

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED UPGRADE AND CONSTRUCTION (WHICH ENTAILS INSTALLATION OF STORMWATER MANAGEMENT SYSTEM AND CROSSINGS) OF QHOZO ACCESS ROAD LOCATED WITHIN KOKWANE A/A, WARD 05, BERGVILLE, KWA-ZULU NATAL.

(Prepared in Terms of EIA Regulations, 2014) (As Amended)

PREPARED FOR



Okhahlamba Local Municipality



Bi Infrastructure Consultants

PREPARED BY



Isolendalo Environmental Consulting

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DOCUMENT TITLE	DATE
<p align="center">Environmental Management Programme for the proposed upgrade and construction, which entails installation of stormwater management system and crossings, in Qhozo access road located within Kokwane A/A, ward 05, Bergville, Kwa-Zulu Natal.</p>	<p align="center">February. 2019</p>

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ACRONYMS

BAR	Basic Assessment
EMPr	Environmental Management Programme
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
DWS	Department of Water and Sanitation
UDM	Uthukela District Municipality
OLM	Okhahlamba Local Municipality
I &AP	Interested and Affected Parties
ECO	Environmental Control Officer
RE	Resident Engineer

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ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

1 INTRODUCTION

The Okhahlamba Municipality through their Integrated Development Plan (IDP) 2018 - 2019, has identified the need to provide a basic efficient and reliable infrastructure by engaging in upgrade and construction works on Qhozo access road for the community of Kokwane A/A within ward 05. Upgrading of the existing road is currently being undertaken; however, constructions has been restricted with 100 m buffer zones on the areas for which this application is being made. The engineers (Bi-Infrastructure consulting engineers) ceased works and commissioned Isolendalo Environmental Consulting for screening purposes; the site was observed to be within 10 km from a National Park and the site was observed to have 05 watercourses (a specialist report was yet to delineate and confirm the identified watercourses).

The National Environmental Management Act (Act No. 107 of 1998) (also referred to as 'the Act') in South Africa aims - "to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matters connected therewith". The NEMA (Act no. 107 of 1998).

The proposed activity falls within the threshold of Listed Activities within GN no. 983 within the EIA regulations 2014 (Gazette No. 38282) as promulgated in terms of the Act. As a result, Isolendalo Environmental Consulting has (in terms of regulation 13 of the amended EIA regulations 2014) been appointed to provide the services necessary to obtain an Environmental Authorization. The information provided within this document is given in good faith and in all transparency for an informed decision making by the competent authority (EDTEA, Uthukela District).

This EMPr has been developed to form part of a BAR for the proposed upgrading and construction of Qhozo access road. The intention in compiling this EMPr is in accordance with the Integrated Environmental Management Guidelines published by the Department of Environmental Affairs & Tourism (DEAT) in 2014, which state that the purpose of an EMPr is "*to describe how negative environmental impacts will be managed, rehabilitated or monitored and how positive impacts will be maximised*". This EMPr therefore organises and coordinates environmental mitigation, rehabilitation and monitoring so that positive impacts are enhanced, and negative impacts and damage to the environment are avoided, minimised or rectified where required.

1.1 Contact Details

Below are the details of the project team including the developer, EAP, Engineer and Competent Authority.

ORGANISATION/COMPANY	ROLE	CONTACT PERSON	CONTACT DETAILS
Nquthu Local Municipality	Developer	Ms Samke Msibi	259 Kingsway Street Bergville 3350 Tel: 036 448 8002 Email: Samke.msibi@okhahlamba.gov.za
Isolendalo Environmental Consulting	EAP	Mr Onesimo Jiba	19 Valley Road Margate, 4275 Tel: 039 315 0437 Fax: 039 315 0407 Cell: 065 831 3657 Email: One.jiba@isolendalo.co.za
Department of Economic Development, Tourism and Environmental Affairs	Competent Authority		No. 1 Colenso, Peter Next to Caltex Garage Lady Smith 3370

2 THE ENVIRONMENTAL PROCESS

The National Environmental Management Act (Act No. 107 of 1998) imposes a duty of care on every person who causes, has caused or may cause significant pollution or degradation of the environment, he is authorised by law and cannot reasonably avoid the Act's requirement, that the pollution be minimised and rectified. For the proposed project, this EMPr will serve as a guideline with the specific objectives to:

1. Highlight mitigation measures for the impacts of the project activities
2. Encourage good environmental management practices
3. Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
4. Ensure that the safety recommendations are complied with.
5. Provide feedback for the continuous improvement in environmental performance.
6. Serve as a framework for the acceptable implementation of environmental and social initiatives.
7. Be able to stand as a structure which addresses the relevant concerns of the public regarding the development.

All activities and earthworks associated with this construction will be undertaken in accordance with SABS 1200 standards, which deal with guidelines for civil engineering and general construction works. Any environmental issues that are identified during or after construction will be addressed in consultation with the Environmental Control Officer (ECO). This EMPr informs the developer of his duties with particular reference to the prevention and mitigation of environmental impacts caused by construction and operational activities associated with the project. As such, it should be noted that this document is a dynamic document that may require updating or revision where necessary. Should the Developer be permitted to continue with the upgrade of the access road, it will be his responsibility to ensure implementation of recommended mitigation measures as approved and directed by the DEDTEA.

3 LEGISLATION

Environmental legislation applicable to the formulation of an EMPr includes but is not restricted to the following:

8. **National Environment Management Act (Act No. 107 of 1998)**

The objective of NEMA is to provide for environmental governance in South Africa by establishing principles for decision-making. NEMA, among others, deals with matters affecting the environment and procedures for coordinating environmental functions exercised by government entities.

9. **National Water Act (Act No. 36 of 1998)**

The purpose of the Act is to ensure water resources are appropriately protected, used, developed, conserved and controlled. This includes: meeting the 'reserve' requirement for basic human needs and environmental flow; equitable access; redressing the result of past racial and gender discrimination; promoting the efficient, sustainable and beneficial use of water in the public interest; facilitating social and economic development; providing for growing demand for water use; protecting aquatic and associated ecosystems and their biological diversity; reducing and preventing pollution and degradation of water resources; and, managing floods and droughts.

10. **National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).**

The objectives of this Act are- (a) within the framework of the National Environmental Management Act, to provide for - (i) the management and conservation of biological diversity within the (ii) the use of indigenous biological resources in a sustainable manner; and (iii) the fair and equitable sharing among stakeholders of benefits arising (b) to give effect to 'ratified international agreements relating to biodiversity (c) to provide for co-operative governance in biodiversity management and (d) to provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

11. **The National Heritage Resources Act (Act No 25 of 1999 as amended)**

The National Heritage Resources Act aims to promote an integrated system for the identification, assessment, and management of the heritage resources of South Africa. Furthermore, it established the South African Heritage Resources Agency (SAHRA) to implement the Act. The Act describes a process to be complied with by developers with respect to the identification, assessment, and management of cultural heritage resources that may be affected by a development.

12. **Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)**

The Act notes the objective of this legislation as: "To provide for control over the utilisation of the natural agricultural resources in the Republic in order to promote the conservation of soil, the water resources, the vegetation and the combating of weeds and invader plants, and the matters connected therewith".

13. **South African Constitution Act (Act No. 107 of 1998), including the Bill of Rights (Chapter 2, Section 24).**

Section 24 in the Bill of Rights of the Constitution specifically states that: Everyone has the right –

- To an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative 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.

Other regulations include but are not limited to; -

14. **Environment Conservation Act (Act No. 73 of 1989)**
15. **Integrated Environmental Management (IEM)**
16. **Development Facilitation Act (Act No 67 of 1995).**
17. **The relevant Municipal norms and standards**

4 PARTIES INVOLVED

a. Project Manager / Engineer (PM / E)

The Project Manager / Engineer are the administrators of the project acting in line with requirements and scope of work from the developer. The engineer is responsible for all direct communication with the contractor.

b. Contractor (C)

The main Contractor(s) appointed by the developer for the construction of the road and any other associated works, or portion of the Project. The main Contractor(s) is required to adhere to the EMPr and is responsible to ensure that all sub-contractors, suppliers and staff appointed by them also adhere to the EMPr.

c. Environmental Control Officer (ECO)

An independent Environmental Assessment Practitioner appointed by the Developer to act on behalf of the Developer in matters concerning the day-to-day implementation of the EMPr and for liaison with the Engineer and Contractor. The ECO must monitor this development on a regular basis during the construction and rehabilitation phases to ensure compliance with the EMPr. Non-compliances identified must be communicated with the Project Manager (PM), Contractor and Developer with open channels of communication and liaison between these parties. Reports are to be compiled by the ECO which must include photographs taken during inspection and must be submitted to the Project Manager and Developer on a monthly basis.

d. Local Community

People residing or present in the region and near the project site.

e. Public

Any individual or group concerned with or affected by the Project and its consequences, including the local community, local, regional, and national authorities, investors, workforce, customers, consumers, environmental interest groups, and the general public.

5 PROJECT DETAILS



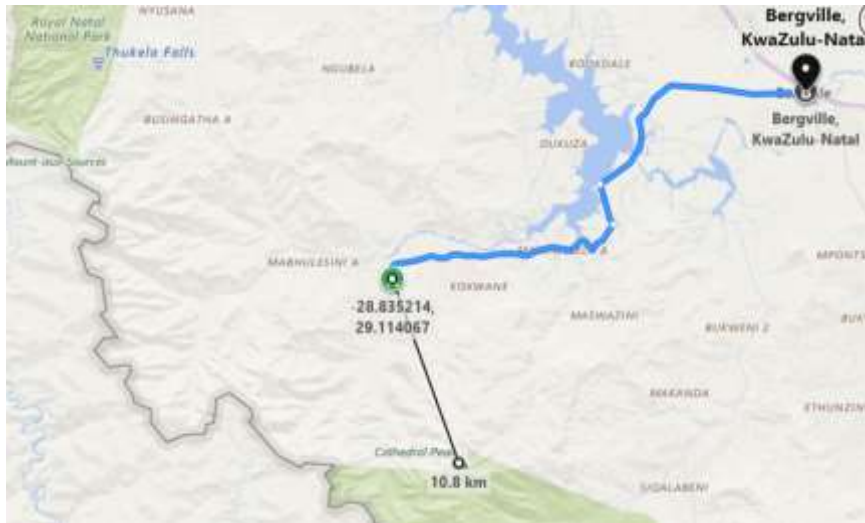
Okhahlamba Local Municipality within UThukela District Municipality, Kwa-Zulu Natal is currently undertaking the upgrade of Qhozo access road. The upgrade of the road has commenced from 0 Km – 1.7 Km; along that path there are no triggering aspects in terms of the EIA regulations 2014, as amended. The Engineers, Bi Infrastructure Consulting have instructed the contractor to not proceed upgrading beyond 1.7 km since there is a watercourse that exists at 1.8 km.

Figure 1: A google image showing the lineage of Qhozo access road and the location of identified water courses.

The Municipality proposes a concrete slab to be constructed within the watercourse (Length = 10 m, Width = 6 m, Height= 1 m). A Buffer of 100 m is maintained on site from the crossings. The scope of the application starts therefore from km 1.8 km and transverse 3.8 km of land, hence the total length of the road is 5.6 km. The proposed upgrade of the existing strand of road as it starts from 1.8 km to 2.46 km entails the construction of a concrete slab (as noted above) and the installation of a 900-diameter pipe. The remaining 3.14 km of the road consists of foot trails (**proposed to be constructed to a 7A type gravel road**) which transverse 4 watercourses; two of the watercourses join to form a single drainage (watercourse 3), hence the Municipality proposes to realign (constructing a new road) to this single drainage where a single culvert structure will be installed (Length = 10, 3 m; W = 9.6 m; Total area: 98.88 m² Rounded off: 100 m²). The road will then continue for the rest of the Length crossing over 2 watercourses, within which piped culverts (900 Diameter) are proposed. The entire project is located within 10 km from a the Drakensburg Mountains, which are a national park. Hence the construction part to the project name of the project is based on the proposed crossing structures (since none exists) and the upgrade part accounts for the road (foot trails and bare gravel areas).

The road is being upgraded to a 7A gravel type access road that has the following storm water drainage pipes and width of 6m and an unaltered / unelongated 5.6 km length; -

- The Municipality proposes a concrete slab to be constructed within a watercourse (Length = 10 m, Width = 6 m, Height= 1 m). The portion of the road within which the structure is proposed falls within 10 km from a National Park when measured on bing.com/maps.



*Approximation of Qhozo access road end to Ukhahlamba – Drakensberg Park – Cathedral peak.
An image sourced from: Bing.com/maps. (10.8 km).*

- The remaining 3.14 km of the road consists of foot trails which transverse 4 watercourses; two of the watercourses join to form a single drainage, hence the Municipality proposes to realign (constructing a new road) to this single drainage where a culvert will be installed (Length = 10, 3 m; W = 9.6 m; Total area: 98.88 m² Rounded off: 100 m²).
- 1 box culvert: L = 10, 3 m; W = 9.6 m
Total area: 98.88 m²

Rounded off: 100 m²

- 1 concrete slab
Length 10 m
Width 6 m
Height = 1 m, hence,
Volume = 60m³
- 1 box culvert:
L = 10, 3 m
W = 9.6 m
Height = 1.8 m

Total volume: 177.984m³

Wetland Assessment:

The causeway structures will be constructed within the boundaries of the drainage lines, which, as a result, will be directly impacted on. As this project entails the upgrade of infrastructure and the construction of new infrastructure, impacts associated with the area are potentially moderate to low, based on the current onsite crossings. Modifications to the watercourses' habitats is likely to occur during construction.

The Moderate risks identified for the construction phase of the project are associated with changes in drainage from the watercourses through channelling or compaction. The increase bare/impervious areas will increase the sediment loads carried down slope into downstream watercourse areas. The moderate risks associated with the construction phase were readjusted to Low ratings with the anticipation that all the prescribed mitigation measures will be implemented.

Road and causeway construction mitigation measures (Wetland Assessment).

The following causeway construction specific mitigation measures are provided:

- The footprint area of the construction should be kept a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas;
- All construction activities and access must make use of the existing road;
- Culverts are to be placed during the dry season;
- Exposed road surfaces awaiting grading must be stabilised to prevent the erosion of these surfaces. Signs of erosion must be addressed immediately to prevent further erosion of the road;
- Silt traps and fences must be placed in the preferential flow paths along the road to prevent sedimentation of the watercourse;
- Temporary storm water channels should be filled with aggregate and/or logs (branches included) to dissipate flows;
- The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly;
- It is recommended that the material surrounding and holding the culverts in place include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability to accommodate flooding and very low flows;
- The culverts used in the design should be as large as possible, partially sunken and energy dissipating material must be placed at the discharge area of each culvert to prevent erosion of these areas;
- Large aggregate outsourced or from the project area (if available) can be used for energy dissipation in the channel downstream of the culverts to reduce the likelihood of scouring the river bed and sedimentation of the catchment. It is preferable that larger aggregate be used to avoid flows removing material from the site;
- The use of larger culverts will prevent the build-up of debris by allowing the free movement of debris through the large culverts;
- Culverts should avoid inundation (damming) of upstream areas by facilitating streamflow and catering properly for both low flows and high flows;
- Surface run-off from the roads flowing down the embankments often scours the watercourse on the sides of the culvert causing sedimentation of the channel. This should be catered for with adequate concreted storm water drainage depressions and channels with energy dissipaters that channel these flows into the river in a controlled manner;
- The culvert installations should further take into account the scouring action of high flows and gabion structures or similar should be placed on both sides of the culvert on the embankments both upstream and downstream. This will serve as retention of the soils from scouring around and underneath the culvert structures aiding in the protection of the structure; and

ARCHAEOLOGICAL AND CULTURAL HERITAGE IMPACT ASSESSMENT:

Vhubvo Archaeo-Heritage Consultants Cc was appointed by Isolendalo Environmental Consulting to conduct an Archaeological and Cultural Heritage Impact Assessment for the proposed upgrade and construction of Qhozo access road in Bergville within Okhahlamba Local Municipality of uThukela district municipality in KwaZulu-Natal province. The investigation was conducted with the exclusive purpose of completely identifying and documenting archaeological sites, cultural resources, sites associated with oral histories, graves, cultural landscapes, and any structure of historical significance that may be affected by the proposed construction, as well as to recommend proper mitigation measures should any archaeological materials or sites be affected.

As part of this archaeological impact assessment, the following tasks were conducted: 1) site file search, 2) literature review, 3) consultations, and 4) analysis of the acquired data, leading to the production of a report (Annexure E). As required by legislature, no subsurface investigation was undertaken, since a permit from Amafa is required to do so, as a result, archaeological materials may be under the surface and therefore unidentifiable to the surveyor until they are exposed once construction resumes. The Phase I Archaeological and Cultural Heritage Impact Assessment for the proposed construction and upgrade of Qhozo access road yielded no archaeological materials within the vicinity of the proposed project. (see report as it is attached within annexure E)

IMPACT MANAGEMENT MEASURES FROM SPECIALIST REPORT

It is the responsibility of the developer to notify contractors and workers about archaeological material (e.g., pottery, stone tools, remnants of stone-walling, graves, etc) and fossils that may be located underground. Thus, unavailability of archaeological material does not mean absentee, archaeological material might be hidden underground, as such the client is reminded to take precautions during construction.

Prior to construction, contractors should be given training on how to identify and protect archaeological remains that may be discovered during the project. The pre-construction training should include some limited site recognition training for the types of archaeological sites that may occur in the construction areas. Below are some of the indicators of archaeological site that may be found during construction: Flaked stone tools, bone tools and loose pieces of flaked stone; Ash and charcoal; Bones and shell fragments; Artefacts (e.g., beads or hearths); Packed stones which might be uncounted underground, and might indicate a grave or collapse stone walling.

The specialist noted that the proposed construction can proceed without further archaeological or cultural heritage assessment, "It is recommended that Amafa approve the proposed development to proceed without further archaeological assessment". However, the specialist also noted that the report is void without approval from Amafa.

6 RECORD KEEPING

Should the construction of the access road be given permission to continue, provisions of the EMPr must be implemented accordingly with especially rehabilitation and operational measures. An Environmental Control Officer must be appointed to monitor implementation. All reports by the ECO and copy of the EMPr must be kept on site.

7 COMPLIANCE AND PENALTIES

The duration over which the Contractor’s controls shall be in place cover the construction period of the project as well as the limited time after the contract completion in the General Conditions of Contract, and the project specifications, as the defects liability period.

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

1. There is evidence of contravention of clauses with the boundaries of the site, site extensions and access roads;
2. Environmental damage occurs due to negligence;
3. The contractor fails to comply with corrective or other instructions issued by the Project Manager or Engineer or Environmental Control Officer within a specified time frame;
4. The contractor fails to respond adequately to complaints from the public or local community.

The Contractor must act immediately after a notice of non-compliance is received, and correct the cause for the issuing of the notice. Application of a penalty clause will apply for incidents of non-compliance. The penalties imposed per incident or violation will be as follows:

Incident / Violation	Penalty
Failure to stockpile material correctly	R 2 500
Pollution of water bodies	R 8 000
Failure to control storm water runoff	R 3 000
Failure to provide adequate sanitation	R 5 000
Unauthorized clearing / removal of vegetation	R 5 000
Failure to provide adequate waste disposal facilities and services	R 15 000
Failure to reinstate disturbed areas within specified time period	R 5 000
Failure to rehabilitate disturbed areas within 3 months of completion	R 7 000
Any other contravention of the environmental specification	R 2 000

The imposition of such a penalty will not preclude the relevant provincial authority from applying an additional penalty in accordance with statutory powers. Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as deemed fit. The polluter-pays principle applies.

The “polluter-pays” principle provides that *“the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment. NEMA imposes a duty of care on every person who causes, has caused or may cause significant pollution or degradation of the environment is authorised by law or cannot reasonably be avoided, NEMA requires that the pollution be minimised and rectified.*

Furthermore, NEMA makes provision for damages to be awarded by the courts where loss or damage has occurred as a result of a contravention of certain environmental statutes. For example, offences under the National Water Act No. 36 of 1965 and the Environmental Conservation Act No. 73 of 1989 may result in penalties being imposed in terms of NEMA. Importantly, NEMA provides

for the liability on conviction of employees, managers, agents and directors for any offences resulting from the failure to take all the reasonable steps that were necessary under the circumstances to prevent the commission of an offence.

8 AMENDMENTS TO THE EMPr

Any amendments to the EMPr shall be made in agreement between the ECO and Project Manager. Some of the provisions within the EMPr may be altered during the construction phase as is seen necessary by the ECO.

9 SIGNING OF THE EMPr

The acknowledgement form at the back of the EMPr is to be signed by the Developer and Contractor.

10 PROCEDURE

10.1 Pre-construction Phase

A pre-construction meeting will be conducted with the professional team to understand the contents of the EMPr and address any arising issues prior the commencement of construction activities. The requirements of the EMPr must be incorporated into any tender/contract documents by way of specific clauses that convey the impact and mitigation required. These clauses are to be agreed between the responsible professional members of the team and the environmental consultant.

10.2 The Construction Phase: Responsibilities and General Matters

Miscellaneous environmental matters and the relationships between the Contractors, ECO and the other members of the professional team are outlined in this section.

10.3 Activity

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

10.4 Management/Mitigation Measures

This section in the table indicates the actions required to either prevent and / minimize the potential impacts on the environment that is associated with the project

10.5 Responsibility

The section indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr. Formal responsibilities are necessary to ensure that key procedures are executed.

10.6 Frequency/Timing

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

Environmental Audits shall be undertaken at least once a month until the construction is complete.

A. PRE-CONSTRUCTION PHASE

Activity	Management / Mitigation	Responsibility	Frequency / Timing
A1 - Legislation, permits, agreements and EA requirements	All members of the project team must adhere to all environmental legislation relevant to the project as highlighted in Section 3.	All	Pre-, during and post construction.
	<ol style="list-style-type: none"> 1. The EMPr must be kept on site at all times. 2. All members of the project team must be provided with adequate environmental training. 3. Any and all mitigation measures that must be set up prior construction must be implemented. 4. Monitoring and control programmes must be put in place to manage alien invasive plants. 5. The working area is to be clearly demarcated and all construction work is to be kept within the demarcated area. 	All	Ongoing
A2 - Access to site	11 A2.1 Routing		
<i>Sound environmental principles must be followed</i>	1. Existing access route must be used. Movement of vehicles within the site must be limited to access route and disturbed areas to avoid creating new disturbances.	ECO, C & PM	Prior to moving onto site and during construction
A3 - Setting up the construction camp <i>Careful planning of the construction camp can ensure that time and costs associated with environmental management and rehabilitation are reduced.</i>	A3.1 Layout & Location	E / C / PM / ECO	During surveys and preliminary investigations and prior to moving onto site
	a. If there are already building structures on the site, one must be used to house the site office to avoid new disturbances.		
	b. The area used for site camp including laydown areas must be kept neat at all times.	E / C / PM / ECO	During site establishment
	A3.2 Ablutions		
	a. Temporary chemical toilets must be provided by a company approved by the Engineer.	PM / C / ECO	During set-up
	b. The construction of a “long-drop” is forbidden.	E / PM / ECO	On-going
	c. A service plan for the maintenance of the toilets must be provided by the Contractor and is to be approved by the Engineer and ECO to ensure toilets are properly serviced and hygienic.		
A3.3 Provision for Camp Waste Disposal			

	<p>a. Bins and / or skips must be provided at convenient intervals for the disposal of waste within the camp. The bins must be covered. Bins should have liner bags for efficient and safe disposal of waste.</p> <p>b. Recycling and the provision of separate waste receptacles for different types of waste should be encouraged. Where possible, plastics, paper, glass and cans should be separated from other domestic waste for recycling. If waste is to be recycled, appropriately labelled waste receptacles must be made available.</p> <p>c. Any potentially hazardous containers must be punctured or disabled prior to disposal.</p>	PM / C / ECO	During site set-up and on-going		
<p>A4 – Establishing Equipment Lay-Down & Storage Areas</p> <p><i>Storage areas can be hazardous, unsightly and can cause environmental pollution if not designed and managed carefully. Hazardous substances are those that are potentially poisonous, flammable, carcinogenic, or toxic. Some examples are: diesel, petrol, oil, bitumen, cement, solvent based paints, lubricants, explosives, drilling fluids, pesticides, herbicides, LPG.</i></p>	<p>A4.1 – General Substances and Materials</p>				
	<p>a. Location for equipment lay-down and storage areas must be located within previously disturbed areas for this project.</p> <p>b. Fire extinguishers must be present at all storage facilities.</p> <p>c. Storage areas must be secure so as to minimise the risk of crime. They must be safe from access by children and animals etc.</p>	PM / E / C / ECO	During site set-up		
	<p>A4.2 –Hazardous Substances and Materials</p>				
	<p>a. Storage areas for hazardous substances or materials must be fenced and access controlled.</p> <p>b. These storage facilities must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources. The Contractor shall submit a method statement to the Engineer and ECO for approval.</p>				
	<p>c. Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs must additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes.</p>		Ongoing		
	<p>d. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. The Contractor must ensure that its staff is made aware of the health risks</p>	PM / E / C / ECO			

	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.		During construction
	e. All concrete mixing must take place on a designated, impermeable surface.		
A5 – Education of site staff on general and environmental conduct	A5. 1 – Education		
<i>These points need to be made clear to all staff on site before the project begins</i>	a. The Contractor must ensure that all site personnel have a basic level of environmental awareness training. Environmental awareness posters must be used on site.	PM / C / ECO	During staff induction and on-going
	b. Staff operating equipment shall be adequately trained and sensitized to any potential hazards associated with their tasks	PM / E / C / ECO	During staff induction, followed by on-going monitoring
	c. The Engineer / ECO must be on hand to explain more difficult / technical issues and to answer questions which may be raised.		
	d. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Management.		
	e. All employees must undergo the necessary safety training.		



	<p>A5.2 – Worker conduct on site</p>	<p>PM / C</p>	<p>During staff induction, followed by on-going monitoring</p>
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	<p>a. A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following rules:</p> <ul style="list-style-type: none"> a. No alcohol / drugs to be present on site, no vehicles or machinery are to be operated whilst under the influence of alcohol or drugs. b. Prevent excessive noise to minimize disturbances to local residents. c. No firearms allowed on site or in vehicles transporting staff to / from the site (unless used by security personnel). d. Bringing pets onto site is forbidden. e. Construction staff are to make use of facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility is strictly forbidden). No fires to be permitted on site. The use of gas-operated cookers for preparation of food on site must be encouraged. f. Trespassing on private / commercial properties adjoining the site is forbidden. g. Only pre-approved security staff and workers shall be permitted to live on the construction site. h. No worker may be forced to do work that is potentially dangerous or for what he / she is not trained to do. i. The staff conduct rules are described in a separate table of Rules (Section F of the EMP). This is aimed at providing staff with the basic information regarding worker conduct on site) 		
<p>A6 – Social Impacts <i>It is important to take notice of the needs and wishes of those</i></p>	<p>A6.1 Public Participation</p>		
	<p>a. All Interested and Affected Parties (IAPs) must be notified of the starting date of construction and the proposed duration.</p>	<p>E / PM/ C</p>	<p>Prior to moving onto the site and on-going</p>

<i>living or working adjacent to the site. Failure to do so can cause disruption to work and increase cost in the form of delays.</i>	b. Open liaison channels must be established between the developer, the contractors and Interested and Affected Parties (IAPs) such that any queries, complaints or suggestions can be dealt with quickly and by the appropriate person(s). The IAPs can be identified as those that live close by the site, work close to the site, will have their services / infrastructure affected by the project, have a general interest in the project, and / or the ward Councillor in which the construction is taking place.	E / PM	Prior to moving onto site and on-going
	c. Adequate designated parking must be provided for site staff and visitors.	C / PM	Prior to moving on site
	d. A complaints register must be kept on site. IAPs need to be made aware of the existence of the complaints book and the method of communication available to them. Details of complaints must be incorporated into the audits as part of the monitoring process. This must be in carbon copy format, with numbered pages.	C / PM / ECO	On-going
	A6.2 Noise Impacts		
	a. Construction vehicles / machines are to be fitted with standard silencers prior to the beginning of construction. Operating and service standards must be followed as per operating instructions of the vehicles and machines.	E / PM / C	During surveys and Prelim Investigations and site set up.
A8 Soil Erosion	A.8.1 Conservation of Valuable Soil Resources		
<i>The stripping of vegetation during preliminary activities on site greatly increases the risk of soil erosion.</i>	a. Procedures that are in place to conserve topsoil during the construction phase of the project are to be applied to the set-up phase.	E / PM / C / ECO	Throughout the duration of the project
A9 Stormwater	A.9.1 Storm water Damage Prevention		
	a. To prevent storm water damage, the increase in storm water runoff resulting from the construction activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Engineer.	E / ECO / PM	During surveys and preliminary investigations.
A.10 Water Quality	A.10.1 Maintenance of Water Quality		
	a. Storage areas that contain hazardous substances must be bunded with an approved impermeable liner.	E / PM / ECO	During site set up.

<p><i>Incorrect disposal of substances and materials and polluted run-off can have serious negative effects on groundwater quality.</i></p>	<p>b. Vehicle washing, and maintenance must be in such that it does not result in harm on the surrounding environment. A set-up must therefore be made to ensure no polluted water enters the natural environment.</p>		
<p>A.12 Set up of Waste Management</p>	<p>A.12.1 Waste Management</p>		
	<p>a. The contractor is responsible for the internal collection of refuse and for transporting it to a registered landfill site once every week; unless a service agreement is entered into between the contractor and the municipality.</p>	<p>C</p>	<p>During site set up</p>
	<p>b. The excavation and use of rubbish pits is forbidden.</p>	<p>PM / ECO / C</p>	<p>During site set up</p>
	<p>c. Burning of waste is forbidden¹.</p>		
	<p>d. A fenced area must be allocated for waste sorting and storage prior to removal.</p>	<p>C / PM / ECO</p>	<p>During site set up and on going</p>
<p>e. Individual skips/bins for different types of waste (e.g. 'household' type refuse, building rubble, etc.) must be provided.</p>			
<p>A.13 Safety and Security</p>	<p>A.13.1 Fencing / Demarcation</p>		
	<p>a. all necessary signage must be obtained prior to the commencement of construction activities.</p>	<p>PM / C / ECO</p>	<p>On-going.</p>
	<p>A.13.2 Lighting</p>		
	<p>a. Lighting on the construction campsite is to be set out to provide maximum security and to enable policing of the site, without creating a visual nuisance to local residents or businesses.</p>	<p>PM / C / ECO</p>	<p>On-going</p>
	<p>A.13.3 Risks Associated with Materials on Site</p>		
<p>a. All IAPs must be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples of these are blasting, earthworks / earthmoving machinery on steep slopes above houses / infrastructure, risk to residences along haulage roads / access routes.</p>			

¹ A possible exception to this may be that the alien invasive vegetation, which is removed from the site, should be burned to prevent the spread of the plants.

B. CONSTRUCTION PHASE



This pertains to all environmental impacts associated with construction and is not limited to the land on which the Project is located. It includes the site footprint, construction campsites, access roads and tracks, as well as any other area affected or disturbed by construction activities. The EMPr (particularly the specifications for rehabilitation) is relevant for all areas disturbed during construction. Furthermore, the EMPr takes into account all secondary impacts on the local community and the public.

Activity	Management / Mitigation	Responsibility	Frequency / Timing
B1 – Access to the site	B1.1 Maintenance of the access		
	a. Access to the site must be controlled and managed in such that it does not result in excessive environmental damage.	PM / E	Initial set up and on-going
	b. Contractors must ensure that access roads are maintained in good condition by attending to any damage as it occurs.	E / C / ECO	Establish at setup
	c. Unnecessary compaction of soil by heavy vehicles must be avoided; construction vehicles must be restricted to demarcated access, haulage routes and turning areas.	PM / C / EC	On-going, and specifically after heavy rain
	d. The construction signs must be placed at the beginning of the project indicating all necessary information such as Contractor and Municipality. Approval must be sought from the relevant authority for the installation of the signage.	PM / E / C / ECO	
	e. Machine / vehicle operators must receive clear instructions to remain within demarcated access routes. Movement of heavy-duty vehicles and vehicles connected with work in progress must be restricted to the construction zone.	E / C / PM	On-going, and specifically after heavy rains
B.2 Maintenance of Construction Camp	B.2.1 Surfaces		
	a. The Contractor must monitor and manage drainage of the campsite.	PM / C / ECO	Weekly inspection
	b. Run-off from the campsite must not discharge into neighbours' properties.		
B.2.2 Ablutions			

	a. Temporary chemical toilets must be provided by a company approved by the Engineer. The toilets must be made available to all staff and must be no closer than 50m from any watercourse. These facilities must comply with local authority regulations, be maintained in a clean and hygienic condition. Their use must be strictly enforced.	C/ECO	On-going
	b. The construction of a "long-drop" is forbidden and Contractor is to ensure that open areas or the surrounding bush are not being used as a toilet facility.	C / ECO	On-going
	c. There shall be a minimum of 1 toilet for every 20 workers and these must be situated no further than 100m from the work front. A toilet must also be provided at campsite.	PM / ECO	On-going
	d. Under no circumstances may open areas or the surrounding bush or degraded and built up areas be used as a toilet facility.	PM / ECO	On-going
	e. A registered chemical waste company is to be used to remove waste from chemical toilets on site on a regular basis. Proof of toilet service and safe disposal of effluent must be kept on site for each service.	PM / ECO	On-going
B.2.3 Camp Waste Disposal			
	a. The Contractor must ensure that all litter is collected from the work and camp areas daily. The construction area must be cleared of litter, debris (e.g. Cement packets, bitumen residues etc.) and other domestic waste on completion of the day's work.	PM / C / ECO	On-going
	b. Bins and / or skips must be emptied regularly and waste must be disposed of at a registered landfill site. Waybills for all such disposal are to be kept by the Contractor for review by the Engineer / ECO.	PM / C / ECO	Daily
B.2.4 Eating Areas			
	a. Eating areas must be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	E / PM / C	Weekly monitoring

	b. All litter throughout the site must be picked up on a daily basis and placed in the bins provided with waste to be separated according to type of waste.	E / PM / C	On-going monitoring
	B.2.5 Housekeeping		
	a. The Contractor must ensure that his camp and working areas are kept clean and tidy at all times.	PM / C	On-going
B.3 Staff Conduct	B.3.1 Environmental Education and Awareness		
	a. The Contractor must monitor the performance of the construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the ECO should be called to the site to further explain aspects of environmental or social behaviour that are unclear.	PM / C / ECO	On-going
	B.3.2 Worker Conduct on Site		
	a. The rules that are explained in the worker conduct section must be followed at all times. Non-compliance of these rules could result in the removal of workers by the contractor.	PM / C / ECO	On-going
B4 – Dust / Air Pollution	B.4.1. Dust & Air Pollution		
<i>Main causes of air pollution are dust particles from vehicle movements and stockpiles, vehicle emissions and fires</i>	a. Vehicles travelling to and from the construction site must adhere to the speed limits so as to avoid producing excessive dust. A speed limit of 40 km/h must be adhered to on the construction site.	E / C / PM	As directed by Engineer
	b. Construction operational hours must be limited to between 07h00 and 17h00 will reduce congestion and disturbance in surrounding areas and minimize road deterioration and consequent dust creation.	E / C / PM	As directed by Engineer
	c. Access points and other cleared surfaces must be dampened whenever necessary and especially in dry and windy conditions to avoid excessive dust.	PM / C	On-going

	d. Should excessive emissions be observed from vehicles and machines; the Contractor is to have the equipment seen to immediately.	PM / C / ECO	On-going
	e. Stockpiles may cause dust and must therefore be managed in accordance with the guidelines in Materials Management.	PM / C / E	On-going
	f. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion.	E / PM / ECO	On-going
B5 – Soil Erosion	B.5.1 Topsoil Stripping and Stockpiling		
	a. Excavated soil and other material must be deposited in a spoil area as agreed with ECO and engineer.	PM / C / ECO	As each activity is completed.
	b. Erosion prevention measures must be implemented: Berms and sand bags may be used to contain all sediment whilst energy dissipaters must be constructed at all outflow points. The site must be monitored weekly for any sign of off-site siltation. All exposed earth must be rehabilitated promptly with suitable vegetation to protect the soil.	E / PM / C / ECO	On-going
	B.5.2 Exposed Surfaces		
	a. Side tipping of soil and excavated materials must not be permitted.	E / C / PM	As directed by the Engineer
	b. Storm water control and wind screening must be undertaken to prevent soil erosion on site.	E / ECO / PM	As directed by the Engineer
	c. There must be no offsite impacts of storm water. A general rule is that the storm water velocity eddies on the site must be the same as the predevelopment area.	E / ECO / PM / C	As directed by the Engineer
	d. In areas where steep slopes are excavated, erosion control measures need to be initiated and these may include the planting of indigenous vegetation at short intervals to prevent the formation of gullies.	E / ECO / PM / C	As directed by the Engineer

	f. A Storm Water Management Plan must be developed, provided and implemented by the engineer. Drainage must be controlled to ensure that runoff from the access road will not lead to erosion and offsite pollution of any water resources along the road. The storm water drainage system must not be contaminated by other waste sources generated during construction phase of the development.	PM / E / C / ECO	On-going and as directed by the Engineer
	g. Battering of all banks shall be such that cut, and fill embankments are no steeper than previous natural slopes unless otherwise permitted by the Engineer. Cut and fill embankments steeper than previous ground levels shall be re-vegetated immediately on completion of trimming or shall be protected against erosion using measures approved by ECO and Engineer.	PM / E / C / ECO	Ongoing and as directed by the Engineer
	h. If cut and fill earthworks are required, these must be limited to the minimum necessary for the proposed development. Cut and fill banks must not be sloped steeper than 1: 1.5. All fill must be well compacted in layers on placement and must not be loose end-tipped. No cut or fill slope must exceed 2.5 m vertical height. All earthworks must be vegetated as soon after completion of construction as is practically possible with locally sourced indigenous vegetation where possible.	E / PM	Directed by the Engineer
	i. All embankments, unless otherwise directed by the Engineer, shall be protected by a cut off drain to prevent water from cascading down the face of the embankment and causing erosion.	E / C / ECO	Directed by the Engineer
B6 – Storm Water	B6.1 General Principles		
<i>Construction activities frequently result in diversion of natural water flow resulting in concentration of flow and an increase in the erosive potential of the water</i>	a. The Contractor must not in any way modify nor damage the banks or beds of streams, rivers, wetlands, other open water bodies and drainage lines adjacent to or within the designated area, unless required as part of the construction project specification. Where such disturbance is unavoidable approval must be obtained from the ECO.	E / PM / ECO	As surface becomes exposed

	b. Earth, stone and rubble is to be properly disposed of so as not to obstruct natural pathways over the site. i.e. these materials must not be placed in storm water channels, drainage lines or rivers.	E / PM / ECO / C	On-going
	c. The provisions of the National Water Act 36 of 1998 shall be complied with at all times.	PM / C / E / ECO	On-going
	d. The Contractor is to ensure that impediments to natural water flow is avoided during construction, or is temporarily diverted.		
	e. There must be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.		
B.6.2 Un-channelled Flow			
	a. During construction un-channelled flow must be controlled to avoid soil erosion.	PM / C / E / ECO	On-going monitoring
	b. Where surface runoff is concentrated (e.g. along exposed tracks), flow must be slowed by contouring.	E / ECO / PM	On-going
B7 – Water	B7.1 Water Quality		
<i>Water quality is affected by the incorrect handling of substances and materials. Soil erosion and sediment is also detrimental to water quality. Mismanagement of polluted runoff from vehicle and plant washing and wind dispersal of dry materials into rivers and watercourses are detrimental to water quality.</i>	a. The Department of Water Affairs and the ECO as well as other emergency contact numbers provided by the Municipality must be contacted in order to deal with spillages and contamination. The Contractor is to compile a list of emergency contact numbers to refer to in order to deal with fire, spillages and contamination of land and aquatic environments.	PM / E	On-going monitoring
	b. Every effort must be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on site.	PM / E / ECO	On-going monitoring / as the work progresses
	c. Care must be taken to ensure that runoff from vehicle or plant washing does not enter surface or ground water. Vehicles and machinery may only be cleaned at a designated place at the construction camp.		

	d. Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface.	PM / E / C	
	e. Contaminated wastewater must be managed by the site manager to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility.	PM / C / ECO	
	f. Site staff shall not be permitted to use any watercourse or natural water source adjacent to the designated site for the purposes of bathing, washing of clothing or for any construction related activities. Municipal water (or another source approved by the Contractor) must instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, compacting etc.	PM / C / ECO	
	g. Dewatering of vessels, tanks, etc is to take place in a controlled manner. No uncontrolled release of water shall be allowed onto the site area. Water wastage must be avoided and where possible water must be recycled.	PM / C / ECO	
B7.2 Water Supply			
	a. Any existing potable water source affected by the road construction is to be maintained for domestic use during construction.	E / PM	
B8 – Conservation of the Natural Environment	B8.1 Fauna and Flora		
	a. The Contractor is to check that vegetation clearing has the prior permission of the E / ECO. Vegetation that is removed is to be replanted and excavation is to be kept to a minimum.	ECO / PM / E / C	On-going monitoring / as the work progresses
	b. Development infrastructure must be screened wherever possible from ecologically sensitive areas to reduce the human disturbance factor.	C / PM / ECO	

	c. Alien vegetation encroachment onto the site as a result of construction activities must be controlled during construction. Immediate re-vegetation of stripped areas and removal of aliens by weeding must take place.	ECO / PM / E	
	B8.2 Geology		
	a. In the event of excavation, the material that is removed must be separated into topsoil and subsoil. The top 150mm would be considered topsoil and must be stockpiled separately.	PM / C / ECO	On-going monitoring
	b. In the event of infilling, replacement of subsoil must precede the topsoil replacement, and all material must be well compacted.		
B9 – Materials Management	B9.1 Stockpile Management		
	a. Stockpiles must not be situated such that they obstruct natural water pathways.	PM / C / ECO	On-going monitoring
	b. Stockpiles must not exceed two (2) metres in height unless otherwise permitted by the Engineer or be left for longer than three (3) months.	PM / C / ECO / E	On-going monitoring
	c. Stockpiles must be protected from erosion using appropriate measures for conditions the stockpiles are exposed to which may include construction of berms or low brick walls around their bases.	PM / C / E / ECO	On-going monitoring
	d. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding.		
	B9.2 Handling of Hazardous Materials		
	a. Cement, bitumen and other potential environmental pollutants must be mixed on an impermeable surface with special provisions for storm water management.	E / PM / C / ECO	On-going
	b. All empty containers must be removed from the site for appropriate disposal at a licensed facility and must be treated as hazardous waste.		
	c. No vehicles transporting concrete may be washed on site.		

	d. All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site.		
	e. Hazardous substances / materials are to be transported in sealed containers or bags.		
	f. The Contractor is to outline a method statement for the dealing with accidents / spillages of hazardous materials. This statement must be handed to the Engineer as well as ECO.		
B9.3 Sourcing construction materials			
	a. Wherever possible, materials that have been produced locally must be used for the construction of the site camp (e.g. bricks, window frames, etc)	E / C / PM	On-going monitoring
B10 – Waste Management	B10.1 On-site Waste Management		
<i>Definition; “Refuse” refers to all construction waste (such as rubble, cement, bags, timber, cans etc)</i>	a. The Contractor shall ensure that all refuse is collected from the camp and work areas daily.	PM / ECO	Monitored weekly and at the start of the builders holidays
	b. All material used for construction and maintenance must be removed from the site after construction or maintenance work.	PM / ECO	On-going
	c. Refuse must be placed in the designated skips / bins which must be regularly emptied. These must remain within demarcated areas and must be covered to prevent wind-blown rubbish and scavenging by people and animals.	PM / C / ECO	On-going
	d. In addition to the waste facilities within the construction camp, provision must be made for waste receptacles to be placed at intervals along the work front.	ECO / PM / C	On-going
	e. Littering on site is forbidden and the site shall be cleared of litter at the end of each working day.	ECO / PM	On-going
	B.10.2 Waste Disposal		
Non – hazardous waste			
	a. All waste must be removed from the site and transported to a registered landfill site.	E / PM / ECO	On-going

	b. Any construction rubble shall be disposed of at registered disposal sites.	PM / E / C / ECO	On-going
	c. Waste from chemical toilets must be disposed of regularly and in a responsible manner by a registered waste contractor. Care must be taken to avoid contamination of soils and water, pollution and nuisance to adjoining areas.	PM / ECO	On-going
	Hazardous Waste		
	a. Contaminated water associated with construction activities must be contained in separate areas with berms and must not be allowed to enter into the natural drainage system.	PM / C / ECO	On-going
	b. Chemical waste must be stored in appropriate containers and disposed of at licensed disposal facilities.	PM / C	On-going
	d. Soil that is contaminated with, e.g. cement, bitumen, petrochemicals or paint must be disposed of at a registered hazardous landfill site.	PM / ECO / C	On-going
	e. A sump must be created for concrete waste. This is to be de-sludged regularly and the cement waste is to be removed to a tip site as approved by the local authority.	E / PM / ECO	At least 24 hours prior to the activity taking place.
B.11 Social Impacts	B.11.1 Disruption of Infrastructure and Services		
<i>Regular communication between the Contractor and the IAPs is important for the duration of the contract.</i>	a. Contractors activities and movement of staff is to be restricted to designated construction areas.	PM / C	On-going
	b. Should the construction staff be approached by members of the public or other stakeholders, they must assist them in locating the Engineer or Contractor or provide a number on which they may contact the Engineer or Contractor.	E / PM / C	Monthly
	c. The conduct of the construction staff when dealing with the public or stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the Engineer.	E / PM / C	

	d. Disruption of access for local residents must be minimised and must have the consent of the Engineer.	E / PM / ECO	
	e. The Contractor is to inform neighbours in writing of disruptive activities at least 24 hrs beforehand.	PM / C / ECO / E	
	f. Drivers of construction vehicles must exercise care when travelling to and from the site specifically when travelling through. Drivers of construction vehicles must be considerate of other road users. They are to be especially careful at narrow sections and water crossings or where livestock is being herded.	PM / C	
B.11.2 Visual Impacts			
	b. The site must be kept clean to minimize the visual impact of the site.	PM / C / ECO	As required
B.11.3 Noise			
	a. Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbours.	PM / C / ECO	On-going
	b. Notice of particularly noisy activities must be given to residents adjacent to the construction site. Noisy activities must be restricted to the times given in the Project Specification or General Conditions of Contract.	PM / C / ECO	On-going
B.11.4 Communication with Interested and Affected Parties (IAPs)			
	a. The Engineer and Contractor are responsible for on-going communication with those people that are interested / affected by the project.	PM / C / E / ECO	On-going
	b. Queries and complaints are to be handled by: - documenting details of such communications; - submitting these for inclusion in the complaints register; - bringing issues to the Engineers attention immediately; - taking remedial action as per Engineer's instruction.		

	c. Selected staff are to be made available for formal consultation with IAPs in order to explain the construction process; answer questions.		
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C. POST-CONSTRUCTION

Activity	Management / Mitigation	Responsibility	Frequency / Timing
C.1 Construction Camp	C.1.1 Construction Camp Rehabilitation		
	a. All structures comprising the construction camp are to be removed from site.	E / PM / C / ECO	Project completion.
	b. The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint and fuels, etc. and these must be cleaned up.		
	c. All hardened surfaces within the construction camp area must be ripped, all imported materials removed, and the area shall be top-soiled and re-grassed using the guidelines set out in the re-vegetation specification.		
	d. The Contractor must arrange the cancellation of all temporary services.		
C2 – Vegetation	C.2.1 Landscaping		
	a. All disturbed areas or areas, which have been engineered for the purpose of the development, are to be rehabilitated with indigenous vegetation, which must be sourced from surrounding areas where possible. This will aid in preventing erosion within the site.		
	b. There must be ongoing weeding of vegetated areas especially areas around the wetland and other areas with sensitive vegetation to remove alien plant species.		
C3 – Land Rehabilitation	C.3.1 Land Rehabilitation		

	a. Excavated soil and soil disturbance – excavated soil not used in the development must be disposed of in a designated area as agreed with Engineer. Surfaces are to be checked for waste products from activities such as concreting and asphaltting and cleared in a manner approved by the engineer.	E / PM / C / ECO	Project Completion
	b. Rehabilitation must be executed in such a manner that surface runoff will not cause erosion of disturbed areas during and after rehabilitation.	E / PM / C / ECO	Project Completion
	c. All rubble is to be removed from the site to an appropriate disposal site as approved by the Engineer. Burying of rubble on site is prohibited.		
	d. The site is to be cleared of all litter.		
	e. All embankments are to be trimmed, shaped and re-planted to the satisfaction of the Engineer and ECO.	E / PM / C / ECO	
	f. All trimmed and / or compacted areas must be left rough to facilitate binding of topsoil and vegetation.	E / PM / C	
C4 – Materials and Infrastructure	C.4.1 Removal of Barriers, Remediation of Damage		
	a. All material used for building and maintenance must be removed from site after construction or maintenance.	PM / C / ECO	As completed
	b. The Contractor must repair any damage that the construction works has caused to adjacent areas.	PM / C / ECO	Continually as necessary
	c. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.	PM / E / C	On completion
	e. All residual topsoil stockpiles must be removed and disposed of as agreed with ECO and Engineer.	PM / E / C	On completion
	f. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer and ECO.	PM / E / ECO / C	On completion

C5 – General	C.5.1 General Remediation		
	a. Temporary road works must be closed and access across these blocked.	E / PM / C	On completion of the construction and maintenance phases.
	b. All areas where temporary services including the borrow pit are to be rehabilitated to the satisfaction of the Engineer and ECO.	E / PM / C / ECO	
	c. A Meeting is to be held on site between the Engineer, ECO, and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer and ECO.		

D. OPERATIONAL PHASE

Activity	Management / Mitigation	Responsibility	Frequency / Timing
D1 – Vegetation / Landscape Management	a. All rehabilitated areas will need to be maintained and re-seeded with local indigenous vegetation where necessary on a regular basis.	The Local Municipality	On-going
D2 – Noise Control	a. All vehicles must be in good condition and follow the norms and standards for noise control that are applicable for race cars.		
	b. Trees may be planted, or walls built around the property to buffer the noise that is released to the surrounding community.		
	c. All neighbours must be notified in due time of the construction activities.		
	d. The sound system must be tested before events to ensure that sound levels are high enough to be heard within the property with as little impact on the surrounding community as possible.		
D 5.4 Storm water Management	a. The storm water management system implemented as part of the road must be monitored and maintained to ensure continued efficient functionality.		

D 5.5. Solid Waste / Refuse Removal	a. Any waste which is produced from maintenance activities must be appropriately disposed of without any harm to the environment.		
D6 - Soil Erosion	a. The following measures need to form part of the management of the site: 1. Monitoring storm water exit points. 2. Fill in and re-vegetate eroded areas.		
D7 – Management of the Development	a. The development must be controlled to ensure that there are no further damages to the affected environment.		
	b. Local environmental authority must be informed in due time of any intended changes or developments which may affect the environment. Furthermore, the Competent authority may at any point visit the site to monitor whether any further environmental degradation has occurred.		

E. DECOMMISSIONING PHASE

It is imperative that non-functional structures be removed as soon as possible, and that the site is rehabilitated as soon as possible.

The following general mitigation measures must be implemented:

- The water resources outside of the specific project site area must be avoided where possible;
- The construction vehicles and machinery must make use of existing access routes as much as possible, before adjacent areas are considered for access;
- Laydown yards, camps and storage areas must be beyond the aquatic areas. Where possible, the construction of the crossings must take place from the existing road and not from within the watercourse and associated buffer;
- The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly;
- It is preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces;
- Prevent uncontrolled access of vehicles through the water resources system that can cause a significant adverse impact on the hydrology and alluvial soil structure of these areas;
- All chemicals and toxicants to be used for the construction must be stored outside the channel system and in a bunded area;
- All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site;
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping";
- Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation);
- Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems;
- All removed soil and material must not be stockpiled within the system. Stockpiling should take place outside of the watercourse. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;
- Erosion and sedimentation into the channel must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed banks;
- Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil;
- Large trees and other debris often collect upstream against the causeways, damming up the channel with risk of flooding and damaging the crossing and its banks. This debris should be cleared routinely with appropriate disposal of the debris. Timber can be sold or donated to local communities;
- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.

F. STAFF CONDUCT CONTROL AND INFORMATION SHEET

	<u>ALL STAFF MUST OBEY THE FOLLOWING RULES:</u>
1	DO NOT leave the construction site untidy and strewn with rubbish that will attract animal pests.
2	DO NOT bring your pets to the construction site.
3	DO NOT trespass on private properties not linked to the project.
4	DO NOT carry a weapon on the construction site or in the vehicles transporting workers to and from the construction site.
5	DO NOT set fires unnecessarily.
6	DO NOT cause any unnecessary disturbing noise at the construction camp/site or at any designated worker collection/drop off points.
7	DO NOT drive a construction-related vehicle under the influence of alcohol.
8	DO NOT exceed the national speed limits on public roads or exceed the recommended speed limits in this management plan (where applicable) whilst driving a construction vehicle.
9	DO NOT drive a vehicle that is generating excessive noise (noisy vehicles must be reported and repaired as soon as possible).
10	DO NOT litter along the roadsides, including both public and private roads.
11	DO NOT remove or destroy vegetation at the construction camp/construction site without the prior consent of the Project Manager and Environmental Control Officer.
12	DO NOT tamper with, destroy or remove vegetation from any areas that have been fenced off or marked.
13	DO NOT pollute watercourses, whether flowing or not.



12. ACKNOWLEDGEMENT FORM

Record of signatures providing acknowledgment of being aware of and committed to complying with the contents of this Environmental Management Programme (EMPr), which relates to the environmental mitigation measures for the project outlined below, and the environmental conditions contained in the civil and other construction contract documents.

PROJECT NAME:
QHOZO ACCESS ROAD

DEVELOPER / PROPONENT:

Signed: Date:

PROJECT MANAGER:

Signed: Date:

CONTRACTOR:

Signed: Date:

ENVIRONMENTAL CONTROL OFFICER

Signed: Date: