be contaminated with the seed of alien vegetation must not be used. Alternatively, the soil is to be sprayed with specified herbicides.					
Soil Erosion and Excavations	Soil Erosion due to excavation and construction vehicles	– The time that's stripped areas are left open to exposure must be minimized wherever possible. Care must be taken to ensure that these times are not excessive. – Soil erosion on site must be prevented during all phases of the development.	Avoid, modify, remedy, control or stop any action, activity or process which	Audit report Visual inspection Maintenance records ECO records	Project Engineer/ECO/ Contractor	Construction phase	Induction

	⇒ Erosion Control	– Wind screening and stormwater control must be undertaken to prevent soil loss from the site. Stormwater control and wind screening must be undertaken to prevent soil loss from the site. – All embankments shall be protected by a cut-off drain to prevent water from cascading down the face and causing soil erosion. – Monitor access roads and the site for signs of erosion and remedy this as soon as possible. – Areas with potential of soil erosion must be rehabilitated with indigenous vegetation to minimize future impacts of soil erosion and other human activities. – Topsoil removed must be placed carefully aside and must be used for rehabilitation purposes. **Surface Water Management:** – Ensure that water abstraction points (i.e. from rivers etc.) do not degrade or erode as a result of leaking pipes, spills, muddy conditions or wash-aways. These problems must be rectified as soon as they arise. – Repair identified leaks and address	causes pollution or environmental degradation. Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation.	Audit report Visual inspection Maintenance records ECO records	Project Engineer/ECO Contractor	Construction phase	Induction

		issues of water wastage as soon as these are identified. – Avoid over-wetting, saturation and unnecessary runoff during dust control activities and irrigation. – Line overflow and scour channels with stone pitching along their length and at their points of discharge to prevent soil erosion. The point of discharge must be at a point where there is dense natural grass cover. – Ensure that channels do not discharge straight down the contours. These must be aligned at such an angle to the contours that they have the least possible gradient. – Ensure that overland discharge occurs over areas that have a minimum cover of 90% grass cover at a minimum height of 150mm. This applies to areas down slope of the discharge point as well. – Stormwater control and wind screening must be undertaken to prevent soil loss from the site.					
	– Erosion Protection	– Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas. – All natural trees, shrubbery and	Avoid,	Audit report	Project Engineer/	Construction	Induction

		grass species must be retained wherever possible. – Do not permit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the Works Area. – Utilise only light equipment for access and deliveries into areas of unstable soils and in areas where erosion is evident. – Do not allow erosion to develop on a large scale before effecting repairs. When in doubt. – Repair all erosion damage as soon as possible and in any case not later than six months before the termination of the Maintenance Period to allow for sufficient rehabilitation growth.	modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation.	Visual inspection Maintenance records ECO records	ECO/ Contractor	phase	
	Excavations	– Excavations must be undertaken carefully incorporating appropriate drainage. – For significant trees trenching must be 3m away from the stem. – Excavate and backfill trenches on a progressive basis.	Comply with any prescribed environmental management standards and practices	Audit report Visual inspection Maintenance records ECO records	Project Engineer/ Contractor/ ECO	Construction phase	Induction

		– Ensure that no trench longer than 1000m is exposed at any one time. – As far as possible, excavations must not be allowed to stand for longer than 2 days where at all possible. – Programme excavations to take place once the required materials are on site. This facilitates the immediate laying of services and / or construction of subsurface infrastructure and minimises open trench time. – Excavation activities must be limited to areas of immediate work to prevent soil erosion.					

Dust and emissions	Limit fugitive dust and exhaust emissions	– Vehicles and machinery such as generators will be operated as per original manufacturer's specification and undergo regular checks and preventive maintenance regimes to ensure efficient fuel combustion. Original emissions control equipment is to be maintained. – Dust suppression techniques will be implemented where necessary to minimize dust impacts. These will include techniques such as: - Clearing vegetation at the latest possible stage before the immediate area is required for construction. - Applying water to reduce emissions from temporary dust sources, and wetting tires of vehicles before and after travel along fashioned access roads. - All vehicles to not exceed the mandated speed limits of 30km/h. - Stockpiles of soil or sedimentary material to be covered by wind-impervious fabric. – No fires will be lit on site, and no toxic materials will be burned – Audit reports will be produced to ensure regular checks and maintenance are carried out for vehicles and machinery.	Comply with any prescribed environmental management standards and practices	Vehicle, machinery and equipment Maintenance records ECO records	Contractor	Throughout Construction	Audit Reports and Induction

		– Where possible and available, low-sulphur diesel (0.1 % sulphur) will be used for vehicles to minimize emissions. – Construction activities to be undertaken in accordance with the National Dust Control Regulations R. 827 dated 01 November 2013 promulgated in terms of the National Environmental Management: Air Quality Act, 2004.					

Air Quality Noise & Dust	Slight increase in noise/dust during construction.	– Construction hours to be limited to normal working hours. – Should dust pollution become a problem during the construction phase, dust amelioration measures (periodic wetting of exposed surfaces) will have to be put in place. – Vehicles travelling along the access roads must adhere to speed limits to avoid creating excessive dust. – Noisy activities must be restricted to the times given in the Project Specification or General Conditions of Contract.	Comply with any prescribed environmental management standards and practices	Audit report Visual inspection ECO records	Project Engineer/ ECO/ Contractor	Ongoing Monitoring	Induction
Safety and Security	Construction camp	– The site must be secured (fenced) or protected by security personnel in order to reduce criminal activity – Potentially hazardous areas such as trenches are to be demarcated and clearly marked with danger tape. – Material stockpiles or stacks (pipes) must be stable and secured to prevent collapse – Obstruction to drivers' line of site due to stockpiles and stacked materials must be avoided, especially at intersections and sharp corners.	Comply with any prescribed environmental management standards and practices	Audit report Visual inspection ECO records	Project Engineer/ Contractor / ECO	Ongoing	Induction

		– No materials are to be stored in unstable or high-risk areas (steep slopes). – All I&AP's must be notified in advance of any potential risks associated with the construction site and the activities. – Campsites to be fenced where feasible. – Burning at campsite area to be prohibited – Proper mobile toilet facilities to be provided – No firearms to be allowed on camp site areas No hunting or poaching to be allowed at any time				24 hours prior to the activity in question	
Traffic Impact	Mitigate traffic impacts	– A Driver Code of Conduct will be applied instructing and governing safe driving behavior, which will include no use of cell phones whilst driving – All vehicles to not exceed the mandated speed limits – If required, alternative arrangements and routes for abnormal loads will be agreed in advance with the relevant	Comply with any prescribed environmental management standards and practices	Driver Code of Conduct Visual inspection Traffic Management Plan Relevant permits	Contractor/ Engineer	Prior to construction During construction Prior to and throughout construction	Audit Reports and Induction.

		authorities and the appropriate permits will be obtained for the use of public roads					
Social Disturbance Factors	Minimize social disturbance impacts	– Contractors to inform workers on Code of Conduct, aspects addressed include: - respect for local residents/commercial enterprises; - respect for surrounding infrastructure and commercial activities; - zero tolerance of illegal activities by construction workers including: theft; unlicensed prostitution; illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling or fighting; - Compliance with all road regulations; and description of disciplinary measures for infringement of the Code of Conduct and company rules. – Contractor to inform ECO on new appointment of labour, to allow ECO to conduct the necessary environmental inductions. The induction register will be copied to the Contractors, for filing purposes in the Environmental File. – If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the commencement of their contract, they will face disciplinary	Comply with any prescribed environmental management standards and practices	Code of Conduct Disciplinary procedure	Contractor/ Engineer	Prior to construction	Audit Reports and Induction.

		procedures that could result in dismissal. Theft must be noted as a dismissible offence. – Contractors must have a site register available on site, as a means of monitoring access to the site, prohibiting unauthorized access to the site and ensuring that all visitors report to the site office. – Responsibility of site registers must be assigned to one individual, who will be accountable should any incidents occur. – No employment will take place at the entrance to the site. Only formal channels for employment will be used.		Site access procedure			

On-site	Access Routes/ Haul Roads	– Control the movement of all vehicles including that of suppliers so that they remain on designated routes, which are distributed so as not to cause an undue concentration of traffic and that all relevant laws are complied with. – In addition, such vehicles shall be so routed and operated as to minimize disruption to regular users of the routes not on the site. – During construction, arrangements and routes for abnormal loads (if required) must be approved in advance with the relevant authorities and the appropriate permit must be obtained for the use of public roads. – All new access roads must follow the route of least environmental destruction.	Comply with any prescribed environmental management standards and practices	Visual Inspection	The Contractor	Throughout project	Audit Reports and Induction

	Materials Handling, Use and Storage	– Ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the Specifications. – Loads including, but not limited to, sand, stone chips, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials. – All manufactured and/ or imported material shall be stored within the Contractor's temporary staging areas. – All lay down areas outside of the temporary staging areas shall be subject to the Engineer's approval. All building materials must be removed after construction.	Comply with any prescribed environmental management standards and practices	Visual Inspection	The Contractor	Throughout project	Audit Reports and Induction
	Hazardous Waste	– Petroleum, chemicals, and other harmful and hazardous wastes are to be stored in enclosed and bunded areas.	Avoid, modify, remedy, control or stop any action, activity	Visual Inspection Auditing	Contractor & ECO	Throughout project	Audit Reports and Induction

		– The location of these sites is to be approved by the Engineer and the ECO. – These wastes shall be disposed of at a registered hazardous waste disposal site. The Contractor shall submit copies of receipts from such waste disposal sites to the Engineer and ECO as proof of proper disposal. – The storage, handling and disposal of hazardous waste are also controlled through other relevant legislation which must be complied with, e.g. the Occupational Health and Safety Act.	or process which causes pollution or environmental degradation				
	Builders Rubble	– The Contractor shall provide staff to clean up the Contractor's staging areas and working areas of rubble generated in the course of construction work, at least once a week. – Rubble shall be temporarily stockpiled in a waste skip or a central stockpile. Any rubble not being recycled (e.g. sent for crushing) or reused shall be removed from the site to an approved landfill site as soon as it constitutes a practical load for removal and before temporary closure of the site (e.g. over builders holidays). A disposal	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation	Visual inspection Auditing	Contractor	Weekly Construction phase	Audit Reports and Induction

		slip/certificate must be obtained for this. – No plastics, shrink wrap, paint buckets or any other debris that does not constitute clean building rubble, shall be stored at such stockpile sites					
	Eating Areas	– Designate eating areas to the approval of the Engineer, which shall be clearly demarcated. Sufficient bins. Any cooking on site shall be done on well-maintained gas cookers with fire extinguishers present.	Comply with any prescribed environmental management standards and practices	Visual Inspection Auditing	Contractor	Construction phase	Audit Reports and Induction
	Drinking Water	– The Contractor shall ensure that fresh drinking water is available for all staff on the site. Especially close to working areas. If no potable water source is available, then the Contractor shall import drinking water to the site.	Comply with any prescribed environmental management standards and practices	Visual Inspection Complaints Register record Auditing	Contractor	Construction phase	Audit Reports and Induction
	Fire Control	– No fires may be lit on the site. – Any fires which occur shall be reported to the Engineer immediately. – Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make viable the rapid spread of an initial	Comply with any prescribed environmental management standards and practices	Documents of respective person	Contractor & ECO	Construction phase -Upon finding of non-compliance	Audit Reports and Induction

		flame. – In terms of the Atmospheric Pollution Prevention Act, burning is not permitted as a disposal method. The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. – The Contractor shall ensure that there is basic fire-fighting equipment available on site at all times.					
	Safety	– The Contractor shall at all times observe proper and adequate safety precautions on the site. Telephone numbers of emergency services, including the local fire-fighting service, shall be posted conspicuously in the Contractor's office near the telephone. – No unauthorized firearms are permitted on the site. The Occupational Health and Safety Act (No 85 of 1993) and in particular the requirements of the Construction Regulations issued in July 2003, must be complied with.	Comply with any prescribed environmental management standards and practices	Auditing Visual Inspection	Contractor	Prior to construction During construction Prior to and throughout construction	Audit Reports and Induction
	Security	– With the possible exception of any security staff who may be required to be present overnight at the site, no	Comply with any prescribed environmental	Auditing Visual Inspection	Security & Contractor	Construction Phase	Audit Reports and Induction

		personnel will be permitted to live on the site. Security staff must be provided with heating and cooking facilities (in order that they do not need to light fires), and access to toilet facilities and communication equipment.	management standards and practices				
	Community Relations	– The Contractor shall erect and maintain information boards at the site. – Such boards shall include contact details for complaints by members of the public in accordance with details provided by the Engineer. – The Contractor shall keep a "Complaints Register" at the site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself.	Comply with any prescribed environmental management standards and practices	Visual Inspection Auditing	Contractor	Prior to construction During construction Prior to and throughout construction	Audit Reports and Induction
	Working Hours	– Working hours in terms of the planning approval shall be adhered to. – If works are to take place outside of normal working hours, the ECO and the Engineer are to be notified. The Engineer will, where required, in turn notify the Local Authority of work done outside of normal working hours	Comply with any prescribed environmental management standards and practices	Auditing	ECO & Engineer	Construction Phase	Audit Reports and Induction

*(i) avoid, modify, remedy, or stop any action, activity or process which causes pollution or environmental degradation. (ii) Comply with any prescribed environmental management standards or practise.(iii) comply with any applicable provisions of the Act regarding closure and (iv) comply with any provisions of the act regarding financial provisions for rehabilitation.

ENVIRON ASPECTS: IMPACT MGT OBJECTIVE & STATEMENT	IMPACTS & RISK TO BE AVOIDED/ MANGED/ MITIGATED	IMPACT MANAGEMENT OUTCOME	PROPOSED MANAGEMENT ACTIONS*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
OPERATIONAL PHASE Dust and emissions	Prevention of excessive dust generation	– Vehicles and machinery such as generators will be operated as per original manufacturer's specification and undergo regular checks and preventive maintenance systems to ensure efficient fuel combustion. Original emissions control equipment is to be maintained. – No fires will be lit on site, and no toxic materials will be burned. – Audit reports will be produced to ensure regular checks and maintenance is carried out for vehicles and machinery. – Where possible and available, low-sulphur diesel (0.1percent sulphur) will be used for vehicles to minimise	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation	ECO records Audit reports	Client	Throughout operational phase	Induction

ENVIRON ASPECTS: IMPACT MGT OBJECTIVE & STATEMENT	IMPACTS & RISK TO BE AVOIDED/ MANGED/ MITIGATED	IMPACT MANAGEMENT OUTCOME	PROPOSED MANAGEMENT ACTIONS*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		emissions. – Compliance with listed activities and associated Minimum Emission Standards identified in terms of Government Notice 893 dated 22 November 2013.					
Soil Erosion	Erosion control	– Ensure that water abstraction points do not degrade or erode as a result of leaking pipes, spills, muddy conditions or wash aways. Rectify problems as soon as they arise. – Repair identified leaks and address issues of water wastage as soon as these are identified. – Do not allow erosion to develop on a large scale before effecting repairs. When in doubt, seek advice from the	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation	Visual inspection and ECO records	Project Engineer	Operational phase	Audit reports

ENVIRON ASPECTS: IMPACT MGT OBJECTIVE & STATEMENT	IMPACTS & RISK TO BE AVOIDED/ MANGED/ MITIGATED	IMPACT MANAGEMENT OUTCOME	PROPOSED MANAGEMENT ACTIONS*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		Project Engineer.					
Noise	Minimize noise impacts	– Client and its Contractor(s) will ensure equipment and vehicles are regularly maintained in accordance with manufacturers specifications. – Client and its Contractor(s) will consider using acoustic screening if unacceptable noise impacts are predicted to shield receptors.	Comply with any prescribed environmental management standards and practices	Maintenance records Visual inspection and ECO records	Client	Operational Phase	n/a

ENVIRON ASPECTS: IMPACT MGT OBJECTIVE & STATEMENT	IMPACTS & RISK TO BE AVOIDED/ MANGED/ MITIGATED	IMPACT MANAGEMENT OUTCOME	PROPOSED MANAGEMENT ACTIONS*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
Vegetation / Watercourses	Clearance of any construction material	– Clearance and rehabilitate where necessary, re-grass where necessary, to improve environment and avoid remaining/cumulative effects as identified by ECO. – Save removal of ablution facilities, clean up spills or contamination.	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation	ECO	Contractor and ECO	Before closure of site	Audit reports
	Emergency Procedures	– An appropriate and timeous response to emergency situations will ensure that the environmental consequences of such situations are managed and reduced. – Client shall ensure that the fire control system is maintained according to the relevant SANS requirements. – Client shall ensure that all measures to avoid the risk of fire according to Environmental Regulations for Workplaces promulgated by	Comply with any prescribed environmental management standards and practices		Client	Throughout operations	Induction

ENVIRON ASPECTS: IMPACT MGT OBJECTIVE & STATEMENT	IMPACTS & RISK TO BE AVOIDED/ MANGED/ MITIGATED	IMPACT MANAGEMENT OUTCOME	PROPOSED MANAGEMENT ACTIONS*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBILITY	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
		Government Notice No. R2281 of 16 October 1987, as amended, is adhered to. – Firefighting equipment is to be visible – Emergency Procedure to be drawn up by Contractor – Emergency Contact Details – A list of emergency services contact numbers shall be displayed on the site. As a minimum, the following emergency services shall be included on the list: • EDTEA: +27 (0) 21 483 4091 • Fire Department: 10111 • Disaster Management: 107 • Ambulance Services: 10177 • South African Police Services: 10111					

*(i) avoid, modify, remedy, or stop any action, activity or process which causes pollution or environmental degradation. (ii) Comply with any prescribed environmental management standards or practise.(iii) comply with any applicable provisions of the Act regarding closure and (iv) comply with any provisions of the act regarding financial provisions for rehabilitation.

10. ENVIRONMENTAL MANAGEMENT SPECIFICATIONS

Site Specific EMPr

Table 2:

Environmental issues and development constraints were identified using professional judgement, project information, and site inspection, a review of available literature and consultations with authorities and the general Public.

An assessment was undertaken of the bio-physical and socio-economic environment for the proposed area. Collection of baseline information was undertaken in order to establish the sensitivity of the environment to potential project impacts and to determine restrictions the environment may have on the proposed deviation of the route.

Information was also obtained from specialist reports, on site observations, Google-earth images and the 1:500 topographical maps for the area.

Environ aspects: Impact Mgt Objective & statement	Impacts & risks to be avoided/ managed/ mitigated	Impact Management outcome	Proposed Management actions*	PARAMETERS FOR MONITORING and method & program for monitoring	RESPONSIBLE	FREQUENCY & TIMING and by when to be implemented	Env. Awareness plan
DECOMISSIONING PHASE							
	⇒ Increased sediment loads and turbidity in stream due to dismantling activities	- Trenching, 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	Comply with any prescribed environmental management standards and practices	Comply with any prescribed environmental management standards and practices	Project Engineer/ Contractor/ ECO	Demolition phase	induction

		sites, during de-construction. All removed soil and material must not be stockpiled within the wetland/watercourse and associated buffer zone. Stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised and be surrounded by bunds. - Any topsoil that is removed during construction must be appropriately removed and stored according to the national and provincial guidelines. This includes on-going maintenance of such topsoil piles so that they can be utilised during decommissioning					

		phases and re-vegetation - Areas that are denuded need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species					
	- Removal of Vegetation	- If the wetland that the *Sideroxylon inerme* specimens are located cannot be avoided, these trees must be relocated as per directive from the relevant authority. This will require permitting from the relevant authority.	Comply with any prescribed environmental management standards and practices	Comply with any prescribed environmental management standards and practices	Project Engineer/ Contractor/ ECO	Demolition phase	Pre-construction induction

PRE-CONSTRUCTION ACTIVITIES							
Site Establishment	⇒ Planning	– Disturbance and interference with natural assets must be avoided. – Natural features must be taken into consideration during design and retained. – Ensure that materials to be used during construction are legally sourced, and that water or sand is not extracted from streams or rivers; should this be a requirement then the necessary permits and approvals have to be obtained from authorities before construction is to commence. – Fence the entire construction camp site.	Comply with any prescribed environmental management standards and practices	Maintenance records Visual inspection and ECO records	Project Engineer	Site Establishment	Pre-construction induction

Access to site	⇒ Routing/Roads	- To minimise the impact on both surface water flow and interflow, portions of the road must include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability of the sub-layers of the road; - Concrete pipes must be strategically positioned under the road to drain surface water, this will ensure the road prism does not act as a barrier to water flow; - The footprint area of the road must be kept at a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas; - All construction activities and access must make use of the existing dirt road; - Exposed road surfaces awaiting gravel must be stabilised to prevent the erosion of these surfaces. Signs of erosion must be	Comply with any prescribed environmental management standards and practices	Maintenance records Visual inspection and ECO records	Project Engineer/ Contractor	Site Establishment	Pre-construction induction

		addressed immediately to prevent further erosion of the road; - Silt traps and fences must be placed in the preferential flow paths along the road to prevent sedimentation of the watercourse; - Temporary stormwater channels must be filled with aggregate and/or logs (branches included) to dissipate flows; - The contractors used for the project must have spill kits available to ensure that any fuel or oil spills are cleaned up and discarded correctly; and - A suitable stormwater plan must be compiled for the road. This plan must attempt to displace and divert stormwater from the road and discharge the water into adjacent areas without eroding the receiving areas. It is preferable that run-off velocities be					

		reduced with energy dissipators and flows discharged into the local watercourses.					
Soils	Slope management	- Density control testing of placed fill material should be undertaken at regular intervals during fill constructio n. - Where natural ground slopes are steeper than 1 vertical to 6 horizontal (> 9 °), the fill must be benched into the slope, to engineer's	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation	Maintenance records Visual inspection and ECO records Specialist report	Project Engineer/ Contractor/ ECO	During surveys and preliminary investigations	Pre-construction induction

		detail. - Placement of fill layers should be undertaken in layers not exceeding 200mm thick when placed loose and compacted using suitable compaction plant to achieve at least 93% of Modified AASHTO maximum dry density at within 1 – 2 percent (wet / dry) of OMC. Boulders larger than					

		⅔ of the layer thickness must not be included in the fill material. - For fill embankments, terraces should be graded to direct water to drainage channels away from the fill edges, and small earth bunds should be constructed along the crests of fills, to prevent overtopping					

		and erosion of fill embankment slopes. These bunds should be a minimum 450mm wide and 300mm high. - All toes of fill embankments near the rivers will need to be protected against erosion from the rivers.					
Rehabilitation	Relocation or rescue of plant specimens	- If the wetland that the *Sideroxylon inerme* specimens are	Comply with any prescribed environmental management	Maintenance records Visual inspection	Project Engineer/ Contractor/		Pre-construction induction

		located cannot be avoided, these trees must be relocated as per directive from the relevant authority. This will require permitting.	standards and practices	and ECO records	ECO		
CONSTRUCTION PHASE							
Flora and Fauna	Disturbance of Flora and Fauna due to excavations and trenching	- The areas to be developed must be specifically demarcated to prevent movement of workers into sensitive surrounding environments. - Areas that are denuded during construction need to be re-vegetated with indigenous vegetation. This will also reduce the likelihood of encroachment by alien invasive plant species - It should be made an offence for any staff to bring or plant any plant species into any	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation	Maintenance records Visual inspection and ECO records Specialist report	Project Engineer/ Contractor/ECO	Construction Phase	Induction

		portion of the project area, unless undertaken in line with the required/approved rehabilitation. No plant species whether indigenous or exotic should be brought into the project area, to prevent the spread of exotic or invasive species. - Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species; - Areas of indigenous vegetation, even secondary communities, should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste.					

		- Fire management plan must be in place for the areas surrounding the project area and the road to restrict the impact from fire on the natural flora and fauna communities. A fire expert should be consulted for suitable guidelines for the area and project requirements - site plan of the area must be made available onsite for all contractors and personnel indicating parking & storage areas, site offices and placement of ablution facilities - Any topsoil that is removed during construction must be appropriately removed and stored according to the national and provincial guidelines. This includes on-going maintenance of such topsoil piles so that they can be					

		utilised during decommissioning phases and re-vegetation - All removed soil and material must not be stockpiled within the wetland/watercourse and associated buffer zone. Stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised and be surrounded by bunds					
	– Excavations	– The colluvium, fill, alluvium, residual tillite and very soft to soft tillite rock are anticipated to classify as "Soft" excavation in terms of SANS 1200, down to the depths investigated i.e. in the range 1.3m to 4.55m below EGL.	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation	Audit report Visual inspection ECO records Specialist report	Contractor/ECO / Project Engineer	During construction phase.	Induction

		Such material can normally be excavated by plant similar to a Track mounted excavator. – Beneath the depth range given above, "Intermediate" to "Hard" material excavation categories are inferred to apply. – Nonetheless, limited "Intermediate" and "Boulder" excavations to the depths investigated cannot be discounted and it is recommended that a contingency amount be allowed for "Intermediate"					

		and "Boulder – Class B" excavations at shallower depths due to likely geological variations. Old foundation and builder's rubble may obstruct excavations. Importantly, slow excavation rates due to the groundwater flows should be anticipated – Cut slopes in soils should be formed to batters not exceeding 1 vertical to 2 horizontal (≤ 26°) and to a height not greater than 3m where stabilizing solutions are not					

		provided. – Cut slopes in competent weathered rock, where encountered, should be no steeper than 1v to 0.75h (≤ 53°) and to a height not greater than 3.0m where retaining walls are not provided. Where joints or bedding planes are exposed during excavation it is recommended that a geotechnical specialist is appointed to assess their effects on the stability of the cutting and the					

		global stability of the slope. – Where excavations intersect or approach the water table, the sidewalls will tend to become unstable and need to be drained and laterally supported or battered back at slopes of the order of 1v in 5h.					
Stormwater	– Management of stormwater	- Remove only vegetation essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. - Ensure that measures are in place to control	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation	Audit report Visual inspection ECO records Stormwater report	Contractor/ECO / Project Engineer	During construction phase.	Induction

		the flow of excess water so that it does not impact on surface vegetation. - The accumulation of water on the surface must be prevented. - The drainage of the surface must be done in such a way that storm water will be led away quickly and efficiently without any erosion taking place. - Runoff from road must be managed to avoid erosion and pollution problems both on and off site. - Prevention of waste water from directly entering the watercourse. Installation of waste traps is recommended to catch the litter conveyed by					

		surface runoff. – Where construction activities take place within flood lines of water courses temporary berms must be formed to ensure that the construction site and disturbed soils are protected from floods, storm flows and erosion.					
OPERATIONAL PHASE							
General	- General aspects	– Temporary roads must be closed and access across these blocked. – All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Project Engineer. – A meeting is to be held on site between the Engineer and	Comply with any prescribed environmental management standards and practices	Maintenance records Visual inspection and ECO records	Contractor/ECO / Project Engineer	Project Completion	Audit reports

		Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer. – The applicant must ensure that contamination of ground and surface water is prevented during the project. – Activities from the proposed development must not impact on any water bodies occurring around the site. – The developer must ensure that facilities used as means to temporary sewage disposal are properly maintained and the necessary withdrawals are made to prevent overflows of sewage into the immediate environment. – The developer and all contractors must ensure that no construction material foreign to the site,					

		including construction debris, is left unattended to after construction activities have ceased. – Damage to all roads in close proximity to the proposed site caused by construction vehicle must be repaired by the developer. – All construction activities including labour provisions must comply with the prescribed provisions of the Occupational Health and Safety Act, (Act No. 85 of 1993). – A signed copy of services agreement for bulk infrastructure must be obtained from relevant authority and be submitted to this Department for record purposes. – A complaints register must be complied and kept on site at all times. – The construction camps and equipment yards must be correctly					

		located to avoid areas susceptible to soil and water contamination. The construction camp must be identified with the assistance of the ECO and it must be located in an already disturbed area. – No cleaning of vehicles must take place on site.					
Surface Water	Water leaks	- Ensure that breakage points in storm water pipe do not degrade or erode as a result of leaking pipes, spills, muddy conditions or wash aways. Rectify problems as soon as they arise . - Repair identified leaks as soon as these are identified. - Do not allow erosion to develop on a large scale before effecting repairs. When in doubt, seek advice from the Project Engineer.	Comply with any prescribed environmental management standards and practices	Maintenance records Visual inspection and ECO records Specialist report	Contractor/ECO / Project Engineer	Operational phase.	Audit reports

	stormwater	– Effective and sustainable stormwater designs must be incorporated into the road design to prevent excessive runoff into the surrounding natural environment and thereby, causing erosion. – Routine surveys of the bridge infrastructure by qualified engineers to ensure that structural integrity is monitored. – Routine maintenance to bridge infrastructure. – Routine cleaning of the bridge road reserve and control of vegetation on site. Keeping of all storm water management infrastructure (bridge, pipe culverts and drains) clear of blockages.					

*(i) avoid, modify, remedy, or stop any action, activity or process which causes pollution or environmental degradation. (ii) Comply with any prescribed environmental management standards or practise. (iii) comply with any applicable provisions of the Act regarding closure and (iv) comply with any provisions of the act regarding financial provisions for rehabilitation.

11. APPLICABLE LEGISLATION

The regulations promulgated in terms of the National Environmental Management Act 107 of 1998, require that the planning and development of facilities be conducted within the framework of the Integrated Environmental Management (IEM) Environmental Guidelines promulgated under the said Act. It is therefore essential to accommodate this set of requirements into the critical path of development applications in an efficient manner to detect whether or not the proposed development will result in significant environmental impacts and to suggest ways of mitigating these impacts. The National Environmental Management Act 107 of 1998 encourages that land development practices and processes be socially, economically and environmentally sustainable.

Legislative Framework

Obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation (i.e. the Environmental Authorization in terms of the National Environmental Management Act No.107 of 1998, as amended) and in accordance with any other requirements specified by the DEADP.

The requirements of this EMPr do not release the Developer from the requirements of any other legislation that may be applicable to the Project such as those listed below.

National:

• National Environmental Management Act (Act No. 107 of 1998), as amended;

• NEMA EIA Regulations 2010, (Government Notice No R543, R544, R545 and R546 of June 2010);

• National Environmental Management Waste Act (Act No. 59 of 2008);

• National Environment Management: Air Quality Act (Act No. 39 of 2004);

• National Water Act (Act No. 36 of 1998);

• National Environmental Management: Biodiversity Act (Act No. 10 of 2004);

• National Heritage Resources Act (Act No. 25 of 1999);

• Hazardous Substances Act (Act No. 15 of 1973);

• Major Hazardous Installations Regulations (GNR 96 of 998 and GNR 692 of 2001); and

• Occupational Health and Safety (Act No. 85 of 1993).

• Integrated Coastal Management Bill (2008)

Provincial:

• Department of Environmental Affairs & Development Planning (DEA&DP) NEMA EIA Regulations Guideline and Information Document Series, 2010.

11.1 National Environmental Management Act (NEMA) No 107 of 1998

The National Environmental Management Act (NEMA) reinforces the constitutional imperative to protect, promote and fulfil the environmental right in the Bill of Rights. Section 24(1) of the act states that any proposed activity which requires authorisation or permission by law and which may significantly affect the environment must be considered, investigated and assessed before implementation. In addition section 24(7) (f) calls for "the investigation and formulation of arrangements for the monitoring and management of impacts, and the assessment of the effectiveness of such arrangements after their

implementation." This in effect refers to management plans for construction and operational phases of the project. Of the NEMA principles, the following are of particular relevance to these guidelines:

- Development must be socially, environmentally and economically sustainable.
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated.
- Disturbance of ecosystems and loss of biological diversity are avoided, or where they cannot be altogether avoided, are minimized and remedied.
- Disturbance of landscapes and sites that constitute the nations cultural heritage is avoided or where they cannot be altogether avoided, is minimized and remedied.
- That negative impacts on the environment and on peoples environmental rights be anticipated and prevented and where they cannot be altogether avoided, is minimized and remedied.
- The participation of all interested and affected parties must be promoted.
- Decisions must be taken in an open and transparent manner, and access to information must be discharged in the national interest.

The proposed development entails listed activities as defined by NEMA and the amended Environmental Impact Assessment Regulations of 2006. Listed activities require environmental authorization, and in this case the Department of Economic Development, Tourism and Environmental Affairs is the decision-making authority.

11.2 Conservation of Agricultural Resources Act No 43 of 1983

The aim of this act is to provide for the conservation of the natural agricultural resources of South Africa"…by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of water sources, and by the protection of the vegetation and the combating of weeds and invader plants.

11.3 National Water Act No 36 of 1998

The purpose of this act is"…to ensure that the nation's water resources are protected used developed, conserved, managed and controlled." The act sets out the principles for regulating water use, which includes pollution of watercourses and abstraction of water from a natural water resource.

11.4 Development Facilitation Act

The Development Facilitation Act, 1995 (Act 67 of 1995) contains provisions and general principles relating to land development and Land Development Objectives (LDOs). Provision is made in the Act for granting statutory status to such principles and policies in both the national and provincial spheres of government.

11.5 National Heritage Resources Act No 25 of 1999

The National Heritage Resources Act established the South African Heritage Resources Agency (SAHRA) in 1999. SAHRA undertaking is to protect heritage resources of national significance.

11.6 National Spatial Biodiversity Assessment, 2004

The National Spatial Biodiversity Assessment (NSBA), conducted by the South African

National Biodiversity Institute (SANBI) is a comprehensive spatial assessment of biodiversity throughout the country. The NSBA classifies areas that require protection based on its biophysical characteristics, which are ranked according to priority levels. The key focus areas of the study include four main components; terrestrial, freshwater, estuarine and marine environments.

12. CONCLUSION

In order to mitigate impacts on the environment to a level of low significance, it is vital that all mitigatory recommendations made within this EMPR are adhered to. Key recommendations are summarised as follows:

1. All management recommendations made in this report as well as Table 1 and 2 must be strictly adhered to.
2. This EMPR addresses the issues of solid waste management; materials management; re-vegetation; erosion; surface water, hazardous waste and pollution control.

This project could potentially result in negative impacts on the receiving environment. These significant negative impacts have been identified and assessed. These impacts can be effectively mitigated thus reducing the risk to the environment. This can be achieved by effective implementation of the necessary mitigation measures as stipulated in the EMPR.

13. REFERENCES

- Camp, K.G. (1997). The Bioresource Groups of KwaZulu Natal.
- Vegetation and Wetland Baseline & Risk Assessment for the proposed Gumede Bridge Upgrade Project Umdoni, KwaZulu-Natal ,The Biodiversity Company
- *Report to Vuba Imagineers on the Results of a GeotechnicalInvestigation for the Proposed Gumede Bridge Located in Ward 16 within the Umdoni Municipality, KwaZulu-Natal,* GEOSURE (PTY) LTD
- Design Report, Vuba Imagineers CC
- Stormwater management Report, Vuba Imagineers CC

14. ANNEXURE A – LAYOUT PLAN (as per fBAR)