Final Environmental Management Programme for the Ntatshana Road

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Prepared for uMzumbe Local Municipality

Royal HaskoningDHV
Enhancing Society Together

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Glossary of Terms

ACCIDENT: A road vehicle accident.

BUILDING AND DEMOLITION WASTE: Building and demolition waste means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition.

CONTRACTOR: Companies appointed on behalf of the Client to undertake activities, as well as their sub-contractors and suppliers.

DEGRADATION: The lowering of the quality of the environment through human activities e.g. river degradation, soil degradation.

DOMESTIC WASTE: Domestic waste means waste, excluding hazardous waste, that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes.

EMERGENCY: An undesired event that results in a significant environmental impact and requires the notification of the relevant statutory body such as a local or provincial authority.

ENVIRONMENT: In terms of the National Environmental Management Act (NEMA) (No 107 of 1998)(as amended), "Environment" means the surroundings within which humans exist and that are made up of:

i. the land, water and atmosphere of the earth;
ii. micro-organisms, plants and animal life;
iii. any part or combination of (i) of (ii) and the interrelationships among and between them; and
iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

ENVIRONMENTAL CONTROL OFFICER: An individual nominated through the Client to be present on site to act on behalf of the Client in matters concerning the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities.

ENVIRONMENTAL IMPACT: A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.

ENVIRONMENTAL MANAGEMENT PROGRAMME: A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of the project.

GENERAL WASTE: General waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes -

i. domestic waste;
ii. building and demolition waste;
iii. business waste; and
iv. inert waste.

GENERAL WASTE LANDFILL SITE: A waste disposal site that is designed, managed and permitted to allow for the disposal of general waste.

GROUNDWATER: All subsurface water that fills voids between highly permeable ground strata comprised of sand, gravel, broken rocks, porous rocks, etc. and move under the influence of gravitation.

HAZARDOUS WASTE: Hazardous waste means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

HAZARDOUS WASTE LANDFILL SITE: A waste disposal site that is designed, managed and permitted to allow for the disposal of hazardous waste.

IMPACT: A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

INCIDENT: An undesired event which may result in a significant environmental impact but can be managed through internal response.

METHOD STATEMENT: A method statement is a written submission by the Contractor to the Engineer in response to the specification 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 a Method Statement. It contains sufficient detail to enable the Engineer to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

MITIGATION: Measures designed to avoid, reduce or remedy adverse impacts.

POLLUTION: The National Environmental Management Act, No. 107 of 1998 defined pollution to mean any change in the environment caused by – substances; radioactive or other waves; or noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

RECOVERY: The controlled extraction of a material or the retrieval of energy from waste to produce a product.

RE-USE: To utilise articles from the waste stream again for a similar or a different purpose without changing the form of properties of the articles.

RECYCLE: A process where waste is reclaimed for further use, this involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material.

REHABILITATION: Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (wherever possible) which it was before disruption.

SAFETY, HEALTH AND ENVIRONMENTAL OFFICER: The SHE officer is a Contractor representative, responsible for the safety, health and environmental aspects on the active areas of construction within the site. The SHE officer will be responsible for the day-to-day monitoring of the EMP and Health and Safety Plan.

SOFT: Refers to soft engineering principles which promotes the use of ecological methods for erosion control along watercourses and in rverine habitats, thereby using vegetation to control erosion.

WASTE: Waste means any substance, whether or not that substance can be reduced, re-used, recycled and recovered -

i. that is surplus, unwanted, rejected, discarded, abandoned or disposed of;
ii. which the generator has no further use of for the purposes of production;
iii. that must be treated or disposed of; or
iv. that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but—
v. a by-product is not considered waste; and
vi. any portion of waste, once re-used, recycled and recovered, ceases to be waste.

WASTE DISPOSAL FACILITY: Waste disposal facility means any site or premise used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premises.

WATER POLLUTION: The National Water Act, 36 of 1998 defined water pollution to be the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it – less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful (aa) to

the welfare, health or safety of human beings; (bb) to any aquatic or non-aquatic organisms; (cc) to the resource quality; or (dd) to property".

WORKFORCE: The entire project team including people employed by the Developer or the Contractor, persons involved in activities related to the project, or person present at or visiting the construction area, including permanent contactors and casual labour.

Acronyms

DAEA	Department of Agriculture, Environmental Affairs (Now EDTEA)
DAFF	Department of Agriculture, Fisheries & Forestry
DDT	dichlorodiphenyltrichloroethane
DWA	Department of Water Affairs (Now DWS)
DWS	Department of Water and Sanitation
DMR	Department of Mineral Resources
EA	Environmental Authorisation
ECO	Environmental Control Officer
EDTEA	Department of Economic Development, Tourism and Environmental Affairs
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EMS	Environmental Management System
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act (No 107 of 1998)(as amended)
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
ROW	Right-of-way
SABS	South Africa Bureau of Standards
SANS	South African National Standard
SCP	Stormwater Control Plan
SDC	Safe Disposal Certificate
SOP	Standard Operating Procedure
SHE	Safety, Health & Environment
SMP	Stormwater Management Plan
TBA	To Be Announced

1 INTRODUCTION

1.1 Project Background

Royal HaskoningDHV were appointed by the Umzumbe Local Municipality via PGA Consulting to act as an independent Environmental Assessment Practitioner (EAP) for the environmental authorisation application for the proposed Ntatshana Road on behalf of Umzumbe Municipality.

Note: that this version of the Enviromental Management Programme (EMPr) has been amended following comments received from the public, stakeholders and commenting authorities on the draft version of the EMPr. Where changes or additions are made, these are presented in white text highlighted in teal.

The Umzumbe Local Municipality propose to develop the Ntatshana Road. The proposed road is located in Mtwalume in Ugu District Municipality, KwaZulu-Natal. The proposed road will be 2.2 km in length and 5 m in width. The proposed road alignment will cross over a river and a bridge is proposed for this crossing. There is no current access road between the D1050 and the D20 to the east. Figure 1 below depicts the locality of the two route alignments proposed. Alternative route alignment 1 (red) is the preferred alignment.

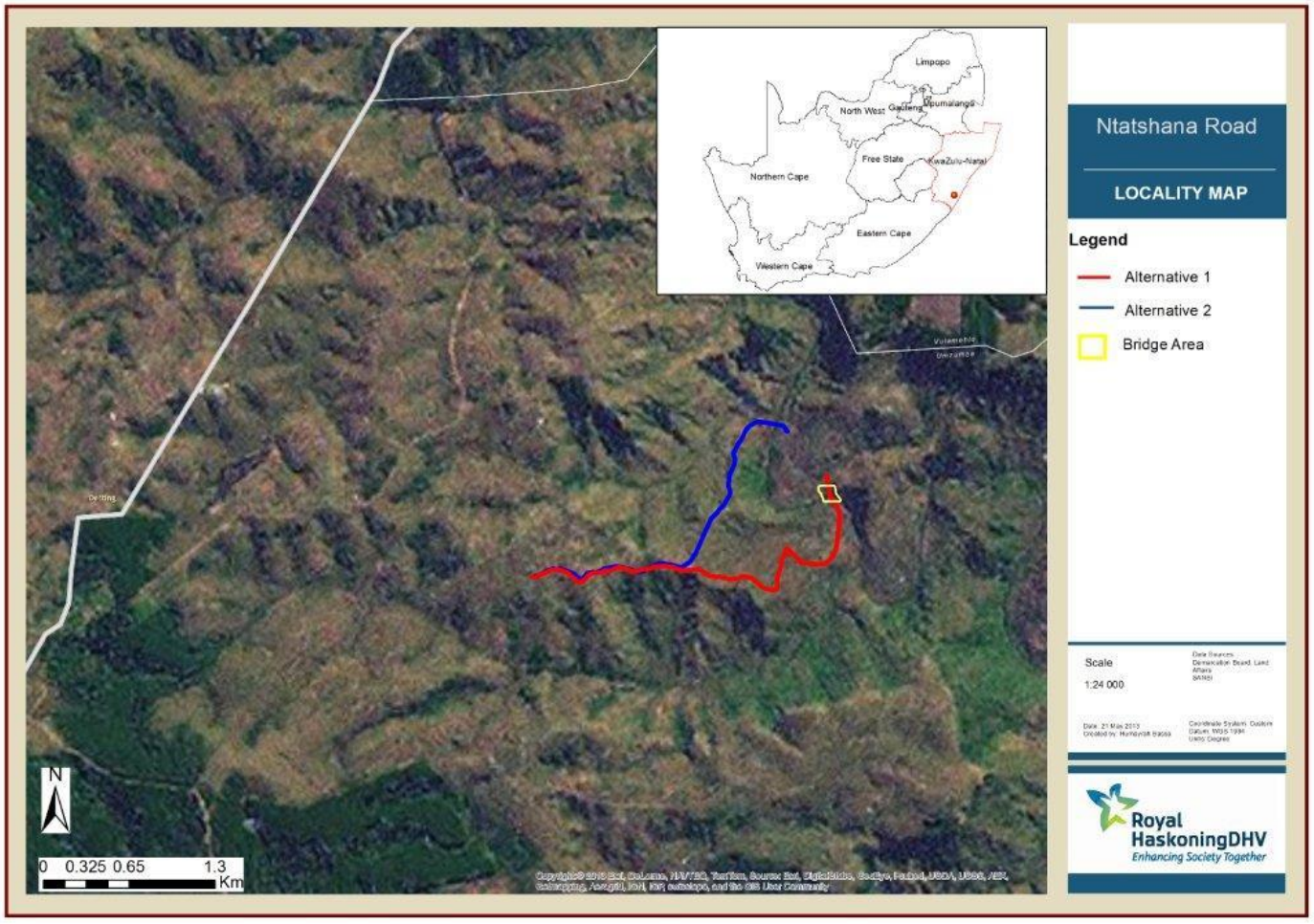

FIGURE 1: LOCALITY MAP OF THE SITE

1.1.1 Sensitive Environments

FAUNA

Three red listed frog species are known from the 3030 BB Quarter Degree Grid Cell (QDGC) in which the Ntatshana Road is situated in. These included the Critically Endangered Pickersgill's Reed Frog (*Hyperolius pickersgilli*); the Endangered Natal Kloof Frog (*Natalobatrachus bonebergi*) and the near-threatened Natal Leaf-Folding Frog (*Afrixalus spinifrons*). However, none of these amphibians were recorded during the field investigations. A search and rescue will be done prior to any construction activities to ensure these are not impacted on.

FLORA

There are existing *Aristida junciformis* hillslopes which the proposed road will traverse. No rare or threatened plants are recorded within this transformed vegetation unit or are likely to occur within the hillslopes immediately adjacent to the proposed road alignment.

Situated along the lower-lying drainage lines are remnant patches of indigenous riparian vegetation although large sections have become degraded due to extensive wood harvesting activities as well as medium-high infestations of alien invasive vegetation.

No threatened plants are recorded within the moist hillslope seepage wetlands as well as seasonally inundated foot-slope seepage wetlands.

Furthermore, situated along the macro-channel banks of the river are patches of seasonally inundated hygrophilous sedge and grass dominated seepage wetlands.

The majority of hillslope *Aristida junciformis* grassland has been historically transformed around the proposed Ntatshana access road. Several terraced agricultural fields as well as old livestock enclosures occur on the lower slopes. The proposed new access road bisects a remnant patch of scattered low-lying rocky extrusions/ outcrops adjacent to an incised non-perennial drainage line. The grasslands have been extensively utilised for livestock grazing activities as well as old terraced agricultural lands.

The current alignment of the preferred route (red route in Figure 1) (30°21'17.49" S 30°21'11.73" E) will result in the removal of two large Umdoni or Waterberries (*Syzigium cordatum*) which occur along a narrow, poorly defined non-perennial drainage line. The road alignment must be re-aligned approximately 10 m to the west in order to conserve these two trees, see Figure 2, else, a permit must be applied for from the Department of Forestry and Fisheries, if the tree is classified as a protected species.

FIGURE 2: UMDONI TREES CURRENTLY ALONG THE PROPOSED ROUTE ALIGNMENT

WETLANDS

Figure 3 depicts the route alignments overlayed on the existing hillslope and footslope wetlands.

The proposed Ntashana road bisects temporary inundated or moist *Aristida junciformis* hillslope seepage wetlands adjacent to the southern non-perennial drainage line. The Ntatshana road bisects a narrow poorly defined non-perennial drainage line as well as degraded footslope seepage wetlands. These areas have been heavily impacted on by surrounding anthropogenic activities including sand harvesting, ploughing of soils for small scale terraced agricultural lands as well as extensive rill erosion from livestock pathways and alien vegetation invasion.

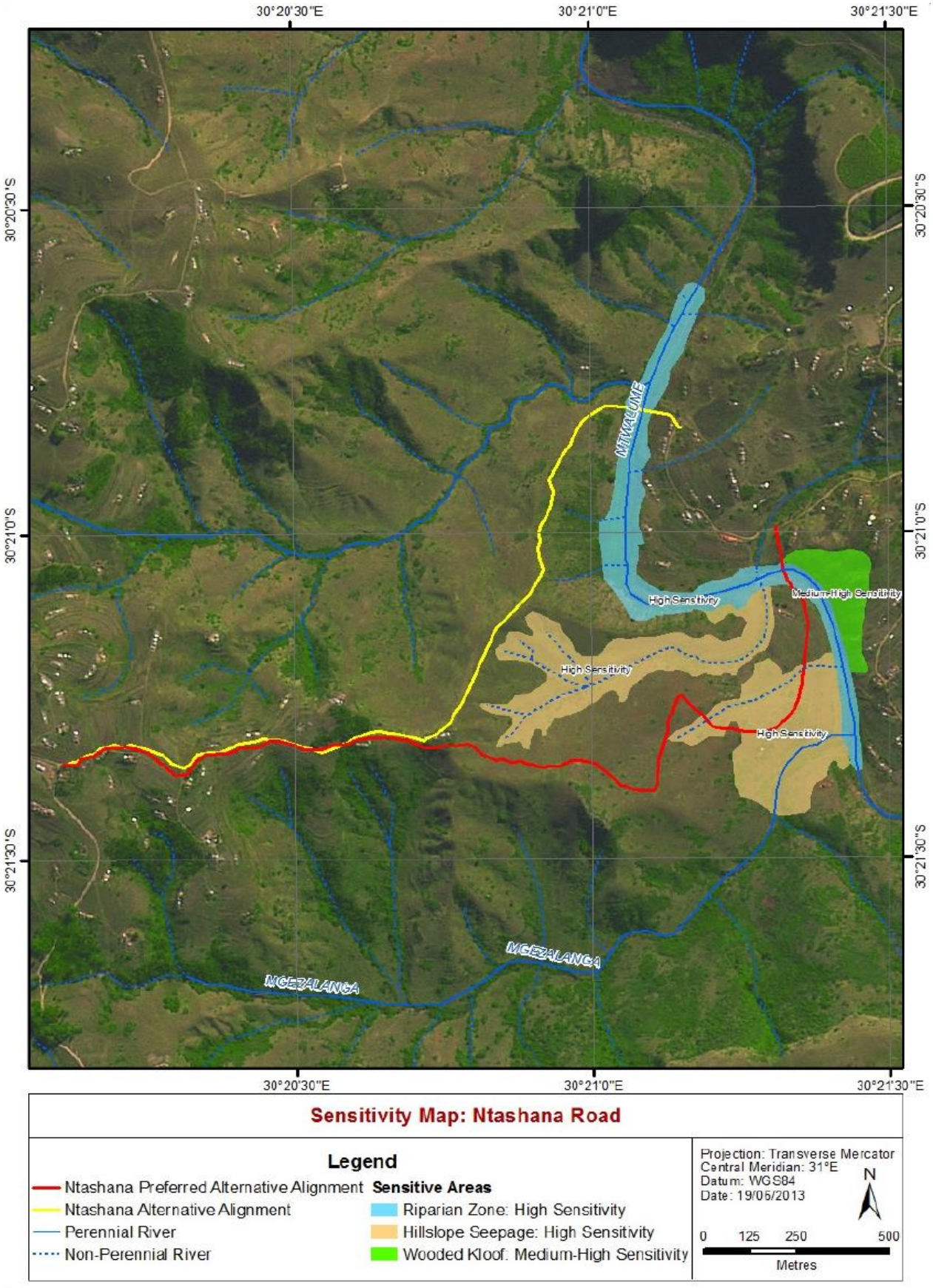

FIGURE 3: NTATSHANA ROAD PREMILINARY SENSITIVITY MAP

THE MTWALUME RIVER AND DRAINAGE LINES

The perennial Mtwalume River and adjacent drainage lines/streams are considered to be of conservation importance.

The riparian zone, of which vegetation is a major component, has a number of important functions including:

- enhancing water quality in the river by the interception and breakdown of pollutants; interception and deposition of nutrients and sediments;
- stabilisation of riverbanks and macro-channel floor;
- flood attenuation;
- provision of habitat and migration routes for fauna and flora;
- provision of fuels, building materials and medicines for communities (if done on a sustainable basis); and
- recreational areas (fishing - rod and line not shade or gill nets; bird watching; picnic areas etc.).

Three drainage lines ranging from small perennial streams to non-perennial or seasonal drainage lines occur adjacent to the proposed preferred alignment (red route in Figure 1). However, uncontrolled livestock grazing, trampling and compaction of hydric soils along the drainage lines has resulted in severe gully erosion and invasion of alien invasive vegetation.

FIGURE 4: THE PROPOSED NTASHANA ROAD BISECTS A POORLY DEFINED NARROW NONPERENNIAL DRAINAGE LINE (RED LINE INDICATES PROPOSED CROSSING)

1.2 Purpose of the Environmental Management Programme

In terms of The Constitution of the Republic of South Africa (1996) everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for benefit of present and future generations, through reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The needs of the environment as well as affected parties should thus be integrated into overall project management.

The Environmental Management Programme (EMPr) ensures that construction activities meet the requirements of existing environmental legislation and good environmental practice in terms of international norms and practice. This is achieved by identifying those construction activities for the proposed development that may have a negative impact on the environment; outlining the mitigation measures that will need to be taken and the steps necessary for their implementation and describing the reporting system to be undertaken during construction.

1.3 Objectives of the Environmental Management Programme

The EMPr has the following objectives:

- To ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international.
- To outline functions and responsibilities of responsible persons.
- To state standards and guidelines, which are required to be achieved in terms of relevant environmental legislation.
- To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the proposed project.
- To identify measures that could optimize beneficial impacts.
- To prevent long-term or permanent environmental degradation.
- To establish a method of monitoring and auditing environmental management practices during all phases of development.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.
- Specify time periods within which the measures contemplated in the draft EMPr must be implemented, where appropriate.
- To provide an environmental awareness plan.
- Provide rational and practical environmental conditions / requirements to:
    - Minimise disturbance of the natural environment;
    - Ensure water resource protection;
    - Prevent or minimise all forms of pollution;
    - Protect indigenous flora and fauna;
    - Prevent soil erosion and facilitate the re-vegetation of affected areas;
    - Maintenance of newly re-vegetated areas;
    - Restrict noise disturbance and nuisance;
    - Ensure compliance with all applicable laws, regulations, standards and guidelines for the protection of the environment (specifically the coastal and marine environment);

- Adopt the best practical means available to prevent or minimise adverse environmental impacts;
- Develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of waste; and
- Train the Developer, its employees and contractors with regard to their environmental obligations.

The EMPr is essentially, a written plan of how the environment is to be managed in practical and achievable terms. An independent Environmental Control Officer (ECO) must be appointed (by the developer: Umzumbe Local Municipality) to ensure compliance with the EMPr. The EMPr will be considered an extension of the Conditions of Approval as set forth by the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (KZN EDTEA) and the Department of Water and Sanitation (DWS). Non-compliance with the EMPr will constitute non-compliance with said Conditions.

1.4 Scope of the Environmental Management Programme

In accordance with the requirements of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations, 2010, and the requirements of the KZN EDTEA, this EMPr is to be implemented by the Developer as well as any employee, contractor, agent or sub-contractor appointed to act on behalf of the Developer in the execution of the project, in order to ensure environmental compliance on site.

The specifications outlined in this EMPr are thus applicable to all activities undertaken by the Developer as well as appointed contractors and all persons involved in the execution of the works including sub-contractors, the workforce, suppliers and volunteers for the duration of construction, operation and future maintenance.

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

The effectiveness of the EMPr is limited by the level of adherence to the conditions set forth in the EMPr by the Developer, the Contractor and Sub-contractors. It is further assumed that compliance with the EMPr will be monitored and audited as set out in this EMPr and contractual clauses.

1.5 Structure of the Environmental Management Programme

The EMPr provides proposed mitigation and management measures for the following phases of the project (refer to Table 1).

TABLE 1: DIFFERENT PHASES OF THE PROJECT LIFE CYCLE

PHASE	DESCRIPTION
Pre-Construction	This section will provide guidelines on pre-construction activities including site establishment and clearance; environmental induction and training and awareness and site access
Construction	This section will provide requirements on construction methods and considerations.
Rehabilitation	This section of the EMPr provides management principles for the rehabilitation phase post construction of the Ntatshana Road. This will include

PHASE	DESCRIPTION
	best practice, procedures and responsibilities as required for various associated activities.

1.6 The EMPr as a "live" document

The approach adopted for this EMPr is derived from the Deming Cycle (Figure 5), a cycle of continuous improvement that entails the reiterative actions of plan, do, check, act, and critically to then return to the planning phase.

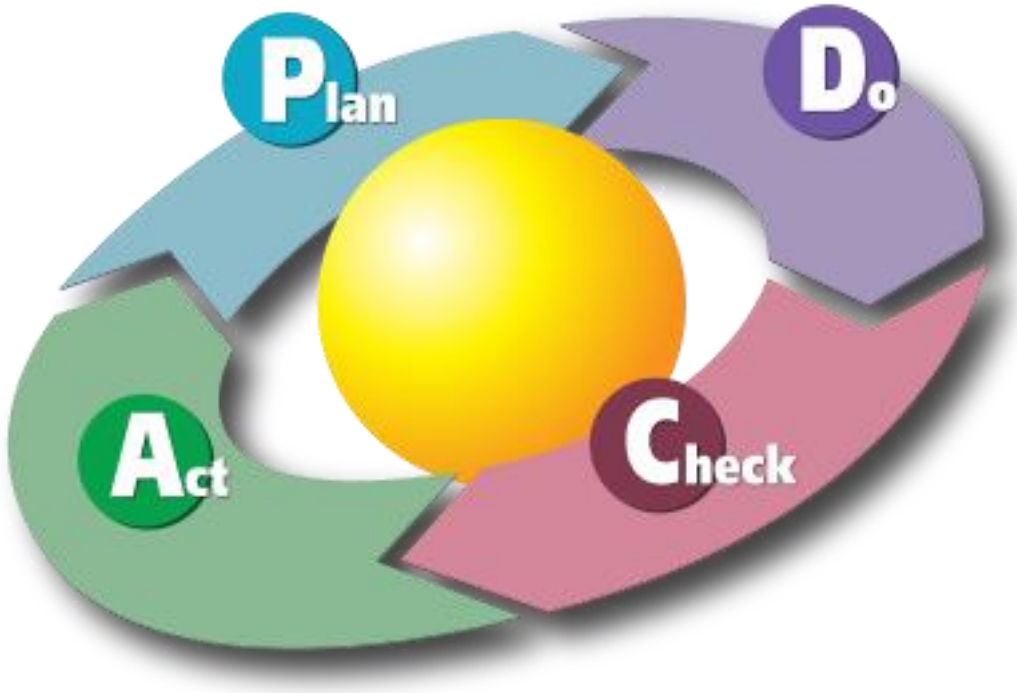

FIGURE 5: DEMING CYCLE OF CONTINUING IMPROVEMENT

1.6.1 Plan

Project-specific planning for the proposed project involves consideration of the legal triggers, the specifics of the proposed development, and the nature of the receiving environment. This provides a starting point for targeted environmental management objectives. Environmental performance indicators are then determined with measurable targets prescribed to monitor the environmental performance of the project. Achieving the targets depends on compliance with this EMPr and the legislative requirements that underpin it.

1.6.2 Do

Throughout the development's life-span, the developer will be required to develop and maintain a Quality Management System – designed to ensure that best management practices are implemented in day-to-day management. Such a QMS should at least include the following information:

- Location and extent of associated infrastructure;
- Associated activities, such as the transportation of people and equipment;

- Resources and experience required (staffing);
- Materials and equipment to be used;
- Management actions;
- Human resources used;
- Construction-monitoring activities;
- Emergency / disaster incident and reaction procedures; and
- Rehabilitation procedures for the impacted environment.

These topics will be cross-linked into the contracts related to the development of the project.

1.6.3 Check

A system of assessing monitoring results has been developed to check the environmental management performance. Continuous assessment facilitates proactive management of the environmental issues. Mitigation measures can then be successfully implemented on an ongoing basis to keep environmental indicators within their target thresholds. Moreover, the assessment system also enables the assessment of the efficacy of the EMPr. Regular auditing of environmental performance is prescribed to prove and preserve accountability.

1.6.4 Act

The assessments and monitoring of the results and findings of the regular audits must be documented within a reporting system. Precautionary mitigation measures and corrective actions will be prescribed and instructions will be given in order to implement these in the field. The findings of monitoring and auditing programmes can also be used to update the EMPr. Although the EMPr is a project-specific document, it is dynamic and should be updated regularly to address the changing circumstances of the scheme.

It must be noted that this EMPr is a dynamic document that should be continually updated, as and when required. Any amendments made must be submitted to the KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZN EDTEA) monitoring, compliance and enforcement sub-directorate for approval prior to implementation.

1.7 Applicable Documentation

The following environmental documentation is applicable for the project, and must be read in conjunction with this EMPr:

- Basic Assessment Report for the Proposed Ntatshana Road;
- Environmental Authorisation for the Ntatshana Road – *when issued*;
- Water Use Licence for the Ntatshana Road – *when issued*;
- Any DAFF Licences for the removal/ relocation of protected trees – *when issued*;
- Any Ezemvelo KZN Wildlife Permits for the removal/ relocation of indigenous plants; and the
- Stormwater Management Plan for the Ntatshana Road.

1.8 Details of the Project Developer

The Developer is the Umzumbe Local Municipality and the details of the responsible person are listed below.

TABLE 2: DETAILS OF THE PROJECT DEVELOPER

Developer	The Umzumbe Local Municipality
Contact Person	Bonginkosi Mzila
Address	Kwa Hlongwa Community Hall
Telephone	039 972 0005
Fax	039 972 0099
E-mail	bonginkosi@umzumbe.gov.za

1.9 Details of the Environmental Assessment Practitioner

Royal HaskoningDHV have been appointed by the Umzumbe Local Municipality via PGA Consulting as the Independent Environmental Assessment Practitioner (EAP) to develop the EMPr. The team responsible for the basic assessment and development of this EMPr on this project has been identified below:

TABLE 3: DETAILS OF THE PROJECT TEAM

NAME	ORGANISATION	QUALIFICATION	TELEPHONE	EMAIL
Humayrah Bassa *Pr.Sci.Nat*	Royal HaskoningDHV	MSc Environmental Science	031 719 5500	humayrah.bassa@rhdhv.com
Sharleen Moodley *Pr.Sci.Nat*	Royal HaskoningDHV	MSc Environmental Science	031 719 5500	Novashni.moodley@rhdhv.com

2 LEGAL FRAMEWORK[1]

Construction will be according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the contractor as to his / her duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The contractor should note that obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter will prevail.

It is expected that the contractor is conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract. Some of the environmental legislation applicable to the construction and operation of the Ntatshana Road include, but are not limited to, the following environmental legislation:

LEGISLATION	SECTIONS	RELATES TO
The Constitution (No 108 of 1996)	Chapter 2	Bill of Rights.
	Section 24	Environmental rights.
National Environmental Management Act (No 107 of 1998 [as amended])	Section 2	Defines the strategic environmental management goals and objectives of the government. Applies through-out the Republic to the actions of all organs of state that may significantly affect the environment.
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	The developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
	GN 543 – Sections 28, 31, 32, 33, 54	Content of scoping reports (Section 28), Environmental Impact Assessment reports (Section 31), specialist report and reports on specialised processes (Section 32), content of draft environmental management programmes (Section 33) and the public participation process (Section 54).
EIA Regulations (2010)	GN 544 – Listing Notice 1	Activities requiring a Basic Assessment study to be undertaken.
	GN 545 – Listing Notice 2	Activities requiring a Scoping and Impact Assessment study to be undertaken.
	GN 546 – Listing Notice 3	Activities in special geographical areas requiring a Basic Assessment study to be undertaken.
EIA Regulations (2014)	GNR 983– Listing Notice 1	Activities requiring a Basic Assessment study to be undertaken.
	GNR 984– Listing Notice 2	Activities requiring a Scoping and Impact Assessment study to be undertaken.
	GNR 985– Listing	Activities in special geographical areas requiring a Basic

[1] It is important to note that legislation is continually updated. It must therefore be ensured that the most recent and relevant legislation is adhered to.

LEGISLATION	SECTIONS	RELATES TO
	Notice 3	Assessment study to be undertaken.
National Environmental Management: Waste Act (No 59 of 2008)		Provides for specific waste management measures and the remediation of contaminated land.
Environment Conservation Act (No 73 of 1989) and regulations	Sections 19 and 19A	Prevention of littering by employees and sub-contractors during construction and the maintenance phases of the proposed project.
National Heritage Resources Act (No 25 of 1999) and regulations	Section 34	No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.
	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.
	Section 36	No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
	Section 38	This section provides for Heritage Impact Assessments (HIAs), which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The Heritage Impact Assessment (HIA) will be approved by the authorising body of the provincial directorate of environmental affairs, which is required to take the provincial heritage resources authorities' comments into account prior to making a decision on the HIA.
National Environmental Management: Air Quality Act (No 39 of 2004)	Section 32	Control of dust.
	Section 34	Control of noise.
	Section 35	Control of offensive odours.
Occupational Health and Safety Act (No 85 of 1993)	Section 8	General duties of employers to their employees.
	Section 9	General duties of employers and self employed persons to persons other than their employees.
National Water Act (No 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution.
	Section 20	Control of emergency incidents.
	Section 21 (a), (c)	Abstraction of water

LEGISLATION	SECTIONS	RELATES TO
	and (i)	Impeding or diverting the flow of water in a watercourse and Altering the bed, banks, course or characteristics of a watercourse
Minerals and Petroleum Resources Development Act (No 28 of 2002)	Section 22	Application for a mining right.
	Section 39	Environmental management programme and environmental management plan.
National Environmental Management Biodiversity Act (Act No. 10 of 2004)		Provide for the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.
National Forests Act (No 84 of 1998) and Regulations	Section 7	No person may cut, disturb, damage or destroy any indigenous, living tree in a natural forest, except in terms of a licence issued under section 7(4) or section 23; or an exemption from the provisions of this subsection published by the Minister in the Gazette.
	Sections 12-16	These sections deal with protected trees, with the Minister having the power to declare a particular tree, a group of trees, a particular woodland, or trees belonging to a certain species, to be a protected tree, group of trees, woodland or species. In terms of section 15, no person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire of dispose of any protected tree, except under a licence granted by the Minister.
Hazardous Substances Act (No 15 of 1973) and regulations		Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
National Road Traffic Act (No 93 of 1996)		Road safety.
SANS 10103 (Noise Regulations)		The measurement and rating of environmental noise with respect to annoyance and to speech communication.
KZN Nature Conservation Ordinance (15 of 1974)		Sensitive species are protected under this Ordinance and must be considered.

3 MANAGEMENT AND MONITORING PROCEDURES

3.1 Organisational Structure and Responsibilities

Figure 6 below gives an indication of the organisational and team structure for the project.

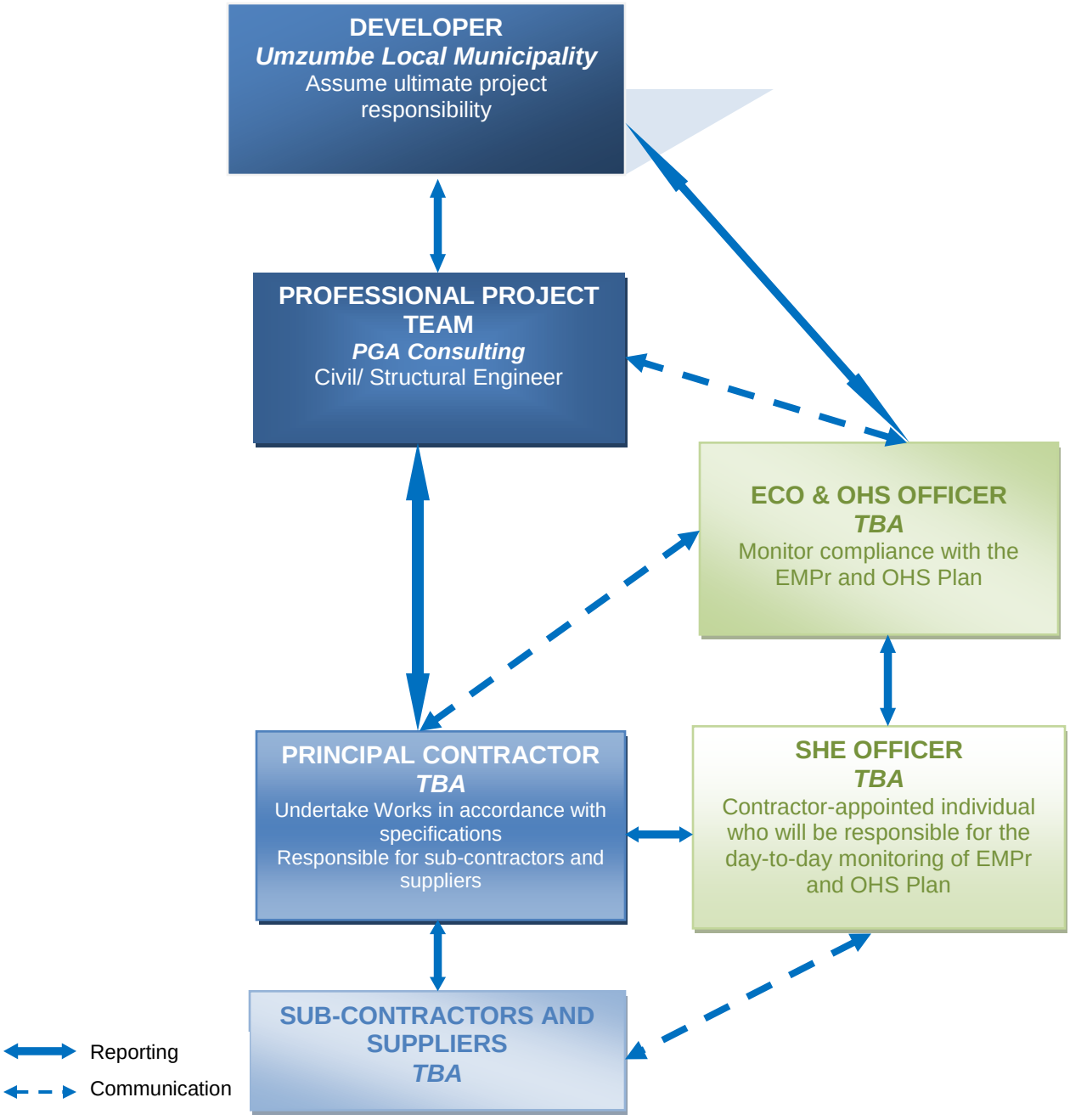

FIGURE 6: PROJECT ORGANISATIONAL STRUCTURE

DEVELOPER

The Developer is ultimately responsible for ensuring compliance with the environmental specification and upholding 100% compliance with all National, Provincial and local legislation that relates to management of this environment.

The Developer will:

- Arrange information meetings for or consults with I&AP's about the impending construction activities;
- May on the recommendation of the Engineer and / or Environmental Officer order the Contractor to suspend any or all works on site if the Contractor or his Sub-Contractor / Supplier fails to comply with the said specifications; and
- Maintain a register of complaints and queries by members of the public at the site office.

ENGINEER

The Engineer will:

- Enforce the environmental specification on site;
- Monitor compliance with the requirements of the specification;
- Assess the Contractor's environmental performance in consultation with the Environmental Officer from which a brief monthly statement of environmental performance is drawn up for record purposes and to be reported on at project meetings; and
- Ensure the documentation, in conjunction with the Contractor, the state of the site prior to construction activities commencing. This documentation will be in the form of photographs or video record.

PRINCIPAL CONTRACTOR (INCLUDING SUB-CONTRACTORS)

The Contractor is required to:

- Be fully conversant with the EMPr and all conditions of the EA, WUL, etc.;
- Provide information on previous environmental management experience and company environmental policy in terms of the relevant forms contained in the Contract Document.
- Supply method statements timeously for all activities requiring special attention as specified and / or requested by the Developer, Environmental Control Officer and/or Engineer during the duration of the Contract.
- Be conversant with the requirements of this environmental specification/ EMPr. Brief all his/ her staff about the requirements of the environmental specification;
- Comply with requirements of the Environmental Officer in terms of this specification and the project specification, as applicable, within the time period specified.
- Ensure any Sub-Contractors/Suppliers who are utilised within the context of the contract comply with the environmental requirements of the project, in terms of the specifications. The Contractor will be held responsible for non-compliance on their behalf.
- Bear the cost of any delays, with no extension of time granted, should he or his Sub-Contractors / Suppliers contravene the said specifications such that the Engineer orders a suspension of work. The suspension will be enforced until such time as the offending party(ies), procedure, or equipment is corrected.
- Bear the costs of any damages / compensation resulting from non-adherence to the said specifications or written site instructions.
- Comply with all applicable legislation.
- Ensure that he informs the Engineer timeously of any foreseeable activities which will require input from the Environmental Officer.

The Contractor will conduct all activities in a manner that minimizes disturbance to the natural environment as well as directly affected residents and the public in general.

ENVIRONMENTAL CONTROL OFFICER

The ECO will:

- Be fully conversant with the EMPr;
- Be familiar with the recommendations and mitigation measures of the associated EMPr for the project;
- Monitor the implementation of the EMPr during the construction and rehabilitation phases;
- Ensure site protection measures are implemented on site;
- Monitor that the Principal Contractor, sub-contractors, construction teams and the Developer are in compliance with the EMPr at all times during the construction and rehabilitation phases of the project;
- Monitor all site activities monthly for compliance.
- Conduct monthly (or according to the conditions contained within the EA) audits of the site according to the EMPr, and report findings to the Developer/Contractor;
- Attend monthly site meetings;
- Recommend corrective action for any environmental non-compliance at the site;
- Compile a monthly report highlighting any non-compliance issues as well as progress and compliance with the EMPr prescriptions. These monthly reports are to be submitted to the Developer and the KZN EDTEA; and
- Conduct once-off training with the Contractor on the EMPr and general environmental awareness.

It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance. Ensuring compliance is the responsibility of the Developer and the Contractor'sSHE Officer.

OCCUPATIONAL HEALTH AND SAFETY OFFICER

The OHS Officer will be responsible for undertaking of the following:

- Compilation of a comprehensive project health and safety risk assessment (HSRA)
- Compilation of health and safety specifications based on risks identified;
- Reviewing and approval of health and safety plan(s) submitted by appointed Principal Contractor(s);
- Conducting monthly health and safety inspections and compiling monthly OHS reports;
- Conducting monthly health and safety audits with audit reports;
- Assisting the Developer/Contractor in the investigation of major accident/incidents;
- Monitoring of site activities for compliance to the Occupational Health and Safety Act and Regulations;
- Establishment and monitoring of project health and safety file;
- Monitoring the Principal Contractor(s') health and safety performance; and
- Preparation of project close-out reports and submission of project health and safety files to the Client.

CONTRACTOR'S SAFETY, HEALTH AND ENVIRONMENTAL (SHE) OFFICER

The Safety, Health and Environmental Officer will:

- Be fully conversant with the EMPr;
- Required to be conversant with the above-mentioned H&S requirements as per the OHS Act and approved project documentation compiled by the OHS Officer
- Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them;
- Compilation of Method Statements together with the Principal Contractor that will specify how potential environmental impacts in line with the requirements of the EMPr will be managed, and, where relevant environmental best practice and how they will practically ensure that the objectives of the EMPr are achieved;
- Convey the contents of this EMPr to the construction site staff and discuss the contents in detail with the Contractor;
- Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMPr;
- Take appropriate action if the specifications contained in the EMPr are not followed;
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible;

CONTRACTOR'S SAFETY, HEALTH AND ENVIRONMENTAL (SHE) OFFICER

- Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EMPr;
- Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the EMPr;
- Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting;
- Ensuring that the list of transgressions issued by the ECO is available on request; and
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement / complaints.
  - Health and safety incidents.
  - Incidents involving hazardous materials stored on site.
  - Non-compliance incidents.

3.2 Training and Environmental Awareness

It is important to ensure that the Contractor has the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm. Training needs must be identified based on the available and existing capacity of site personnel (including the Contractors and Sub-contractors) to undertake the required EMPr management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The environmental training is aimed at:

- promoting environmental awareness;
- informing the Contractor of all environmental procedures, policies and programmes applicable;
- providing generic training on the implementation of environmental management specifications; and
- providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment.

Training will be done in a verbal format. The training will be a once-off event. In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This ensures that environmental accidents are minimised and environmental compliance maximized.

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3.3 Monitoring

A monitoring programme will be in place not only to ensure compliance with the EMPr through the contract/work instruction specifications, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required.

A monitoring programme will be implemented for the duration of the construction phase of the project. This programme will include:

- Monthly audits (or according to the specification of the EA) will be conducted by the ECO for the duration of the construction phase. The ECO shall undertake environmental monitoring on a monthly basis and the audits will consider compliance with the EMPr and licence conditions.
- External auditing may take place at unspecified times by the authorities and/or other relevant authorities.
- The ECO must compile a monthly audit report with a rating of the compliance with the EMPr. The ECO must keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage must be recorded in full to ensure the responsible party is held liable. The Contractor must be held liable for all unnecessary damage to the environment.

3.4 Reporting Procedures

3.4.1 Documentation

The following documentation must be kept on site in order to record compliance with the EMPr:

- An Environmental File which includes:
  - Copy of the EMPr;
  - Copy of the Environmental Authorisation;
  - Copy of the Water Use Licence;
  - Copy of all other licences/permits;
  - Copy of all rehabilitation plans;
  - Copy of the Stormwater Management Plan;
  - Copy of relevant legislation;
  - Environmental Policy of the Main Contractor;
  - Environmental Method statements compiled by the Contractor;
  - Non-conformance Reports;
  - Environmental register, which shall include:
    - Communications Register – including records of Complaints, and, minutes and attendance registers of all environmental meetings.
    - Monitoring Results – including environmental monitoring reports, register of audits, non-conformance reports.
    - Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record.
    - Waste manifests.
- Waste Documentation such as Sewerage Disposal Receipts;
- Material Safety Data Sheets for all hazardous substances;
- Dust suppression register;
- Water Quality Monitoring reports (if necessary);
- Written Corrective Action Instructions; and
- Notification of Emergencies and Incidents.

3.4.2 Environmental Register

The Developer will put in place an Environmental Register. The contractor will ensure that the following information is recorded for all complaints/incidents:

- Nature of complaint/incident.

- Causes of complaint/incident.
- Party/parties responsible for causing complaint/incident.
- Immediate actions undertaken to stop/reduce/contain the causes of the complaint/incident.
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint/incident.
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions.
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented.
- Copies of all correspondence received regarding complaints/incidents.

The above records will form an integral part of the Contractors' Records. These records will be kept with the EMPr, and will be made available for scrutiny if so requested by the Developer.

3.4.3 Non-Conformance Report

A Non-Conformance Report (NCR) will be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued by the ECO to the Contractor in writing. Preceding the issuing of an NCR, the Contractor must be given an opportunity to rectify the issue.

Should the ECO assess an incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR. The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects.
- Nature of the risk.
- Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and should take the hierarchy of controls into account.
- Agreed timeframe by which the actions documented in the NCR must be carried out.
- ECO should verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and Contractor should sign the Close-Out portion of the Non-Conformance Form and file it with the contract documentation.

In terms of raising issues, allowing for correction and then elevating the issue when it remains uncorrected, or alternatively if repeat non-compliances arise, consider the following:

1. Non-conformance is raised (NC); Contractor given a reasonably practicable period of time to correct
2. For issues remaining uncorrected thereafter, or for repeat non-compliances, the NC then gets elevated to a Non-Conformance Report (NCR)

NCR's may become Contractual and often have a bearing on tendering

3.4.4 Environmental Emergency Response

The Contractor's environmental emergency procedures must ensure appropriate responses to unexpected / accidental actions / incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e. into the watercourse) and land;
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

The Environmental Emergency Response Plan is separate to the Health and Safety Plan as it is aimed at responding specifically to environmental incidents and must ensure and include the following:

- Construction employees shall be adequately trained in terms of incidents and emergency situations;
- Details of the organisation (i.e. manpower) and responsibilities, accountability and liability of personnel;
- A list of key personnel and contact numbers;
- Details of emergency services (e.g. the fire department / on-site fire detail, spill clean-up services) shall be listed;
- Internal and external communication plans, including prescribed reporting procedures;
- Actions to be taken in the event of different types of emergencies;
- Incident recording, progress reporting and remediation measures to be implemented; and
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

The Contractor and their sub-contractor(s) must comply with the environmental emergency preparedness and incident and accident-reporting requirements as per the relevant legal requirements.

3.4.5 Method Statements

It is a statutory requirement to ensure the wellbeing of employees and the environment. To allow the mitigation measures in this document to be implemented, task-specific method statements should be developed for each set of tasks.

A Method Statement details how and when a process will be carried out, detailing possible dangers/risks, and the methods of control required.

- Type of construction activity;
- Timing and location of the activity;
- Construction procedures;
- Materials and equipment to be used;
- Transportation of the equipment to / from site;
- How equipment/material will be moved while on site;
- Location and extent of construction site office and storage areas;
- Identification of impacts that might result from the construction activity;
- Methodology and/or specifications for impact prevention / containment;
- Methodology for environmental monitoring;
- Emergency/disaster incident and reaction procedures (required to be demonstrated); and
- Rehabilitation procedures and continued maintenance of the impacted environment.

The Contractor will be accountable for all actions taken in non-compliance of the approved Method Statements. The Contractor shall keep all the Method Statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation.

As a minimum the following Method Statements will be required to be generated:

- Bunding;
- Construction site and office/yard establishment;
- Cement mixing / concrete batching / bentonite mixing;
- Contaminated water;
- Dust;
- Environmental awareness training of all staff involved on the project including: office management, site supervision and labourers etc;
- Environmental monitoring;
- Erosion control;
- Fire, hazardous and/or poisonous substances;
- Fuels and fuel spills (may form part of the item above);
- Storage, handling and decanting of diesel (may form part of the item above);
- Personnel, public and animal safety;
- Rehabilitation of modified environment(s);
- Solid and liquid waste management;
- Sources of materials (including MSDSs);
- Top-soil management;
- Stormwater Management; and
- Wash areas.

3.4.6 Public Communication and Liaison with I&APs

The Developer must ensure that the adjacent landowners are informed and updated throughout the construction phases. This has come through as a specific requirement during the public participation of the Basic Assessment. Notification must be given to the communities affected via councillors and *Inkosis* three weeks prior to contractors going to site.

Sufficient signage should be erected around the site (including at the entrance), informing the public of the construction activities taking place. The signboards should include the following information:

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

4 COMPLIANCE WITH THE ENVIRONMENTAL SPECIFICATION

The EMPr forms part of the Contract Documentation and is thus a legally binding document. It is also necessary for the Contractor to make provisions as part of their budgets for the implementation of the EMPr. In terms of NEMA an individual responsible for environmental damage must pay costs both to the environment and human health and the preventative measures to reduce or prevent additional pollution and/or environmental damage from occurring. This is referred to as the *Polluter Pays Principle*. Section 28 of the NEMA embodies the polluter pays principle.

The Contractor is deemed not to have complied with the Environmental Specification / EMPr if:

- There is evidence of contravention of clauses within the boundaries of the road;
- Environmental damage ensues due to negligence;
- The Contractor ignores or fails to comply with corrective or other instructions issued by the Developer, ECO or Engineer within a specified time; and
- The Contractor fails to respond adequately to complaints from the public.

Application of a penalty clause will apply for incidents of non-compliance. The contractor will be allowed one offense and a written warning will be issued by the Environmental Officer. Failure to rectify the offense within one (1) working week of the issue of the warning or a repeat offence will result in a fine. This fine will be issued by the Environmental Officer. The penalty imposed will be per incident. Unless stated otherwise in the project specification, the penalties imposed per incident or violation will be:

TABLE 4: FINE SYSTEM TO BE IMPLEMENTED

OFFENCE	AMOUNT
Failure to demarcate working areas	R 10 000
Working outside of the demarcated areas	R 30 000
Failure to strip topsoil with intact vegetation	R 50 000
Failure to stockpile topsoil correctly	R 30 000
Failure to stockpile materials in designated areas	R 10 000
Failure to take measures to control dust dispersion on site	R 10 000
Washing of vehicles on site	R 10 000
Pollution of water bodies and/or groundwater	R 20 000
Failure to implement stormwater management provisions during construction	R 20 000
Failure to control stormwater runoff	R 30 000
Downstream erosion	R 30 000
Failure to provide adequate sanitation	R 10 000
Failure to erect temporary fences around trenches	R 10 000
Failure to provide adequate waste disposal facilities and services	R 50 000
Failure to reinstate disturbed areas within the specified time-frame	R 30 000
Removal of protected flora species without a permit to do so	Specified by DAFF
Any other contravention of the project specific specification	R 10 000

Such fines will be paid by the Contractor to the Developer and will be used in rehabilitation and/ or landscaping.

The Developer is responsible for the implementation of the EMPr and for compliance monitoring of the EMPr. The EMPr will be made binding on all contractors (including sub-contractors) operating on the site and will be included with the Contract. Non-Compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

5 DETAILED ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMPr specifies the minimum requirements to be implemented by the Developer as per the scope of works and scope of the environmental authorisation, in order to minimise and manage the potential environmental impacts and ensure sound environmental management practices. It also provides the framework for environmental monitoring throughout the construction and operational phases.

The provisions of this EMPr are binding on the Developer during the life of the project. The EMPr must be binding to Umzumbe Local Municipality or any authority to which responsibility for the construction activities has been delegated to, until such time that the EDTEA or applicable environmental authority has formally absolved the Developer from its responsibilities in terms of this EMPr.

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

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

ENVIRONMENTAL MEASURES, ACTIONS AND CONTROLS

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

RESPONSIBILITY

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

MONITORING FREQUENCY

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

PRE-CONSTRUCTION PHASE

5.1 Authorisations, Permits and Licences and other General Considerations

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
All necessary authorisations, permits and licences must be obtained by the Developer prior to the commencement of construction. Particular reference in this regard is made to borrow pits. It is noted that the bulk of gravel wearing coarse material will be obtained from the local borrow pit for which Drennan Maude holds the permit. It is thereby required that there must be compliance with that existing EMP and that the developer notifies the DMR of this. There cannot be two permit holders however, permission must be obtained from the DMR and Drennan Maude.	Developer	Once-off
The community must be informed prior to construction commencing.	Developer / Contractor	Once-off
The Department of Transport must be consulted to discuss connection to the P612 provincial road.	Developer	Once-off

5.2 Appointment of Contractor

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
The Developer must ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project. The Contractor must make adequate provision in their budgets for the implementation of the EMPr.	Developer	Once-off
The Principal Contractor (including sub-contractors and suppliers) must comply with the relevant provisions of the EMPr, applicable environmental legislation, by-laws and associated regulations promulgated in terms of these laws.		
Tender documents must include statements to include the use of local communities or local community organisation in supplying services and labour to the construction activities.		
Local labourers must be used for such methods.		

5.3 Preparation of Method Statements

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Method Statements must be submitted by the Contractor to the ECO and SHE Officer and must be adhered to by the Contractor and Project Engineer. These relate to water and stormwater management requirements, traffic requirements, solid waste management requirements, fuel storage and filling and dispensing of fuel (diesel and petrol), hydrocarbon spills, contaminated water treatment, the storage of hazardous materials, standard emergency procedures, and biohazard control.	Contractor	Once-off
The ECO will monitor the implementation of the Statements. All copies of the statements and plans must be submitted to the appointed ECO.		
A qualified ecologist must mark vegetation such as indigenous trees which are to be conserved or relocated prior to the Contractor commencing with clearing on site.		

5.4 Appointment of ECO

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
An Independent ECO must be appointed, at the developers cost, to monitor the implementation of the EMPr.	Developer	Once-off
The nomination of the ECO must be given, in writing, at least fourteen days before the start of any work, clearly setting out reasons for the nomination, and with sufficient detail to enable the developer to make a decision. The developer will, within seven days of receiving the request, approve, reject or call for more information on the nomination.		
Once a nominated representative of the developer has been approved he/she will be the ECO and must undertake site inspections as per EA for the duration of appointment and provide monthly audit reports for the duration of the construction and rehabilitation phases. Each audit report must contain the results of the full audit. These audit results report must be agreed upon between developer, ECO and competent authority in terms of content and structure.	ECO	Once-off/Monthly or as specified in the EA

5.5 Environmental Training and Awareness

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Construction staff must be adequately educated by the ECO, and the SHE Officer, as to the provisions included in the EMPr and general environmentally friendly practice.	ECO SHE Officer	Once-off
The EA and EMPr forms part of the formal site induction for all contractors, sub-contractors and casual labourers, preferably in their native language. The induction training will, as a minimum, include the following: ▪ the importance of conformance with all environmental policies; ▪ the environmental impacts, actual or potential, of their work activities; ▪ the environmental benefits of improved personal performance; ▪ their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Consultant's environmental management systems, including emergency preparedness and response requirements; and ▪ the mitigation measures required to be implemented when carrying out their work activities.		
All contractors, sub-contractors and casual labourers must acknowledge their understanding of the EMPr and environmental responsibilities by signing an induction attendance record.		
The Contractor is expected to have "tool box" talks. These talks must be in accordance with the risks and trends associated with the project. Proof of these talks must be kept on site.	SHE Officer	Weekly

5.6 Ecological Planning for the receiving environment

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
If the road alignment does not follow existing tracks and pathways within the wooded gorges as well as stream a suitably qualified botanist/ecologist must closely examine the proposed road alignment through these sensitive areas as well as provide site specific environmental management measures for potential impacts.	Developer	Once-off
Prior to construction and vegetation clearance a suitably qualified		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
ecologist/zoologist should closely examine the proposed construction areas (road alignment) for the presence of any animal burrows (including spiders and scorpions), rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitat away from the road.		
Prior to construction and vegetation clearance a suitably qualified ecologist/botanist should conduct a final walk down of the entire alignment and adopt a rescue and recovery programmes for any remaining geophytes, Aloes etc. These can be planted in suitable habitat away from the proposed road alignment.		

5.7 Planning and Design of Road

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
A preconstruction photographic survey of the entire works area; "before photographs"; must be undertaken, this ensures all environmental impacts are monitored and corrective and/or preventative actions are successful in mitigating against environmental degradation.	Design Engineer	Once-off
Ensure the planning undertaken by engineers appointed takes cognisance of the responsibility to preserve the natural environment.		
Adequate stormwater management must be planned for.		

CONSTRUCTION PHASE

5.8 Geological Stability and Earthworks

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
'Soft' excavation along the preferred route is expected to depths in excess of 2.0 m with normal earthmoving equipment in terms of SABS 1200. Boulder excavation class will apply in areas marked as tallus boulder zones and alluvial	Engineer	Ongoing

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
boulder zones (areas on site underlain with alluvial boulders).	Contractor	
All site disturbances must be limited to the areas where structures will be constructed.		
Numerous erosion gullies were encountered along the proposed preferred route and significant portion is located in areas of talus, appropriate strormwater control is essential both during and after construction.		
The tallus could be used for general fill and subgrade purposes, however, care must be taken in avoiding using the more clay rich tallus. The alluvium material classified as G5 is thus suitable for sub-base material. It is stipulated that the residual granite not be used as a general fill and moved to spoil. However, the weathered granite sampled from the borrow pit classifies as G5 to G6 and is suitable for use as sub-base.		
Cuts: Cutting is considered feasible provided the banks are trimmed to a satisfactory batter. It is stipulated that for construction, the following batters be adopted: Colluvial soils 1:2 (26°) and weathered bedrock 1:1.75 (may be increased subject to inspection).		
Fills: Prior to the placing of the fill, the area must be stripped of all vegetation. Thereafter the fills must be placed in layers not exceeding 300 mm loose and compacted to 95% Mod AASHTO density for sandy materials. Rock fragments greater than two thirds of the layer thickness i.e. boulders (>200mm), must be removed to spoil. Where fill embankments are to be constructed on relatively steep slopes, it is recommended that the fill is benched into competent weathered bedrock to promote compaction and increased stability. Benches must be a maximum of 3m wide to allow for appropriate roller compaction. It is rrequired that all fills be battered back at a maximum slope angle of 26° (1:2) provided that the fill material is well compacted in layers. Fill embankments must be suitably top-soiled and vegetated to limit the risk of erosion of the subsoils.		
Lateral support: Where large cuts are to be made exposing weathered granite, an assessment of the stability thereof may be required. Lateral support measures in these instances		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
may include bolted meshing with or without guniting, however must be assessed on a site to site basis. Rock fall control may also be required in the tallus zone.		
Site drainage: Control of both surface and potential subsoil seepage is essential on this site to protect the proposed road layer works against th ingress of water. Where the road cut intercepts seepage, subsoil drainage may be required. Control of surface drainage must be by means of the installation of surface drains on the cut portion of the proposed road. A drainage pioneer layer prior to placing earthworks also aids in this regard.		
Bridge founding: Founding for the proposed bridge across the Mtwalume River must be taken into the hard granite bedrock underlying the site. If the degree of uncertainty is unacceptable to the bridge engineer then a drilling investigation must be conducted to determine the depth to bedrock on the southern flank. The acceptable is drill rock 1.5 m deep. All pier and abutment bases must be doweled at least 1.5 m into the underlying bedrock to prevent up-lift during periods of flooding. The positions of the dowels must be agreed with the Geotechnical Engineering. Construction must be undertaken during the winter motnhs to minimize the effects of seepage. Excavations for the pier must be air cleaned of all loose material along the top of the hard granite and blinding layers must be cast prior to shuttering of the bridge bases.		

5.9 Health and Safety

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
The Contractor must adhere to the prescriptions of the relevant health and safety legislation and standards. The Contractor must familiarise himself and his employees with the contents of the aforementioned legislation.	Contractor SHE Officer	Ongoing
First Aid contents must be on hand at all times.		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
The Contractor must implement adequate and mandatory safety precautions relating to all aspects of the construction. Such safety measures and work procedures/instructions must be communicated to construction workers.		
The wearing of Personal Protective Equipment (PPE) on site is mandatory for all personnel and construction team members. Minimum requirements must include the wearing of an approved safety helmet, safety boots, safety eyewear, safety reflective jackets and dust masks, ear plugs, etc where appropriate.		
PPE signs must be erected on site at the areas where it is required and the integrity and availability of the signs must be maintained.		
No one must be allowed on site unless they are wearing approved safety equipment.		
Casual visitors must be required to sign a register at the security checkpoint and undergo a site induction by the SHE Officer. The responsible person must then be contacted before the visitor is allowed access to site. No unauthorised visitors are to be allowed on site.		
Workers' right to refuse work in unsafe conditions must be respected.		
All personnel must be trained in basic site safety procedures.		
The Contractor must design, test/exercise appropriate emergency preparedness programmes (plans, schedules, procedures and methods) for addressing environmental accidents, incidents and events such as spills of fuel, oil or lubricants; fires etc.		
The Client and/or client's agent will carry out regular audits on the principal contractor at least once per month. Similarly, principal contractors must be responsible for carrying out regular audits on their contractors at least once per month. The results must be tabled for action and discussed at the Health and Safety Committee meetings or the site meetings, as appropriate.		
The principal contractor must provide evidence by means of a procedure or chart that he is fully aware of the "hierarchy" of incidents that can occur e.g. unsafe situations, near misses, first aid box injuries, medical cases, disabling injuries etc. He must keep an incident register of all such incidents, investigate and apply corrective action where required. The client also reserves the right to stop any unsafe work and request incident statistics from the principal contractor.		

5.10 Site Management

5.10.1 Site Establishment

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Prior to the establishment of the site camp / office, the Contractor will produce a site layout plan showing the positions of all equipment storage, waste stockpiling, fuel storage areas and other infrastructure for approval of the ECO and SHE Officer.	Contractor	Once-off
The construction area must be clearly demarcated on the layout plan, and all other areas must be considered no-go areas for the construction personnel.		
Adequate signage must be placed in the area where construction will take place informing the public of the activities taking place.		
The site must be secured and fenced. Open excavations shall be secured through the use of danger tape as a minimum. Lay-down and plant parking areas shall be secured with either fencing, or a security guard, or an appropriate combination thereof. Watercourse crossings and related workings shall not be left unsecured at any time – the level of securing shall be determined by the site engineer in consultation with the ECO.		
The Contractor must take responsibility for the site to conform to all contractual aspects and environmental standards applicable.		
The Contractor must provide adequate refuse bins that must be cleaned / emptied and the waste removed from site on a regular basis.		
The construction camp must be kept in an orderly state at all times.		
Vegetation removed for the site establishment is to be kept to a minimum. No trees are to be removed, if possible, with the exception of alien weeds and invader plants.		
The construction camp is to be located a minimum horizontal distance of 100 m from any watercourse, above the 1:100 year flood line and away from the wetland habitats on site.		
The Contractor must ensure that drainage on the camp site is such to prevent standing water and/or sheet erosion from taking place.		

5.10.2 Ablution/ Sanitation

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
A minimum of one chemical toilet must be provided per 10 persons.	Contractor	Daily
An Safe Disposal Certificate (SDC) is to be obtained and kept on site.		
The chemical toilets must be strategically placed (easily accessible to workers, preferably no more than a 100 m from the work face) and will not be situated within any watercourse.		
Chemical toilets must be secure, clean and functional throughout the maintenance period.		
All ablution activities must take place in these facilities, and the waste material must be stored and disposed of at the registered waste disposal site or collected by a suitable waste contractor on a regular basis.		
The Contractor must ensure that toilets are cleaned or emptied regularly and that no spillage occurs during routine maintenance.		
All temporary/portable toilets must be secured to the ground to prevent them from toppling due to wind or any other cause.		
Unauthorised dumping / spilling of waste from toilets into the environment and burying of waste are strictly prohibited.		
The use of temporary chemical toilets during the construction phase of the development must not cause pollution to water resources as well as pose a health hazard. The contents of these toilets must be emptied and safely disposed of. In addition, these toilets must be situated out of the 1:100 year floodline of a watercourse or outside 100 m from the watercourse, whichever is greater.		
Project's of this nature may result in the generation of small volumes of water containing waste being generated during the construction phase. In this instance, the following is applicable: a) Water containing waste must not be discharged into the natural environment. b) b) Measures to contain water containing waste and safely dispose of it must be implemented.		

5.10.3 Access

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
The active areas of construction must have strict access control to reduce the risks associated with vehicular transportation and pedestrian access on the site.	Contractor	On-going
Watercourses and steep gradients must be avoided as much as possible.		
No vehicles must drive onto the wetland or other sensitive sites and no-go areas.		
All no-go areas must be indicated as such with warning signs in all relevant languages. Tool Box Talks, public meetings and training could be considered as alternatives to creating awareness for those who are illiterate.		
Adequate drainage and erosion protection in the form of cut-off berms or trenches must be provided around the sites and where necessary.		

5.10.4 Fires

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
No open fires or uncontrolled fires will be permitted on site.	Contractor	Daily
No collection of fire wood shall be permitted		
Fire fighting measures such as fire extinguishers must be located on site.		
The workforce must be made aware of fire prevention and fire fighting measures.		

5.10.5 Vehicle Maintenance Yard

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Heavy machinery and construction vehicles are to be stored in a vehicle maintenance yard which must be illustrated on the construction camp layout map.	Contractor	Once-off
A dedicated maintenance area must be demarcated with an impermeable surface leading to an oil-water separator. No vehicle may be extensively repaired in any place other than in the dedicated maintenance yard.		Ongoing
Washing of vehicles is prohibited on site or at the Construction Camp and Vehicle		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Maintenance Yard.		

5.11 General and Hazardous Substances and Materials

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Storage areas must not be within any watercourses or within 100 m of any drainage lines.	Contractor SHE Officer	Daily
Storage areas must be designated, demarcated and fenced.		
Storage areas must be secure, under lock and key, so as to minimise the risk of crime.		
Fire prevention facilities must be present at all storage facilities.		
Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume. Such a facility must be on an impervious surface. The storage area must be securely fenced and all hazardous substances such as fuel, oils, chemicals, etc., must be stored therein. Drip trays, a thin concrete slab or a facility with PVC lining, must be installed in such storage areas with a view to prevent soil and water pollution.		
Any water that collects in the bund must not be allowed to stand and must be removed immediately.		
All waste areas must be demarcated and stored within a designated waste collection/storage area. Access control to this area must be properly managed and the removal and disposal of the waste to a permitted waste disposal site must be carried out by a certified waste contractor or the local Municipality.		
The recycling of suitable material (i.e. glass, paper. plastic etc.) is encouraged provided it is properly managed. The necessary authorisation must be obtained should there the possibility for the re-use of waste in road construction.		
Contaminated/hazardous materials are to be disposed of at a permitted hazardous landfill site that is authorised to accept such waste material.		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
All waste generated at the site during construction should be disposed of in a suitable manner so as not to cause any surface and groundwater pollution or a health hazard.		
All fuel storage tanks and associated facilities must be designed and installed in accordance with the relevant oil industry standards, SANS codes and other relevant requirements.		
Symbolic safety signs depicting “No Smoking”, “No Naked Flames” and “Danger” are to be prominently displayed in and around the fuel storage area.		
The capacity of the tank must be clearly displayed and the product contained within the tank clearly identified.		
Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks must be sealed and stored in an area where the ground has been protected.		
If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used.		
The drum must not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank must be stored in a waterproof container when not in use.		
All waste fuel and chemical contaminated rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site.		
Storage sites will be provided with bunds to contain any spilled liquids and materials. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of stormwater from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.		
Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or spillages.		
Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.		
A suitable Waste Disposal Contractor must be employed to remove waste oil.		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
These wastes must only be disposed of at licensed landfill sites designed to handle hazardous waste. Appropriate weigh bills must be provided for all hazardous waste being disposed of.		
The Contractor must ensure that his staff are made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.		
Cement / concrete must not be mixed directly on the ground. Dagga boards, mixing trays and impermeable sumps must be used at all mixing and supply points. Unused cement bags are to be stored so as not to be effected by rain or runoff events.		
The washing of concrete trucks on site is prohibited.		
Used cement bags must be stored in weatherproof containers to prevent windblown cement dust and water contamination. Used cement bags must be disposed of on a regular basis via the solid waste management system, and must not be used for any other purpose.		
All visible remains of excess concrete must be physically removed on completion of the plaster or concrete pour section and disposed of. Washing the remains into the ground is not acceptable as groundwater contamination could occur.		
No paint products may be disposed of on site.		
Care must be taken of the storage thresholds contained in the EIA Regulations (2010) Listing Notices and the 2014 Listing Notices, as well as the Waste Management Activities contained in Category A, B and C.		
Storage areas must not be within any watercourses or within 100 m of any drainage lines.		
Labourers are to receive training on how to use a spill kit.		
The Contractor must maintain a record of the sourcing of all materials used during construction. The Mineral and Petroleum Resources Act must be complied with.		

5.12 Spills, Incidents and Pollution Control

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
A Spill Contingency Plan must be developed and any spillage, which may occur, must be investigated and immediate action must be taken according to the requirements of the Spill Contingency Plan. This must also be reported to the ECO and SHE Officer.	Contractor SHE Officer	Ongoing
In the case of a spill of hydrocarbons, chemicals or bituminous material in the active areas of construction / bunding area, the spill must be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk and reduce bunding capacity.		
Should a pollution incident occur on site the Contractor must: ▪ Implement reasonable measures immediately to contain and minimise the impacts of the incident; ▪ Notify all persons whose health may be affected by the incident; ▪ Undertake clean up procedures immediately; ▪ Notify the Contractor of the incident immediately who will advise the employee as to the measures that must be implemented; ▪ Record the incident in the Environmental Incident Register; and ▪ Implement measures to prevent similar incidents from occurring in the future.		
Concrete mixing must be confined to as few areas as possible and ad hoc mixing is to be avoided. Areas where concrete was mixed must be cleaned up after use. Concrete mixing is to be undertaken on an impervious surface.		
No forms of secondary pollution should arise from the disposal of sewage and refuse. Any pollution problems arising from the above development are to be addressed immediately by the Developer.		
The storage of materials, chemicals, fuels etc. to be used during the construction phase must not pose a risk to surrounding environment. Such storage areas must be located out of the 1:100 year floodline of any water resource and unauthorised to these areas must be controlled. Temporary bunds must be constructed around chemical or fuel storage areas to contain possible spillages		
It is important that any significant spillages of chemicals, fuels, etc. during the construction phase are reported to this office and other relevant authorities. In the event of a spill, the following steps can be taken: a. Stop the source of the spill; b. Contain the spill; c. All significant spills must be reported to this Department and		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
other relevant authorities; d. Remove the he spilled product for treatment or authorised disposal; e. Determine if there is any soil, groundwater or other environmental impact; and f. If necessary, remedial action must be taken in consultation with this Department. g) Incident must documented		
Soil and construction material stockpiles are to be bermed to prevent leachate and polluted runoff.		
In the event of a spill incident, the Emergency Response Plan developed must be followed.		

5.13 Heritage

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
If an artefact on site is uncovered, work in the immediate vicinity must be stopped immediately.	Contractor	On-going
The contractor must take reasonable precautions to prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the Construction Engineer of such discovery which in turn must contact a registered archaeologist and AMAFA.		
Work may only resume once clearance is given in writing by the archaeologist and AMAFA.		

5.14 Noise

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Neighbouring landowners must be notified about construction activities three days in advance.	Contractor	Daily
All construction vehicles and equipment are to be kept in good repair and must be fitted with standard silencers prior to construction.		
Where possible, stationary noisy equipment (for example compressors, generators etc. must be encapsulated in acoustic covers, screens or sheds. Portable acoustic shields must be used in the case where noisy equipment is not stationary (for example drills, angle grinders, chipping hammers).		
Construction activities, and particularly the noisy ones, are to be contained to reasonable hours (between 07h00 and 17h00 only).		
Machines in intermittent use must be shut down in the intervening periods between work or throttled down to a minimum.		
In general, operations must meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993).		
Construction staff working in areas where the 8-hour ambient noise levels exceed 75 dBA must wear ear protection equipment.		
Noise levels must be kept within acceptable limits. No pure tone sirens or hooters may be utilised except where required in terms of SANS standards or in emergencies.		
Noisy operations must be combined so that they occur where possible at the same time.		
Noise from labourers must be controlled.		
Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from site.		
The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour must be transported to and from the site by the Contractor or his sub-contractors by the contractors own transport.		
Construction activities are to be contained to reasonable hours during normal		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
working hours (between 07h00 and 17h00 only).		
Neighbours are to be given at least three days warning prior to any blasting, piling or other 'noisy' activities.		

5.15 Air Quality

5.15.1 Pollution Management and Odour Control

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Any oil containing equipment or containers must be managed in a manner to avoid oil exposure to atmosphere to limit evaporation of volatiles to atmosphere.	Contractor	Daily
Odours from chemical toilets and waste must be managed. Removal and disposal of litter and debris must be undertaken during periods of high ventilation. Chemical toilets must be cleared and cleaned at least weekly.		
No fires are to be allowed on site.		
Vehicles must be maintained to avoid excessive emissions and smoke. Similarly equipment must be serviced.		

5.15.2 Dust Control

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Dust track-on from disturbed areas to paved road surfaces must be avoided by making use of one of the following measures to: ▪ Road sweeping. ▪ Chemical dust suppression of disturbed areas to reduce the amount of dust which can be lifted by the wheels of trucks. ▪ Wet suppression to the roads using a light spray. ▪ The washing down of the wheels of trucks before they exit only paved road surfaces.	Contractor SHE Officer ECO	Daily
Water for dust suppression must not be sourced from the Mtwalume River or any other watercourse on site without a Water Use Licence for this water use.		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Dust liberated to atmosphere must not reduce the visibility for private vehicles making use of the road passing by the site.		
All construction vehicles and equipment are to be kept in good repair.		
Speed limits of a maximum of 40 km/hr are to be implemented on site and enforced by the Contractor.		
Construction activities are to be contained to reasonable hours during the day (between 07h00 and 17h00) avoiding periods of sunrise and sunset.		
In areas where there is a large potential for dust liberation (high wind days) wet suppression using a light spray must be applied to the areas in question.		
A dust suppression register as well as a complaints register needs to be kept.		
All complaints received need to be investigated with remedial action taken communicated to the affected party within 14 days.		

5.16 Spoil, Topsoil and Erosion

5.16.1 Topsoil

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
The Contractor must strip and stockpile all soil within the work area for subsequent use at a later stage. First consult the ECO to assist in determining the depth of topsoil to be stripped and stockpiled, before the works are undertaken.	Contractor Engineer	Ongoing
Topsoil removed must be stockpiled in a designated area and must not exceed 1 m in height.		
Stockpiles must be located outside of the 32 m wetland buffer. Stockpiles must be protected from wind and rain with the use of tarpaulins where necessary. The Engineer is to use his discretion.		
Topsoil must be kept separate from overburden and must not be used for infilling.		
Weeds must be eradicated from topsoil prior to spoiling.		
The Contractor must exercise suitable precautions with the storage, handling and transport of all materials that could adversely affect the environment. If pollution		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
of any surface or groundwater occurs, it must immediately be reported to this Department and appropriate mitigation measures must be employed.		
Soil stockpiling areas must be sufficiently situated away from the drainage areas towards the lower lying Mtwalume River and drainage areas.		
Any erosion channels developed during the construction period or during the vegetation establishment period must be backfilled and compacted, and the areas restored to a proper condition. The Contractor must ensure that cleared areas are effectively stabilised to prevent and control erosion. This is especially pertinent within steep hillslopes which are situated on a shallow soil layer. Extensive gully erosion is evident around the entire area.		
All necessary precautions must be taken into account to prevent and/or minimise erosion at the site.		
Erosion control measures to be implemented in areas sensitive to erosion such as near water supply points, edges of slopes, etc. These measures could include the use of sand bags, hessian sheets, retention or replacement of vegetation.		
Soil removed from the new road reserve is to be appropriately stored for later use in back-filling. Sub-soil and topsoil (the top +/- 30-50 cm of the soil) must be stored separately. Topsoil is only to be used for rehabilitation purposes.		

5.16.2 Spoil

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Litter and general waste is to be removed from the soil and spoiling before stockpiling.	Contractor	Daily
Spoil sites will be shaped to fit the natural topography.		
Spoil sites must receive a minimum of 75 mm topsoil and be grassed with a recommended seed mixture by a qualified ecologist.		
Stockpiling of soil or any other materials used during the construction phase must not be allowed on or near steep slopes, near a watercourse or water body. This is to prevent pollution or the impediment of surface runoff. The developer must control and establish suitable mitigation measures to prevent the erosion of the		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
stockpiles.		
Slopes must not exceed a vertical: horizontal ratio of 1:3.		

5.16.3 Soil Erosion and Sedimentation

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Soil erosion on site must be prevented at all times, i.e. pre, during and post construction activities. Suitable erosion control measures must be implemented in areas sensitive to erosion such as near water supply points and edges of slopes. These measures must include: ▪ Phased construction activities must take place to ensure the removal of vegetation, only as it becomes necessary for work to proceed. This enables erosion and sedimentation to be minimised and centralised in relatively small areas easier to control and to stabilize. Topsoil storage must be as brief as possible and storage must occur in a bunded area away from watercourses as described above. ▪ Vegetative Cover – vegetation reinforces soil and holds it in place thereby reducing erosion. Temporary or permanent vegetation must be planted on all bare soil immediately after any ground disturbance. The prompt rehabilitation of exposed soil areas with indigenous vegetation will ensure that soil is protected from the elements. The unnecessary removal of vegetation especially on steep areas must be prevented. Taking necessary precautions in terms of design and construction and earthworks, cuts and fills must be taken. Soil stockpiles must be vegetated or covered to reduce soil loss as a result of wind or water to prevent erosion and sedimentation. Disturbed areas must be rehabilitated as soon as possible. ▪ Seeding, anchored mulch, wool binders or erosion control fabrics must be used to provide surface protection and stabilisation until vegetation is established. ▪ The suitable use of sand bags or Hessian sheets must be used to stabilise bare soil. ▪ The suitable use of geo-textiles, turf blankets or mats must be used as slope protection for exposed slopes. ▪ Proper drainage controls such as culverts and cut-off trenches must be used to ensure proper management of surface water runoff to prevent erosion and sedimentation. ▪ Construction vehicles must remain on designated demarcated areas.	Contractor	Daily

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
▪ Work areas must be clearly defined and demarcated to avoid unnecessary disturbance of areas outside the maintenance area. Constant cognisance of the inherent high erosion risk potential of all soils and sites on the property must be taken and appropriate control and preventative measure put in place.		

5.16.4 Site Establishment, Management and Erosion Control

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
The spoil site must not be within 32 m to any watercourse.	Contractor	On-going
A signboard must be placed in the area where spoiling activities such as clearing and infilling will take place informing the public of the activities taking place.		
The Contractor must take responsibility for the site to conform to all contractual aspects and environmental standards applicable.		
The spoil site must be cleared of all inert waste and rubble, including surplus rock, foundations and litter.		
Topsoil must be separated from overburden and spoiled separately.		
No large rocks or building rubble is permitted to be spoiled at these sites. If building rubble is to be spoiled, a waste management licence as per the requirements of the National Environmental Management Waste Act will be required.		
Dumping of any other material, including litter is prohibited.		
Spoil site must not be located within the 1:100 year flood line.		
Litter and general waste is to be removed from the soil and spoiling before stockpiling.		
Spoil sites will be shaped to fit the natural topography.		
Spoil sites must receive a minimum of 75 mm topsoil and be grassed with the recommended seed mixture.		
Soil erosion on site must be prevented at all times, i.e. pre-, during and post spoiling activities. Suitable erosion control measures must be implemented in areas sensitive to erosion such as near water supply points and edges of slopes.		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
These measures must include: • Vegetative Cover – vegetation reinforces soil and holds it in place thereby reducing erosion. Temporary or permanent vegetation must be planted on all bare soil immediately after any ground disturbance. The prompt rehabilitation of exposed soil areas with indigenous vegetation will ensure that soil is protected from the elements. The unnecessary removal of vegetation especially on steep areas must be prevented. Taking necessary precautions in terms of design and construction and earthworks, cuts and fills must be taken. Soil stockpiles must be vegetated or covered to reduce soil loss as a result of wind or water to prevent erosion and sedimentation. Disturbed areas must be rehabilitated as soon as possible. • Seeding, anchored mulch, wool binders or erosion control fabrics must be used to provide surface protection and stabilisation until vegetation is established. • The suitable use of sand bags or Hessian sheets must be used to stabilise bare soil. • The suitable use of geo-textiles, turf blankets or mats must be used as slope protection for exposed slopes. • Proper drainage controls such as culverts and cut-off trenches must be used to ensure proper management of surface water runoff to prevent erosion and sedimentation. • Construction vehicles must remain on designated roads. • Work areas must be clearly defined and demarcated to avoid unnecessary disturbance of areas outside the development footprint. Constant cognisance of the inherent high erosion risk potential of all soils and sites on the property must be taken and appropriate control and preventative measure put in place.		

5.17 Waste Management

5.17.1 General Waste

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
General waste produced on site includes: ▪ Office waste (e.g. food, waste, paper, plastic); ▪ Operational waste (clean steel, wood, glass); and ▪ General domestic waste (food, cardboards, paper, bottles, tins).	Contractor	Daily
An adequate number of general waste receptacles, including bins must be arranged around the Construction Camp, on site to collect all domestic refuse, and to minimise littering.		
Bins must be clearly marked and lined for efficient control and safe disposal of waste.		
Different waste bins, for different waste streams must be provided to ensure correct waste separation.		
A fenced area must be allocated for waste sorting and disposal on the site.		
General waste produced on site is to be collected in skips for disposal at a registered landfill site. Hazardous waste in not to be mixed or combined with general waste earmarked for disposal at the municipal landfill site.		
No general waste is to be disposed of at the spoil area.		
Under no circumstances is waste to be burnt or buried on site. The excavation and use of rubbish pits on site is forbidden.		
Waste bins must be cleaned out on a regular basis to prevent any windblown waste and/or visual disturbance.		
All general waste must be removed from the construction areas on a daily basis and disposed of in suitable waste receptacles at the Construction Camp.		
The Contractor must ensure that all general waste is disposed of at an appropriately licensed waste disposal facility. Through exploring practical means for reducing, reusing and recycling waste generated in undertaking the activity, the Contractor must dispose of the minimum amount of waste possible. Waste Manifests are to be kept on file for record keeping purposes		

5.17.2 Hazardous Waste

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Hazardous waste produced on site includes: ▪ Oil and other lubricants, diesel, paints, solvent; ▪ Containers that contained chemicals, oils or greases; and ▪ Equipment, steel, other material (rags), soils, gravel and water contaminated by hazardous substances (oil, fuel, grease, chemicals or bitumen).	Contractor	Daily
Hazardous waste is to be disposed of at a Permitted Hazardous Waste Landfill Site. The ECO must identify an approved waste disposal site at the inception of the project.		
Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid).		
A Safe Disposal Certificate (SDC) must be obtained from the waste removal company as evidence of correct disposal.		

5.17.3 Wastewater

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
All wastewater generated at the proposed development must be disposed of in a suitable manner so as not to cause any surface or subsurface water pollution or health hazard. Waste water including cement-contaminated water must not enter any water course and must be managed by the site manager to ensure that the existing water resources on and off site are not polluted by activities emanating from the above development.	Contractor	Daily
Used oil and wastewater must be disposed of to a ROSE registered facility. An SDC is to be obtained by the Contractor.		

5.18 Water Management

5.18.1 Water Pollution Management (including groundwater and soil contamination)

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
The non-perennial or seasonal stream is poorly defined and narrow. Adequate culverts or concrete pipes must be installed in order to maintain the current hydrological patterns.	Contractor	Daily
The original geometry, topography and geomorpholgy in both cross-sectional and longitudinal profile must be reinstated, above and below the stream and river crossing.		
Appropriate mitigatory measures for controlling sediment input into the stream and drainage areas will be required during the construction phase. The use of hay bales packed in rows across diversions and active flow areas during construction may be one way of limiting sediment inputs. They also help to buffer the pH. The bales will need to be removed and disposed of after construction. Other alternative methods of controlling sediment must also be considered such as sediment fences etc.		
All coffer dams, causeway and construction materials must be removed from the stream immediately after construction at the site is completed.		
Where necessary and according to risks in terms of bank erosion, gabions or storm water control structures must be used to disperse storm water flows and prevent further bank erosion. Appropriate gabion structures or gabion mattresses must be installed to prevent further bank erosion. This is especially pertinent to the heavily eroded and unstable left hand macro-channel bank (looking upstream).		
There must be no unacceptable impact on the quality of both surface and groundwater in the area. If pollution occurs it must be immediately reported to the EDTEA and DWS and the appropriate mitigation measures must be employed.		
Stormwater must not be allowed to be contaminated by any water containing waste during the construction phase.		
The site should be contoured to ensure free flow of runoff and to prevent ponding of water.		
Drainage must be controlled to ensure that runoff from the site will culminate in off-site pollution or result in damage to properties downstream of any stormwater		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
discharge.		
Where necessary and according to slope and risks in terms of bank erosion, disturbed areas must be re-vegetated using either a specified seed mix and/or appropriate indigenous trees.		
Ideally the proposed bridge shall span the entire active channel of the Mtwalume River and the bridge supports shall be situated outside the macrochannel banks.		
Construction activities of the Mtwalume bridge as well as southern non-perennial drainage line must be scheduled to take place during low flow periods of the stream (winter months); when as little of the construction area and exposed sediment is in contact with the flow as possible.		
No large riparian tree species must be removed from the proposed Mtwalume River crossing site.		
It is required that the construction programme preferably commence during the dry winter months, when the Mtwalume River's base flow is lower and the risk of soil and bank erosion is lowest. All earthworks must be undertaken in such a manner so as to minimize the extent of any impacts.		
The flow direction of any surface water runoff must be established prior to disturbing any area.		
The stockpiling of soil or any other material must not be allowed near a watercourse or water body in order to prevent pollution or impede surface runoff.		
Every effort must be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on site.		
Bathing or washing of clothes, equipment or machinery within any watercourse is prohibited.		
Erosion and loss of soil must be prevented by minimising the construction areas exposed to surface water runoff.		
Bare areas are to be rehabilitated as soon as the areas become available or after use.		
All water consumption on site must be recorded on a daily basis.		
The abstraction of water from any water resource for construction purposes and/ or dust suppression must not be permitted without a water use licence from the DWS.		

5.18.2 Wetland Management

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
The route must be realigned wherever possible albeit short distances to bypass the wetlands and where this is not possible, rehabilitation must be conducted.	Contractor	Daily
A 32 m buffer from the edge of the permanent zone must be maintained to all wetlands which will not be infilled.		
Clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities must be put on hold. In this regard, the contractor must be aware of weather forecasts.		
No clearing or infilling of the remaining wetlands not licenced for infilling is permitted. The wetland must be pegged to demarcate it and prohibit workers of vehicles from entering onto the wetland. The entire boundary of the wetland along the working corridor must be screened off with snow-fencing/shade-cloth or a similar barrier. This barrier must not be easily permeable to humans so as to prevent access to the wetland. The barrier must be on the wetland side of the clearing activities.		
Under no circumstances may any of the construction workers or staff access the wetland. All staff must be informed of this requirement.		
No vehicular access to the wetland is to occur. As per the method statement reviewed, the excavator used may not leave the roadbed to access any part of the wetland. All machinery operators must be made clearly aware of this requirement.		
The use of machinery within the wetland during construction must be limited to only the areas of infilling and/or crossing (i.e. road crossing- for which a water use licence has been obtained from DWS). The area of construction must be pegged out and no machinery or personnel are allowed outside of this demarcated area.		
No machinery may cross a wetland as a short-cut between two points. Any contractor who does so must be liable for a fine as a non compliance offence.		
A spill kit must be present on site at all times of operation. The kit must be used immediately should any diesel or hydraulic fluid spills occur. The ECO must be notified immediately should a spill occur.		
No stockpiling/ banks/ berms in the wetland.		
The full length of works must not be stripped of vegetation at once. The Contractor must submit a clearing and earthworks plan to the SHE officer for		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
approval prior to construction occurring. This plan must indicate how clearing and earthworks are going to progress across the site in a phased manner. The unnecessary removal of groundcover on slopes must be avoided.		
The stormwater management system must look to return water to the ground as quickly as possible.		
A combination of sandbags and silt fences must be established along the edge of the construction phase and repaired immediately when damaged. The berms, sandbags and silt fences must only be removed once vegetation cover has successfully re-colonised the embankments.		
Every effort must be made by the developer to ensure that any ecologically significant areas such as wetlands or marshes are protected during construction activities. A means to ensure continued protection of the sensitive areas after construction must also be implemented.		
Pipes or culverts under the road must not concentrate flow but must aim to allow even movement of water under the road bed across the entire wetland.		
Revegetation must take place immediately after completion of the construction activities. If re-vegetation of exposed surfaces cannot be established immediately due to phasing issues, rows of sand bags or silt fences must be established along the contours at regular intervals to slow runoff and capture eroded soil.		
Effort must be made to ensure that the stormwater system including pipes, drains, headwalls and Reno-mattresses are not silted up during the construction phase. Siltation will be minimised by ensuring that the roads and paths remain clear of sediment.		
After every rainfall event, the contractor must check the site for erosion damage and rehabilitate this damage immediately. Erosion rills and gulleys must be filled-in with appropriate material and silt fences or fascine work must be established along the gulley for additional protection until grass has re-colonised the rehabilitated area.		
Incised stream crossings must be pipe-bridged to avoid the unnecessary disturbance to the stream channels and wetlands. This must apply to all wetlands, drainage lines and stream channels.		
Rehabilitation must take place according to the Preliminary Ecological Assessment (Cook, 2013) and the Eco-pulse rehabilitation plan (Eco-pulse, 2015).		

5.19 Clearing and Protection of Fauna and Flora

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Ideally a detailed herpetological survey should be conducted prior to construction in order to ascertain the direct impact the proposed Road could have on the frog habitats. The survey should furthermore prescribe mitigation measures applicable. As a minimum, the use of DDT must be limited and alien vegetation must be controlled to nurture a habitat suitable for the frogs indigenous to the and Makhiqizana Farms.	Contractor	Daily
Artificial lighting must be restricted to areas under construction and not directed towards the River or non-perennial drainage lines in order to minimize the potential negative effects of the lights on the natural nocturnal activities. Where lighting is required for safety or security reasons, this must be targeted at the areas requiring attention. Yellow sodium lights must be prescribed as they do not attract as many invertebrates (insects) at night and will not disturb the existing wildlife. Sodium lamps require a third less energy than conventional light bulbs.		
The Contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase. All animals captured must be released in appropriate habitat away from the development.		
An Alien Invasive Plant (AIP) eradication programme must be considered for inclusion in the scope of work.		
Vegetation clearance should be restricted to areas invaded by invasive alien plant species.		
Large indigenous riparian trees should be marked prior to construction and avoided during the construction phase.		
However should there be a need to cut/disturb tree species protected in terms of the National Forest Act no.84 of 1998 a licence should be applied for, at DAFF offices in Pietermaritzburg.		
Ideally the road must be situated away from any densely vegetated areas or alternatively restricted to the existing livestock and human pathways. This will result in minimal vegetation clearance and disturbance		
Contract employees must be educated about the value of wild animals and the importance of their conservation.		
No animals are to be intentionally killed or destroyed and poaching and hunting is		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
not permitted on the site.		
Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harm remaining faunal species.		
During the construction phase workers must be limited to areas under construction within the road servitude and access to the undeveloped areas, especially the surrounding hills and woodlands, River and valley bottom wetlands must be strictly regulated ("no-go" areas during construction as well as operational activities).		
All construction activities must be strictly limited to the construction servitude area. Vegetation clearance must be restricted to the actual road servitude especially within the drainage line and River crossings.		
The extent of the area disturbed must be kept to the minimum required to successfully implement the road maintenance activities, thus minimising the destruction of any fauna and flora.		
All remaining wetlands must be demarcated and avoided.		
Removing of vegetation must be restricted to the immediate area for construction.		
No natural vegetation on surrounding land is to be collected for use as firewood.		
No animals are to be disturbed unnecessarily and no animals are allowed to be shot, trapped or caught for any reason.		
Protected trees may not be removed or cut without a permit from the Department of Forestry & Fisheries (DAFF).		
Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas.		
Where alien plants have been introduced on to the site during clearing and infilling, they must be removed. The Contractor must develop an Action Plan for the removal of alien invasive species and submit it to the ECO for approval.		
Invader species and weeds must be removed and disposed of in accordance with existing legislation on a regular basis.		
The removal of indigenous/endemic shrubs and small trees must be kept to a minimum and only be removed if absolutely necessary.		

5.20 Stormwater Management

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
All contaminated standing water must be immediately removed and treated or disposed of appropriately.	Contractor Engineer	Daily
All incidents must be reported to the responsible site officer as soon as it occurs.		
Ensure effective storm water management will be exercised to limit negative impacts on the environment and enhance the positive impacts, and ensure catering for the hydraulic needs of the development while minimising the associated negative environmental impacts.		
Current depressions in the area must be raised to prevent stormwater ponding		
Surfaces and conduits must be constructed to drain the run off more efficiently.		
All alien invasive vegetation as well as dumped materials must be removed from the riparian areas as well as thornveld buffer zones.		
Sheet runoff from paved surfaces and access roads needs to be curtailed. Runoff from paved surfaces must be slowed down by the strategic placement of berms.		
No surface storm water generated as a result of the development may be directed directly into the River or non-perennial drainage lines but towards carefully planned storm water attenuation/retention ponds. Ideally the ponds or dams must be seasonally inundated and be appropriately vegetated providing potential increased habitat diversity on the site.		
Special care needs to be taken during the construction phase to prevent surface stormwater rich in sediments and other pollutants from entering the River. In order to prevent erosion, mechanisms are required for dissipating water energy.		
No activity such as temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment or any other use of the buffer/flood zone whatsoever, may be permitted during the construction phase. The demarcated buffer and riparian zone must be fenced during the construction phase to prevent any misinterpretation of the demarcated no-go zone.		
Provision of adequate toilet facilities must be implemented to prevent the possible contamination of surface (River) and ground water in the area.		
Ensure the establishment of storm water diversion berms around the contractor		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
laydown area and other potential contaminated areas (e.g. diesel storage tanks or refuelling station).		
The Stormwater Management Plan must be implemented to ensure proper management of stormwater on the site during and after construction to ensure that pollutants and sediment are not released into any water resources.		
Design in general must avoid concentration of stormwater runoff both spatially and in time and may be required to provide for on-site attenuation of stormwater runoff to limit peak flows to pre-development levels.		
Detailed plans to control and prevent erosion by water must be agreed prior to the commencement of any works, including site clearance, on any portion of the site.		
Removal of vegetation cover must be carried out with care and attention to the effect, whether temporary or long-term, that this removal will have an erosion potential.		
Precautions must be taken at all times on building sites to contain soil erosion and prevent any eroded material from being removed from the site.		
On-site stormwater control systems, such as swales, berms and soil fences are to be constructed before any construction commences on the site. As construction progresses, the stormwater control measures are to be monitored and adjusted to ensure complete erosion and pollution control at all times.		
Earthworks on sites are to be kept to a minimum. Where embankments have to be formed, stabilization and erosion control measures must be implemented immediately.		
Stormwater must not be allowed to pond.		
Prior to any physical work proceeding on site, a stormwater control plan (SCP) detailing the proposed stormwater control measures are to be formulated. No work is to be undertaken without an approved SCP.		
The SCP must describe what control measures are to be implemented before and during the construction period, as well as the final stormwater control measures required for the site on completion of site development. Plans must indicate who is responsible for the design of the control measures and who is, or will be, designated as the responsible person on site during each stage of the implementation of the control measures.		
SCPs must show that all the provisions, regulations and guidelines contained in		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
this document have been taken into account.		
In the event of a failure to adequately implement the approved stormwater control plan, the contractor must be responsible for making good all consequential environmental damage at his own cost. The developer is therefore advised to ensure that all members of the professional team and contractors are competent to undertake the development work and are adequately insured.		
No materials, fluids or substances are allowed to enter the stormwater system that could have a detrimental effect on the flora, fauna and aquatic life in the water courses and wetlands. Regular monitoring of the sites must be undertaken.		
Any site that is required to store any substances that could be regarded as hazardous in terms of water pollution must notify Umzumbe and Ugu Municipalities and must take measures to ensure spillages of the substance(s) can be adequately contained to prevent contamination of the water resources within the development area.		
No stormwater, wash water, or wastewater may be directed towards any permanent water body or wetland without the installation of a suitable filtration system to prevent pollution, including silt, from entering such water body.		

5.21 Traffic and Safety

5.21.1 Pedestrian Protection

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Pedestrians to be protected from construction activities at all times.	Contractor	Daily
Pedestrian conflict with site access and construction vehicles to be managed by traffic officer.		
The active construction areas within the site must remain fenced (where needed) for the entire maintenance period.		

5.21.2 Maintenance Vehicles

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Access of all maintenance and material delivery vehicles must be strictly controlled.	Contractor	Daily
Vehicles and equipment must be serviced regularly to avoid the contamination of the area from oil and hydraulic fluid leaks etc.		
Servicing of vehicles should be done off-site. Should it be required that servicing is done on site then a method statement outlining mitigation measures for the servicing must be developed, failure to do so will result in a spot fine. These method statements must be communicated to all staff via tool box talks.		
All speed limits must be adhered to.		
Machinery or equipment used on site must not constitute a pollution hazard in respect of the above substances. The Constructor must order such equipment to be repaired or withdrawn from use if they consider the equipment or machinery to be polluting and irreparable.		
Suitably covered receptacles must be available at all times and conveniently placed for the disposal of waste. All used oils, grease or hydraulic fluids must be placed therein and these receptacles will be removed from the site on a regular basis for disposal at a registered or licensed disposal facility.		

5.21.3 Damage to any existing infrastructure

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Contractors must ensure that any damage to the pedestrian walkway or holding areas are maintained in good condition by attending to any damages (e.g. road signs or stormwater damage etc.) as soon as these develop.	Contractor	On-going
If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt.		
Road signs must be erected.		

5.22 Social Considerations

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Ensure that there are flag men and signs at access points to the active areas of construction within the site.	Contractor	On-going
Ensure the appointment of a Safety Officer to continuously monitor the safety conditions during construction.		
All construction staff must have the appropriate PPE.		
The construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the environmental, health and safety consequences of incidents.		
Report and record any environmental, health and safety incidents to the responsible person.		
Firearms or any other hunting weapons must be prohibited on site.		
Contractors must be educated about the value of wild animals and the importance of their conservation.		
Members of the public adjacent to the active areas of construction within the site must be notified of construction activities in order to limit unnecessary disturbance or interference.		
Construction activities will be undertaken during daylight hours and not on Sundays.		
Consult with local communities regarding the location of construction camps, access and hauling routes and other likely disturbance during and after construction.		
Provide clear and realistic information regarding employment opportunities and other benefits for local communities.		
Implement proper road signs to warn motorists of construction activities ahead;		
People of the homesteads targeted for expropriation or construction through their land must be met with to have discussions with the intention to reach a resolution which is mutually satisfactory and beneficial.		
Working hours are restricted to 07:00 – 17:00 during weekdays and 08:00-16:00 over weekends if necessary. Should work be required after these hours, the ECO must be notified and any person who resides in close proximity to the site and		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
who may be impacted upon by the disturbance must also be notified.		
All neighbouring landowners and those that are disturbed due to construction activities are to be notified of construction activities three days in advance and provided with regular feedback on the status of construction.		
The Contractor is to arrange for a suitable candidate to assist with the appointment of local labour and assist with labour disputes.		
Due to the concentration of a workforce in the area over the construction period, the contractor must implement an HIV/AIDS Awareness Programme on site. The contractor must appoint an HIV/AIDS Awareness Officer for the duration of the construction period. Activities for HIV/AIDS awareness and prevention will be broad based, targeting both individuals and groups. They may consist of: ▪ Information posters in public places both on and off site (eating places, bars, guest houses, etc); ▪ Peer educators (reference people) drawn from the local labour force and trained in HIV/AIDS issues for discussions with colleagues (estimate 1 per 30 employees); ▪ Small focus group discussions and information covering key issues must be held; ▪ Inclusion of HIV/AIDS activities at site meetings and other discussions; and ▪ Voluntary Counselling and Testing. Education will cover: ▪ Stigma and discrimination issues; ▪ Preventative behaviours including partner reduction, condom use, and awareness and importance of treatment of STDs; ▪ Skills including negotiating safer sex, correct condom use, purchase without embarrassment; Referral to local health centres and services available.		

5.23 Reporting & Record Keeping

5.23.1 Complaints Register

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
Complaints received must be registered and recorded by the contractor and also	Contractor	On-going

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
brought to the attention of the contractor. Both parties will respond accordingly. The following information must be recorded in the case of any complaint/incident: ▪ Time, date and nature of complaint; ▪ Response and investigation undertaken; and ▪ Corrective and preventative actions taken and by whom.		
All complaints received will be investigated and a response is to be given to the complainant within 7 days.		

5.23.2 Environmental Incidents Register

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
All environmental incidents occurring on the site will need to be recorded in an Environmental Incident Book and brought to the attention of the ECO. The following information must be provided: ▪ Time, date and nature of complaint; ▪ Response and investigation undertaken; and ▪ Corrective and preventative actions taken and by whom.	Contractor	On-going

POST-CONSTRUCTION PHASE – REHABILITATION

5.24 Rehabilitation

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
The Developer is responsible for compliance with the provisions for Duty of Care and Remediation of Damage in accordance with Section 28 of National Environmental Management Act (NEMA), Act No. 107 of 1998.	Contractor/ Developer	Post-Construction Weekly
All remaining maintenance materials, building rubble and waste are to be removed from the site.		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
All disturbed surfaces compacted by maintenance activities including the ablutions and loading areas must be ripped to a minimum depth of 30 cm to allow organic contaminants to breakdown and promote vegetation establishment.		
Final rehabilitation must be completed within a period specified by the Engineer.		
Rehabilitation must be undertaken as per the requirements of the Preliminary Ecological Assessment (Cook, 2013) and the Eco-pulse rehabilitation plan (Eco-pulse, 2015).		
Remove all construction material from the area where construction has been completed. To be undertaken by hand.		
Topsoil that has been stockpiled during construction must be applied to the area to undergo rehabilitation. The depth of the topsoil layer to be applied depends on the natural depth of topsoil in the area, and the amount of topsoil that may have been lost during construction. Topsoil must be applied from the topsoil stockpiled during construction.		
The naked ground must be seeded with a stabilising grass mix, suited to the conditions. The quantity of seed used will depend on the slope, with a steeper slope requiring a heavier application of seed. For slopes: • >15º: 25-50 kg/ha • <15º: 15-25 kg/ha The natural seed bank in the topsoil will supplement the seed mix applied. The seed mix must consist of pioneer grass species of the area, and will also depend on what species are commercially available during the season required. A standard seed mix would consist of the following species (in decreasing order of proportion constituting the seed mix): • *Andropogon chinensis* • *Aristida congesta* • *Cynodon dactylon* • *Cymbopogon plurinodes* • *Eragrostis curvula* • *Eragrostis gummiflua* • *Themeda triandra* • *Setaria spp.* • *Imperata cylindrica* • *Sporobolus fimbriatus* and sedges such as *Schoenoplectus spp*. and *Juncus spp*. must be used		
The areas which have been seeded must be regularly watered directly after seeding until the grass cover becomes established. Watering is to be done in a manner that ensures that no erosion of the topsoil and seed mix takes place. A hosepipe must be available on site.		

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
If the grasses have not established after a period of two months after seeding, the areas must be reseeded. If necessary, another dressing of topsoil must be applied prior to seeding.		
Slope stabilisation measures may be necessary in places where grass has not been able to establish and there is an erosion risk. The measures implemented depend on the situation, and can be varied as necessary. Various slope stabilisation measures are available and vary in effectiveness according to the situation including ▪ Logs/bark held in place with pegs ▪ Rows of *Cynodon dactylon, Panicum maximum, Imperata cylindrica, Hyparrhenia filipendula* held in place with pegs.		
All alien vegetation is to be appropriately removed and disposed of. Alien species that have been encountered along the proposed route include Syringa *Melia azedarach*,Brazilian Glory Pea or Red *Sesbania Sesbaniapunicea*, Castor-Oil Plant (*Ricinus communis*),Lantana (*Lantana camara*), Giant Reed(*Arundo donax*), Bugweed (*Solanummauritianum)*, Peanut Butter Cassia (*Sennadiymobotrya*), Jacaranda *Jacarandamimosifolia*, Morning Glory (*Ipomoeapurpurea*), Paraffin Bush (*Chromolaena odorata*), Yellow Oleander (*Thevetia peruviana)*, Oleander (*Nerium oleander*),Montanoa (*Montanoa hibiscifolia*), Indian Shot (*Canna indica*), *Ageratum conyzoides,Caesalpinia decapetala, Campuloclinium macrocephalum, Chromolaena odorata,Ipomoea indica, Leucaena leucocephala,Psidium guajava, Melia azedarach, Mimosapigra, Tithonia diversifolia.* Removal will to a large extent bedone by hand. Saws may benecessary in certain cases andspecific herbicides may be required (if used, the use of these must bestrictly controlled)		
The upgraded road servitude must be regularly inspected during the operational phase and alien vegetation that had reemerged, must be removed / follow-up treatment applied. On-going alien vegetation removalprogramme (beyond the scope of the project).		
Control weeds by means of extraction, cutting or other approved methods. An alien invasives eradication programme must be implemented and carried through to the operational phase of the road development.		
For planted areas that have failed to establish, replace plants with the same species as originally specified. The same species as originally specified must be used unless otherwise specified by the ECO.		

5.25 Monitoring and Maintenance

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
The conditions of the development must be monitored for a period of one year after the development is complete to ensure that: ▪ Erosion is not taking place; ▪ The stormwater runoff measures are working; ▪ An Environmental Complaints Register must be kept detailing complaints received, date, response and action taken; ▪ The alien invasive eraidication programme is being continually implemented; ▪ Any maintenance where intrusive works are necessary must adhere to the mitigation measures put in place in the EMPr; and ▪ Where such measures are impractical due to the nature, duration and extent of maintenance works, a maintenance method statement must be developed prior to maintenance works being undertaken.	Developer	Daily

5.26 Air Quality

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
▪ Planting of trees along the road reserve will help to absorb the Carbon Dioxide and vehicular emissions.	Developer	Daily

5.27 Protection of Flora and Fauna

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
An alien species eradication programme must be established and maintained beyond the scope pf this project. Weeds and alien vegetation must be removed and prevented from spreading. All alien invasive plant and tree species must be removed from the site especially along the River and non-perennial drainage lines; preventing further invasion.	Developer	Daily

ACTIONS AND CONTROLS	RESPONSIBILITY	MONITORING FREQUENCY
No cutting down of trees for firewood.		

6 ENVIRONMENTAL CODE OF CONDUCT

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

ENVIRONMENTAL CODE OF CONDUCT

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

Ignorance, negligence, recklessness or a general lack of commitment resulting in environmental degradation or pollution shall not be tolerated!

ENVIRONMENTAL RULES

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

APPENDIX A:
STORMWATER MANAGEMENT PLAN

Please Refer to Appendix D6 of this final BAR.

This report will however, be appended to the final stand alone EMPr

APPENDIX B:
PRELIMINARY ECOLOGICAL ASSESSMENT

Please Refer to Appendix D2 of this final BAR.

This report will however, be appended to the final stand alone EMPr

APPENDIX C: FRESHWATER AQUATIC HABITAT IMPACT ASSESSMENT

Please Refer to Appendix D5 of this final BAR.

This report will however, be appended to the final stand alone EMPr

APPENDIX D:
CONSTRUCTION METHOD STATEMENT