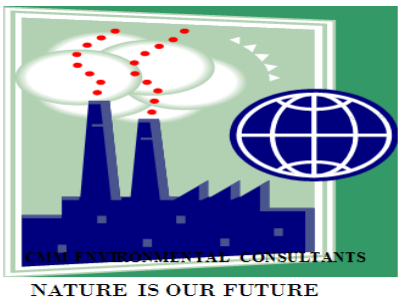
ENVIRONMENTAL MANAGEMENT PLAN FOR UPGRADING OF TSOLO TOWN RETICULATION: PHASE 1.

OCTOBER 2021

Prepared for:	**OR Tambo District Municipality** Private Bag X6043 Mthatha 5100	
Compiled by:	**CMM ENVIRONMENTAL CONSULTANTS** 2nd Floor Office 12 CK Building 2 Merriman Lusiti Mthatha 5099 Tel : 047 535 9050 Cell: 072 1270268 Fax : (086) 660 8216 Email:cmm.environmental@gmail.com	
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ACRONYMS

DEAET	Department of Economic Development and Environmental Affairs
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EMP	Environmental Management Plan
EMPR	Environmental Management Plan Report
ESP	Environmental Scoping Report
IAPS	Interested and Affected Parties
IDP	Integrated Development Plan
MSA	Municipal Structures Act (Act No. 117 of 1998)
NEMA	National Environmental Management Act 107 Of 1998
PM	Project Manager
PSC	Project Steering Committee
DBA	Decibels frequency A-response function
RDP	Reconstruction and Development Plan
SAHRA	South African Heritage Resources Association
VT	Veld Type (Acocks Vegetation Number)
Csb	Dry summer or Mediterranean climates

ENVIRONMENTAL MANAGEMENT PLAN

A. DECLARATION

I the undersigned in my capacity as designated below hereby undertake to ensure that the conditions and recommendations in terms of the Environmental Management Plan (EMP) for the construction of Tsolo Sewer Reticulation are implemented and assume responsibility and accountability in this respect.

I further understand that officials from Environmental, Water Affairs Departments, Local and District Municipality may during any phase of the project, conduct an inspection of the development in order to ensure compliance with the conditions and recommendations in the EMP.

CONTRACTOR

Name: _____

Signature: _____

Date: _____

NATURE IS OUR FUTURE

Ref 70/15

VERIFICATION PAGE

TITLE:DESIGN AND UPGRADING OF THE TSOLO TOWN SEWER RETICULATION PHASE 1 ENVIRONMENTAL MANAGEMENT PLAN .		
CMM NO: 2015/70	**DATE**: October 2021	**REPORT STATUS:** Final

CARRIED OUT BY: **CMM ENVIRONMENTAL CONSULTANTS** Office No: 12 CK Building 2 Merriman Lusiti Street Mbuqe extension Mthatha 5099 Phone: 047 535 9050 Contact Number: 072 334 3230 Fax: 086 660 8216 Email: cmm.environmental@gmail.com	**COMMISSIONED BY:** **Uhambiso Consulting Engineers** 112 Berry Street, Queenstown, South Africa
AUTHOR: M Kholisa	**CLIENT CONTACT PERSON:** Mr S Nyikana

SYNOPSIS:

Environmental Management Plan for the upgrading of Tsolo Sewer Reticulation .

KEY WORDS: EMP

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2000.

Verification	Capacity	Name	Signature	Date
By Author	Environmental Scientist	Makhosi Kholisa		**October 2021**
Checked by	Environmental Scientist	Dumisani Bokveldt		**October 2021**
Authorised by	Director	Makhosi Kholisa		**October 2021**

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1 INTRODUCTION

Part 1

1.1 Development objectives and Project description.

The town Tsolo is situated at approximately 40km from Umtata and it forms part of OR Tambo District Municipality. The proposed development in this town will include the repair and replacement of existing sewerage infrastructures as well as the design and construction of the new sewer manholes, pipelines and erf connection, (please refer to engineer's preliminary design report attached to this EMP). The primary objective of the project is to provide basic services to the beneficiary households of Tsolo and surrounding areas in accordance with the guidelines and principles of the Municipal Infrastructural programme reflected in section 88 of the Municipal Structures Act (Act No. 117 of 1998).

Furthermore, the proposed water borne sewer will provide the residents, health care facilities, schools, retail facilities, community facilities in the above mentioned town with better sewerage management and moreover improve the standards of living for the residents through the betterment of life for all residents as stipulated in section 3 of the Development Facilitation Act 67 of 1995 which sets out principles on promoting the integration of the social, economic, institutional and physical aspects of land development while promoting sustained protection of the environment.

1.1.1 Sensitive elements on site

There are existing services like water reticulation pipelines and electricity power lines which run adjacent to the road but construction in this site should avoid disturbing these pipelines by using labour intensive methods where necessary

1.2 Proposed Project Scope

The general work involves upgrade of the Tsolo town sewer reticulation as defined in the Engineers preliminary design report. The proposed project is economically and physically possible and therefore labour-based construction methods should be used. It is recommended that the local labour should be used in doing the clearing and preparation of pipeline routes, backfilling, site establishment and removal of oversize material and removal of unwanted material and traffic control etc.

1.3 Environmental Authority.

Table

Name of Authority	Department of Economic Development and Environmental Affairs

Contact person	The Regional manager: Environmental Affairs		
Contact person	Q Paliso		
Postal address	PRIVATE BAG X 9060 , Umtata		
Postal code	5100		
Telephone number		Cell:	None
Mobile number	071 874 8728	Fax :	

1.4 Applicable documentation

This EMP will form the basis of all Environmental Documentation for the project.

1.5 Scope of EMP

This report is done in accordance with the requirements of the NEMA Principles (Section 2) (Act 107 of 1998) as well as section 28(1) of NEMA which states that every person who has caused or may cause significant degradation of the environment must take reasonable measures to prevent such degradation from occurring, continuing or recurring.

This EMP is to be implemented by the applicant as well as any employee, contractor, agent or sub-contractor appointed on behalf of the applicant in the execution of the project, in order to ensure environmental compliance on site. The specifications outlined in this EMP are thus applicable to all activities undertaken by the applicant 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.

1.6 Objectives of the EMP

The objective of this document is to:

Form a strategy that will be used to avoid, prevent and minimize the negative impacts to certain scale that is acceptable.

Provide rational and practical environmental conditions/ requirements to:

- Minimize disturbance of the natural environment;
- Ensure sensitive ecosystem (wetlands and rivers) protection;
- Prevent or minimize all forms of pollution;
- Protect indigenous flora and fauna;
- Prevent soil erosion and facilitate the re-vegetation of affected areas;
- Ensure that borrow pit is rehabilitated;

- Ensure the restoration of disturbed environment.
- Ensure public awareness about environmental issues.

1.7 Principles

- Minimize or Avoid disturbance of Eco-systems and loss of biodiversity must be avoided.
- Particularly on sensitive systems (wetlands and rivers).
- Avoid land use that results in vegetation loss in critical biodiversity areas.
- Maintain ecological processes at all scales, and avoid or compensate for any effects of land uses on ecological processes.
- Plan for long-term change and unexpected events, in particular those predicted for global climate change.
- Plan for cumulative impacts and knock-on effects.
- Minimize the introduction and spread of non-native species.
- Minimize land use that reduce ecological resilience (ability to adapt to change), particularly at the level of catchments.
- Implement land use and land management practices that are compatible with the natural potential of the area.
- Balance opportunity for human and economic development with the requirements for biodiversity persistence.
- The contractor's attention is specifically drawn to the land use principles and the principles of NEMA (107 of 1998).

2 ENVIRONMENTAL MANAGEMENT PLAN

The EMP specifies the minimum requirements to be implemented by the applicant as per scope of work and the scope of the EMP, in order to minimize and manage the potential environmental impacts and ensure sound environmental management practices. Provisions of this EMP are binding on the applicant during the life of the proposed project, thus until decommissioning and closure. As the decommissioning and closure phases are not anticipated, the EMP shall be binding to the OR Tambo District Municipality or any authority to which the responsibility has been delegated to, until such time that the DEDEAT or applicable environmental authority has formally absolved the Municipality from its responsibility in terms of this EMP. It is essential that the EMP requirements be carefully studied, understood, implemented, and adhered to at all time.

2.1 The Project Proponent/Project Manager should :-

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

The Project Manager should be fully conversant with the EMP for the project, as well as all applicable environmental legislations.

2.1.1 The Site Manager/ Engineer

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

2.1.2 Extent Of The Contractor's Obligations

- 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 Project Manager, Environmental Control Officer and / or Engineer during the duration of the contract.
- Be conversant with the requirements of this environmental specification/ environmental management plan.
- Brief all his/ her staff about the requirements of the environmental specification.

- Comply with the Environmental (Control) Officer in terms of this specification and the project specification, as applicable, within the time period specified.
- Ensure any Sub-Contractors/ Suppliers who are utilized 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 noncompliance on their behalf.
- Bear the cost of any delays, with no extension of time granted, should he/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 cost of any damages / compensation resulting from non-adherence to the said specifications or written site instructions. The above responsibilities listed for the contractor will also apply to any appointed sub-consultants.

2.1.3 Duties and Powers of the Environment Control Officer (ECO):

- Briefs the Contractor about the requirements of the Environmental Specification and /or EMP as applicable, Advises the Project Manager and Engineer / Supervisor about the interpretation, implementation and enforcement of the Environmental Specification and other related environmental matters
- Develops a photographic record of the state of the site prior to the commencement of construction.
- Attend site meetings, as necessary
- Monitors the Constructor's compliance with this specification and the project environmental specification as applicable
- Undertakes periodic audits of the effectiveness of the environmental specifications on site
- Be fully conversant with the EMP:
- Be fully conversant with all environmental legislation and ensure compliance;
- Ensure that all the environmental specifications contained within this EMP are adhered to;
- Regularly liaise with the site Manager on matters relating to the environment; and
- Compile monthly reports as to the progress of the construction phases and report to all parties involved (Site Manager, Project Proponent).

2.1.4 Flexibility

The EMP is a dynamic and flexible document subject to review and updating. During the implementation of a project there is always the possibility that unforeseen issues could arise, this EMP should therefore be revised where necessary to mitigate unanticipated impacts.

2.1.5 Failure to comply with EMP

Outlined below are a number of steps, relating to increasing severity of environmental problems, which will be implemented. The principle is to keep as many issues within the first few steps as possible.

- **Step 1**

The ECO discusses the problem with the Contractor or guilty party, and they work out a solution together. The ECO records the discussion and the solution implemented.

- **Step 2**

The ECO or PM observes a more serious infringement, and the Principal Agent notifies the guilty party in writing, with a deadline by which the problem must be rectified. All costs will be borne by the Contractor.

- **Step 3**

The Principal Agent shall order the Contractor to suspend part, or all, the works. The suspension will be enforced until such time as the offending party (ies), procedure or equipment is corrected and/or remedial measures put in place if required. No extension of time will be granted for such delays and all cost will be borne by the Contractor.

- **Step 4**

Breach of Contract - One of the possible consequences of this is the removal of the Contractor and/or equipment from the project and/or the termination of the Contract, whether a construction contract or an employment contract. Such measures will not replace any legal proceedings that the PM may institute against the Contractor.

3 LEGAL AND POLICY CONSIDERATIONS

3.1 General legislation

3.1.1 The Constitution of South Africa, 1996 (Act No. 108 of 1996)

The Bill of rights promulgated in the constitution, 1996 states that everyone has the right:

a) To an environment that is not harmful to their health or well-being; and

b) To have the environment protected, for benefit of present and future generations, through reasonable legislation and other measures that;

i. Prevent pollution and ecological degradation;

ii. Promote conservation; and

iii. 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.

3.1.2 Legislation and policies relevant to the Construction and/or Operational phase of the proposed project.

Environmental Management Principles in terms of NEMA section 2;

- Sustainable Developments; Development must be socially, environmentally and economically sustainable .Pollution and waist minimized and remedied. The exploitation of non-renewable resources addresses equity and takes in consideration the consequences of its depletion. The use renewable resources do not exceed the level beyond which their integrity is jeopardized.
- Environmental Justice and Equity: Environmental Management must address the needs of people first. It allows for workers to refuse working under conditions that is harmful to their health. Negative impacts on socio-economic and biophysical environment must be anticipated and precautionary and preventative principles applied.
- Participation, Empowerment and transparency: Participation of all interested and affected parties must be promoted and community well-being and empowerment promoted. Decision must be taken on an open and transparent manner.
- Co-operative Governance: intergovernmental co-ordination promoted. Potential conflicts between organs of State resolved. Global and National interests addressed.
- Ecological Integrity: Disturbance of ecosystems and loss of biodiversity must be avoided. Sensitive systems (Wetlands and rivers) require a specific attention in management and planning.

3.1.3 National Water Act, 1998 (Act No. 36 of 1998)

This Act provides for Constitutional demands including pollution prevention, ecological and resource conservation and sustainable utilization. In terms of the Act, all water resources are the property of the State and the EIA process is used as a fundamental management tool. A water resource includes a watercourse, surface water, estuary or aquifer and (where relevant) its bed and banks. A watercourse means: a river or spring; **a natural channel** in which natural water flows regularly or intermittently; a **wetland, lake or dam,** into which or from which water flows.

Permits are required in terms of the Act for the undertaking of the following activities:

- Alteration of the bed, banks course or characteristics of a water course in terms of Section 21(i) and 40;
- Abstraction of water from a water resource in terms of Section 21(a);
- Stream flow reduction as contemplated in Section 36 of Act in Section 21(d);
- Disposal of waste in manner that may detrimentally impact on a water resource in term of Section 21(g).

Impending or diverting the flow of water in a watercourse

- This authorization allows the flow of water in watercourse to be impeded or diverted provided the water use is within the conditions set out by the authorization.
- Pollution of river water (silt-laden run-off, oil from machines, etc) is a contravention of this Act.
- Part 4 of the Act state that the person who owns, controls, occupies or uses the land in question is responsible taking measures for to prevent pollution of water resources.
- The Act (Chapter 3, Part 3) also provides for the protection of significant water resources through the Ecological Reserve; i.e. the quantity and quality of water needed to sustain human needs and ecosystems (e.g. Wetlands, estuaries, lakes, groundwater and rivers). The implication of certain road-building activities on aquatic ecosystems triggers the requirement for licensing, (which is a function normally conducted by DWAF).

3.1.4 National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998)

The purpose of this Act is 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 the coordination of environmental functions exercised by organs of state; and provide for matters connected therewith.

- Section 2: Requires all organs of state to enforce the environmental management principles contained in NEMA.
- Chapter 5: (Section 23 and 24) presents the general objectives and implementation of **Integrated Environmental Management (IEM).**
- Section 24: provides for the protection of the environment, cumulative impacts, alternatives and significant impacts must be assessed.
- Chapter 3: Gives effect to co-operative governance.
- Chapter 4: Describes procedures to be followed in addressing environmental conflict.
- Section 28: Duty of care and directives for the remediation of environmental damage.
- Section 30 directives for the control of emergency incidents.

3.1.5 Hazardous Substances Act, 1973 (Act No.15 0f 1973)

- Section 4: Stipulates the need for a license to use, install hazardous substances on premises.

3.1.6 National Heritage Resource Act, 1999 (Act No. 25 of 1999)

- in terms of Section 35 (4) of the Act, no person may, without a permit issued by the response heritage resources authority destroy, damage , excavate , alter or remove from its original position, or collect , any archaeological material or object.
- In terms of Section 36 (3) of the Act, no person may, without permit issued by SAHRA or a provincial heritage authority, destroy, damage, alter, exhume or 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.

- Any finds should be reported to SAHRA, the project archaeologist, the South African Police Service (SAPS) and the state pathologist.

3.1.7 National Environmental Management: Air Quality Act, 2004(Act No.39 of 2004)

- The Act, which is administered by DEDEA, provide for the control of air pollution.
- Air pollution is defined as any change in the composition of the air caused by smoke, soot, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances.
- The other legislation that deals with limited aspects of air pollution control is the Health Act (NO,69 of 1979) ,regulations in terms of the Mines and Works Act 27of 1956 and the Road Traffic Act 29 of 1989.
- Part v deals with the control of dust, which can impact on local air quality during construction activities.
- The minister has the authority to declare a dust control area by notice in the Government Gazette. The Act requires that these impacts be controlled during construction and operation of a project.

3.1.8 Nature and Environmental Conservation Ordinance, 1974 (as amended)

- Land within a state forest is considered to be a national issue, thus parliament would need to de-proclaim such an area for development of a road/bridge.
- The Ordinance also covers the protection of important plants and animals outside of protected areas.

3.1.9 National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004)

- In terms of Section 57 (1) of the Act a person may not carry out a restricted activity involving a specimen of a threatened or protected species without a permit issued in term of Section 90 of the Act.
- In terms of Section 57 (2) the Minister may by notice in the Gazette prohibit the carrying out of an activity which is of a nature that may negatively impact on the survival of a threatened or protected species; and
- This is specified in the notice, or prohibits the carrying out of such activity without a permit issued in terms of Section 90 of the Act.

3.1.10 Occupational Health and Safety Act, 1993 (Act No 85 of 1993)

- Regulations contained in Government Notice R1179 of 25 August 1995, promulgated under this Act would be of importance during the construction of the road.
- Substances such as cement, lime and all fuels and lubricants are listed as hazardous chemical substances.
- Employees must be protected against exposure to such substances.
- Adequate storage areas should be provided for such substances and these should be kept neat and under control.

3.1.11 Noise Control Regulations: Environment Conservation Act, 1989 (Act No 73 of 1989**)**

- In accordance with the ECA, the South African National Standard (SANS) 10328 contains procedures to be followed to quantify the predicted impact that noise emanating from a proposed development will have on surrounding land, based on scientific principles.
- In terms of Schedule 3 (d) of the National Noise Control Regulations;
- No person shall build a road or change an existing road, or alter the speed limit on a road, if it shall in the opinion of the local authority concerned cause an increase in noise in or near residential areas, or office, church, hospital or educational buildings, unless noise control measures have been take in consultation with the local authority concerned to ensure that the land in the vicinity of such road shall not be designated as a controlled area"
- In other words if the predicted noise due to the proposed development is likely to cause the noise level on surrounding land to exceed 65 dBA, noise mitigation measures would need to be implemented to ensure that noise levels on affected land are reduced so as not to exceed 65 dBA.

4 BIOPHYSICAL ENVIRONMENT

4.1 Current Land use zoning

The current land use in the proposed area for development is a mixed development which includes residential areas, health care facilities, schools, retail facilities, community facilities etc. The terrain is undulating with gentle slopes in some sections

4.2 Climate

Tsolo normally receives about 701mm of rain per year, with most rainfall occurring mainly during summer. It receives the lowest rainfall in June and the highest in February. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Tsolo range from 18.6°C in June to 27°C in January. The region is the coldest during July when the mercury drops to 3.8°C on average during the night.

4.3 Water Quality

There is one river to be crossed by the proposed development and it's called xokonxa River

4.4 Noise

The noise levels produced during the construction will be high but not hazardous as earthworks will produce the most noise, and therefore recommended that these activities be carried out during suitable hours such as 7am till and 5pm.

4.5 Fauna and Flora

- **The fauna & flora along the developed area include veld grasses like**

short grasslands	Scattered bush clumps

4.7 Historic and Cultural Resources

Eastern Cape Province is well known for its abundant historic and cultural resources, however the proposed development, will not go through any historic sites, activities and aspects causing impacts on the historic and cultural resources in the town.

Potential negative environmental impacts that may occur during the construction and operational phases of the proposed project include;

- Environmental pollution as well as
- Social impacts

4.6 Impact assessment criteria and rating scales

The significance ratings are based on largely objective criteria and inform decision making at a project level as opposed to a community level. In some instances, the significance rating of potential negative impacts might be "low" or "very low", the importance of these impacts to local communities or individuals might be extremely high. The comments which I&APs attach to impacts must also be

taken into consideration, and recommendations should be made as to ways of avoiding or minimising these negative impacts through appropriate project design, selection of appropriate alternative and/ or management.

The relationship between the residual significance ratings and decision-making can be broadly defined as follows:

- **Very Low** / **Low** – will not have an influence on decision to proceed with the proposed project, provided that recommended mitigation measures to mitigate impacts are implemented;
- **Medium** – should influence the decision to proceed with the proposed project, provided that recommended measures to mitigate impacts are implemented; and
- **High** / **Very high**- would strongly influence the decision not to proceed with the proposed project.

4.7 Table1. Showing the degree of Impacts and their significances

IMPACT	**DEGREE (Low, moderate or high)**	**SIGNIFICANCE (Minor, moderate, or significance)**	**REASONS**
Social	Low	Minor	The upgrade will occur within the town of Tsolo and residential areas.
Air quality	Low	Moderate	The dust made by moving earth works will be suppressed by regular watering.
Noise	Low	Minor	The noise levels produced during the construction will be high but not hazardous and lower than 65 dBA stipulated by the **Noise Control Regulations: Environment Conservation 73 of 1989**
Soil erosion	Low	Minor	Not anticipated.
Agriculture/land use potential	Low	Minor	no agricultural land will be impacted.
Fauna and flora	Low	Minor	There are no, endangered, or threatened species that were

			Identified on the proposed routes for pipeline
Infrastructure	Low	Low	There are existing services like water pipes, electricity power lines and houses that might be affected in the event of the ECO failing to comply with the stipulated conditions of the EMP.
Operational pollution	Low	Minor	The operational pollution effluents are low key, the contractor will be guided by the generic environmental instructions in the EMP report.

Responsibility

This section indicates the party responsible for implementing the environmental measures and action plans laid out in the EMP. Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Proponent, Project Manager, Site Manager/Engineer, Contract/ Operator and Environmental Control Officer are as detailed below.

Part 2

5 DESCRIPTION OF MITIGATION MEASURES

This section of the report serves to prescribe mitigation measures to reduce, limit, eliminate or compensate for impacts, to acceptable/insignificant levels. In setting mitigation measures, the practical implications of executing these measures must be borne in mind. With early planning, both the cost and the impacts can be minimised. The stipulations of this report should be conveyed to Contractor prior to the commencement of construction.

5.1 PRE-CONSTRUCTION MANAGEMENT PLAN

The pre-construction or planning management plan is to be used as a guide during the planning, design and detailing of the development components. This part of the plan is to be referenced by all involved in decision making during the planning and design phases.

5.2 Environmental Method Statements

The Environmental Method Statements (EMSs) must submitted by the contractor and reviewed by ECO prior construction activities. The table below indicates the issues that must be covered by the EMS which has been requested from and prepared by the contractor. The contractor has to submit the environmental method statements for approval by the ECO.

Table 6: Environmental Method Statement Status

EMS Number	Title	Prepared by Contractor	Reviewed by ECO	Accepted and Finalised
1	**Site Establishment**			
1.1	Site offices			
1.2	Site camp			
1.3	Material stockpiling sites			
1.4	Fuel and hazardous chemical store			
1.5	Plant and vehicle parking areas			
1.6	Vehicle maintenance and wash-down areas			
1.7	Cement batching areas			
1.8	General waste, solid waste, wastewater and hazardous waste storage containers			
2	**Clearing, Grubbing and Topsoil Removal**			
2.1	Depth of topsoil to be removed			
2.4	Topsoil stockpiling locations			
2.5	Maintaining of topsoil stockpiles including keeping them free of alien vegetation			
3	**Dust Control**			
3.1	Monitoring of wind conditions.			
3.2	Frequency of watering of roads in conditions of high wind			
3.3	Frequency of watering of stockpiles in conditions of high winds			
3.4	Height of topsoil and overburden stockpiles			
3.5	Transportation of dust generating materials			
4	**Control of Hazardous Substances and Hazardous Waste**			
4.1	Types of hazardous substances to be used in construction and risk of pollution through handling			
4.2	Storage of hazardous waste generated by construction, cement bags, cement runoff water, cement spillages, oil contaminated soil and oily rags			
4.3	Disposal of hazardous waste at a registered hazardous waste facility			
5	**Solid and General Waste Management**			
5.1	The provision of sufficient vermin and weather proof bins at the camp and work sites to store general waste generated on a daily basis			
5.2	System for the collection, temporary storage, transportation and disposal of general waste, including details of proposed disposal site to be used			
5.3	System for the collection, temporary storage, transportation and disposal of			

EMS Number	Title	Prepared by Contractor	Reviewed by ECO	Accepted and Finalised
5.4	hazardous waste, including details of proposed disposal site to be used The provision of toilet facilities at the camp and work sites and a maintenance plan for servicing toilets			
6	**Cement and Concrete Batching (if required)**			
6.1 6.2 6.3 6.4	Location and facilities for cement and concrete batching at site camp and work areas Prevention measures for concrete spillage Method for collection and disposal of cement bags and concrete spillage Prevention measures for cement dust			
7	**Stormwater Control**			
7.1 7.2	Areas susceptible to stormwater collection and temporary drainage works for stormwater control Temporary stormwater discharge points including slope stabilisation from land slides.			
8	**Access Routes**			
8.1 8.2	Access routes to work sites Speed limits and signs and types of vehicles using each route			
9	**Rehabilitation**			
9.1 9.2 9.4 9.5 9.6	Clearance of rubble and structures associated with construction Removal of contaminated soils from closed work areas Rehabilitation of compacted areas. Control and removal of invasive species Re-vegetation of slopes and disturbed areas			
10	**Environmental Awareness Training**			
10.1	Training plan including: a list of staff designations, their main activities, the specific environmental training they require, as well as proposed method of training			

5.2.1 EMP TRAINING

Mitigation / Management Action	**Responsible Agent**

The Contractor shall arrange for Environmental and Heritage Awareness Training programmes for the personnel on site, to the satisfaction of the PM and ECO, and familiarise his/her/its employees with the contents of this EMP, either in written format or verbally.	ECO & Contractor

5.2.2 CONTRACT AREAS

Mitigation / Management Action	**Responsible Agent**
The ECO must indicate/point out to Contractor the areas that they will have in their possession for the duration of the contract (this shall include access roads to be used, construction lay-down areas, materials storage and delivery requirements, contractors' offices, operational demarcation etc.). Aspects pertaining to temporary housing for persons involved in the project shall also be included. A material delivery and storage area should be demarcated. The facility must be planned and laid out in such a way that the total footprint area is minimised.	ECO &Contractor

5.2.3 SENSITIVE ECOLOGY

Mitigation/ Management Action	**Responsible Agent**
Prior to the commencement of construction, the proposed site/s and roads, must be inspected by ECO (where necessary), in order to: • Confirm the absence of Red Data Book Species; Relocate, demarcate or recommend conservation / preservation measures for any identified ecologically "sensitive" and/or protected species and areas, and • Point out and/or demarcate all ecologically "sensitive" areas to the Contractor (e.g. red data habitats & species, rivers, streams, drainage lines, wetlands, sensitive soils, steep slopes and areas susceptible to erosion).	PM,ECO &Contractor

5.2.4 HERITAGE AREAS

Mitigation / Management Action	**Responsible Agent**

In known archaeological sensitive areas the South African Heritage Resources Agency (SAHRA) will inspect all above-mentioned contract areas, in order to: • Confirm the absence of archaeological sites and/or artefacts; • Relocate, demarcate or recommend conservation / preservation actions and measures for any identified ecologically "sensitive" and/or artefacts prior to the commencing of any work at these sites, and • Point out and/or demarcate all archaeologically "sensitive" areas to the Contractors.	No heritage areas identified on site. PM, ECO & Contractor

5.2.5 ROADS

Mitigation / Management Action	**Responsible Agent**
The final alignment of the access routes and internal camp roads shall be planned in conjunction with the PM, and ECO and once finalised only the agreed roads must be used.	PM, ECO & Contractor
Roads must be planned to deviate around significant trees and Red Data Species marked out in an approved manner by the ECO.	ECO &Contractor

5.2.6 SITE ESTABLISHMENT

Mitigation / Management Action	**Responsible Agent**
Construction camps and staff accommodation facilities on the site will be required to be established in appropriate locations prior to the commencement of construction, preferably within already disturbed areas. After completion of the contract, these areas will be required to be rehabilitated as per contract arrangements.	PM, ECO & Contractor
Site Plan: Before construction can begin, the Contractor shall submit a site layout plan to the ECO for approval, including: • Site access (including entry and exit points). • All material and equipment storage areas (including storage areas for hazardous substances such as fuel and chemicals). • Construction offices and other structures.	PM , ECO& Contractor

• Security requirements (including temporary and permanent fencing, and lighting) and accommodation areas for security staff. • Solid waste collection facilities and waste treatment facilities for litter, kitchen refuse, sewage and workshop-derived effluents. • The Contractor must take appropriate and active measures to prevent erosion resulting from his own works, operations and activities as well as storm water control measures to the satisfaction of the ECO / Engineer. Restoration costs are likely to be for the Contractor's account, should these measures not be reasonably implemented. Aspects normally covered in construction contracts in terms of “protection of works” are standard and are not to be billed or confused with any details covered under environmental requirements. During construction, the Contractor must protect areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible. Other measures as may be necessary must be taken to prevent the surface water from being concentrated in streams and from scouring the slopes, banks or other areas. All such measures must be discussed with and approved by the ECO / Engineer. Measures can include cut off trenches, straw stabilising, brush packing etc. A method statement is required from the Contractor prior to site clearing of alien invasive plants. • Provision of potable water and temporary ablution facilities. Only designated areas may be used for the storage of materials, machinery, equipment and site offices. The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be disturbed areas along routes. Offices (and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles) must be located as far away as possible from any watercourse. Regardless of the chosen site, the Contractor’s intended mitigation measures shall be indicated on the plan throughout the period of construction; the	

contractor shall restrict all activities to within the designated areas on the construction layout plan. Any relaxation or modification of the construction layout plan is to be approved by the ECO.	
Site Camps: The following restrictions or constraints are placed on the site camp, and construction staff in general and will not be permitted: • The use of rivers and streams for washing of clothes. • The use of welding equipment, oxy-acetylene torches and other bare flames where veld fires constitute a hazard. • Indiscriminate disposal of rubbish or construction wastes or rubble. • Littering of the site. • Spillage of potential pollutants, such as petroleum products. • Collection of firewood. • Poaching of any description. • Use of surrounding veld as toilets. • Burning of wastes and cleared vegetation	ECO,PM & Contractor
Vegetation clearing: The natural vegetation encountered on the site is to be conserved and left as intact as possible. Only trees and shrubs directly affected by the works, and such others as may be approved by the Department of Agriculture, Forestry and Fisheries in writing, may be felled or cleared. A firebreak shall be cleared and maintained around the perimeter of the site camp/s and office sites where necessary.	ECO ,PM & Contractor
Water for human consumption: Water for human consumption should be available at the site offices and at other convenient locations on site.	ECO ,PM & Contractor
Sewage Treatment: Sanitary arrangements should be to the satisfaction of the PM and ECO. If no other ablution facilities are available, chemical toilets must be supplied (1 per 15 persons) and must be regularly cleaned and maintained by the Contractor. The positioning of the chemical toilets is to be done in consultation with the ECO. The Contractor should arrange for regular emptying of toilets and will be entirely responsible for enforcing their use and for maintaining such latrines in a clean,	ECO ,PM &

orderly and sanitary condition to the satisfaction of the ECO. If necessary, the ablution facilities must be screened from the public view. In remote areas where chemical toilets may not be a viable option, agreement must be reached on alternatives before construction starts.	Contractor
Cooking Fuel: The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. Collection of firewood is not permitted.	ECO, PM & Contractor
Waste Management: Solid waste shall be stored in an appropriate/ demarcated area within the site camp in covered drums for collection and disposal. Disposal of solid waste shall be at an approved landfill site – this must be agreed to with the ECO. During the construction period, the facilities shall be maintained in a neat and tidy condition, and the site is to be kept free of litter. At all places of work, the Contractor shall provide litter collection facilities for later safe disposal at approved waste disposal sites.	ECO, PM & Contractor

5.2.7 MATERIALS HANDLING, USE AND STORAGE

Mitigation / Management Action	**Responsible Agent**
The Contractor's management and maintenance of his plant and machinery will be strictly monitored according to the criteria given below, regardless of whether it is serviced on the site (i.e. at the place of construction activity or at a formalised workshop) or not.	ECO & Contractor
Safety: All the necessary handling and safety equipment required for the safe use of petrochemicals and oils shall be provided by the Contractor to, and used or worn by the staff whose duty it is to manage and maintain the Contractor's and his subcontractor's and supplier's plant, machinery and equipment. The Contractor must comply with the Occupational Health and Safety Act (Act 85 of 1993) and Construction Regulations, 2003 as this governs what the contractor has to do/provide for his staff.	ECO& Contractor

Hazardous Material Storage: Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials will be stored in a secure appointed/ demarcated area that is fenced and has restricted entry. Storage of hazardous products shall only take place using suitable containers approved by the ECO. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure.	ECO, PM & Contractor
Fuels and Gas Storage: Fuel should be stored in a secure area in a steel tank supplied and maintained by the Contractor according to safety procedures. Gas welding cylinders and LPG cylinders should be stored in a secure, well-ventilated area. The Contractor must supply sufficient fire fighting equipment in the event of an accident and no smoking will be allowed where fuel is stored and used.	ECO, PM & Contractor

5.2.8 WATER SUPPLY

Mitigation / Management Action	**esponsible Agent**
Point out to Contractor where they can obtain water (e.g. water for construction purposes) as well as for drinking. Contractor shall not make use of/collect water from any other source than those pointed out to them as suitable for use by them.	ECO & PM

5.3 CONSTRUCTION MANAGEMENT PLAN

The Construction Management Plan forms part of the contract documentation. The plan must be read in conjunction with the contract documents including the relevant Bill of Quantities and Specifications.

5.3.1 VEHICULAR ACCESS AND MOVEMENT OF CONSTRUCTION VEHICLES

Mitigation / Management Action	**Responsible Agent**
During construction, use should be made of existing access routes to construction areas where possible. Construct approved vehicle turning areas, avoiding selected ecological sensitive areas or species, and have turning area routes approved by the	ECO, PM & Contractor

ECO. Temporary access roads must be rehabilitated after usage to contract specifications.	

5.3.2 MOVEMENT OF CONSTRUCTION PERSONNEL, LABOURERS AND EQUIPMENT

Mitigation / Management Action	**Responsible Agent**
The Contractor must ensure that all construction personnel, labourers and equipment remain within the demarcated construction sites at all times. Where construction personnel and/or equipment wish to move outside the boundaries of the site, the Contractor/ labourers must obtain permission from the ECO.	ECO, PM & Contractor

5.3.3 VEGETATION CLEARING

Mitigation / Management Action	**Responsible Agent**
The extent of all construction site footprints will be minimised and limited to existing and / or already disturbed areas wherever possible.	ECO, PM & Contractor
The areas needing to be cleared and the degree of clearing required will be determined and demarcated in consultation with the ECO before clearing begins.	ECO, PM & Contractor
The Contractor may not deface, paint or otherwise mark and / or damage natural features / vegetation on the site, unless agreed beforehand with the ECO. Any features / vegetation defaced by the Contractor will be restored to the satisfaction of the ECO.	ECO, PM & Contractor
Plant Search and Rescue: • Plant search and rescue (i.e. the location and removal of specified plant species, without unnecessary damage, and their transfer to a specified location) and the collection of seed, shall be conducted by the ECO prior to the onset of any site clearing operations, should the ecologist indicate this to be necessary. • De-stumping shall only occur on the request of the ECO. Where roots can act as erosion protection, trees should be cut as close as possible to the ground level however no endangered trees were identified that will need relocation.	ECO, PM & Contractor

• During the clearing of woody vegetation, no basal cover or grass and topsoil shall be removed and damage to this layer shall be minimised as far as possible.	
Vegetation Removal and Trimming on watercourses : No heavy machinery shall be permitted for any purpose, except emergency procedures, without the prior approval of the ECO. Clearing of vegetation shall be conducted by hand. All cleared and trimmed vegetation shall be removed from any natural watercourse to prevent flooding/snagging hazards being created. However no watercourses were identified that will need this action to be implemented.	ECO, PM & Contractor
Rehabilitation: The PM, ECO, and Contractor must agree on rehabilitation of areas. The Contractor shall be held responsible for the rehabilitation of all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, road construction has to be stored temporarily or otherwise within the road reserve, or at designated or instructed areas outside the construction reserve. This responsibility shall extend until expiry of the Defects Liability Period.	ECO, PM & Contractor

5.3.4 PROTECTION OF FAUNA

Mitigation / Management Action	**Responsible Agent**
• Under no circumstances shall any animals be handled, removed, killed or be interfered with by the Contractor, his employees, his subcontractors or his subcontractors' employees. • The Contractor and his employees shall not bring any domesticated animals onto the site. • The Contractor shall ensure that the work site is kept clean, tidy and free of rubbish that would attract animals. • No poaching of fauna and flora shall be tolerated by the Contractor or his personnel on Site or elsewhere.	ECO &Contractor

5.3.5 HERITAGE AND/OR ARCHAEOLOGICAL SITES

Mitigation / Management Action	**Responsible Agent**
• Historical and Archaeological Sites: If any artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. • The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the ECO of such discovery. The South African Heritage Resources Agency (SAHRA) or Provincial Heritage Agencies shall be contacted and if necessary an archaeological consultant will be appointed to excavate and record the site. Work may only resume once clearance is given in writing by the archaeologist.	ECO &Contractor

5.3.6 SOIL MANAGEMENT

Mitigation / Management Action	**Responsible Agent**
T**opsoil**: The Contractor is required to strip topsoil together with grass / groundcover from all areas where permanent or temporary structures are located, construction related activities occur; access roads are to be constructed, etc. This must be read together with the contract specifications & conditions. Topsoil must be stockpiled for later use.	ECO &Contractor
Topsoil is to be handled twice only - once to strip and stockpile, and secondly to replace, level, shape and scarify.	ECO &Contractor
Topsoil stockpiles are not to exceed 1.5 m in height and should be protected to prevent erosion where needed.	ECO &Contractor
Topsoil stockpiles are to be maintained in a weed free condition. The ECO can assist with guidance as to which plants are weeds and require removal.	ECO &Contractor
Topsoil is to be replaced by direct return where feasible (i.e. replaced immediately on the area where construction is complete), rather than stockpiling it for extended periods.	ECO &Contractor
Spoil Material: The location of spoil stockpile sites shall be agreed upon by the ECO prior to the commencement of any operations that will	

generate spoil materials. No spoil material shall be dumped outside the defined site. The Contractor shall ensure that the material does not blow or wash away. If the spoil material is in danger of being washed or blown away, the Contractor shall cover it with a suitable material, such as hessian or plastic.	ECO &Contractor

5.3.7 EROSION CONTROL

Mitigation / Management Action	**Responsible Agent**
The Contractor shall protect all areas susceptible to erosion and shall take measures, to the approval of the ECO. This must be read together with the contract specifications & conditions. The Contractor shall not allow erosion to develop on a large scale before effecting repairs and all erosion damage shall be repaired as soon as possible.	ECO &Contractor
The specifics of erosion protection work will vary from situation to situation. These specifics should be cleared with the PM and/or ECO and comply with the contract specifications.	ECO &Contractor
During construction, areas susceptible to erosion must be protected by installing temporary or permanent drainage works and energy dispersion mechanisms – to be agreed to by Contractor	ECO &Contractor
Storm water drainage measures are required on site to control runoff and prevent erosion.	ECO &Contractor

5.3.8 ACCESS ROADS

Mitigation / Management Action	**Responsible Agent**
Construction staff may only use authorised paths and roads from the camp site.	ECO &Contractor
ECO will monitor the conduct of drivers and report any negative impact to the Contractor immediately.	ECO &Contractor
Construction roads must follow existing roads and tracks and should not be wider than necessary with a maximum width of 3 m. Should a wider road be required, this will require the approval of the ECO.	ECO &Contractor
If two-way traffic movement is to take place, passing bays are to be used where specified by the ECO to prevent access / detours	

into the surrounding areas. The drivers delivering construction materials to site are to be made aware of this. They may not drive off the road in order to allow another vehicle to pass.	ECO &Contractor
Continual use of dirt access roads by heavy machinery and increased transport loads means they will have to be carefully monitored and regularly graded as soon as potholes or rutting occurs.	ECO &Contractor
Upon completion of the construction period, the Contractor will ensure that the access roads are returned to a state no worse than prior to construction commencing.	ECO &Contractor

5.3.9 EXCAVATION, BACKFILLING AND TRENCHING IF NECCESSARY

Mitigation / Management Action	**Responsible Agent**
Where at all possible, excavations must not stand open longer than 2 days, and should preferably be opened and closed on the same day. They should not be permitted to stand open longer than a week under any circumstances. Excavations must be marked with tape to clearly demarcate the area and warn against access.	ECO &Contractor
Excavations must not be undertaken until such time that all required materials / services etc. are available on-site, to facilitate immediate laying of such services or the construction of subsurface infrastructure.	ECO &Contractor
Any such excavations should ideally be undertaken within the confines of an established construction site - i.e. a site that is either protected with a peripheral fence, or a site that has a regular / continual human presence. Failing this, regular daily inspections are essential.	ECO &Contractor
Excess rocks and sand as a result of excavation activities is not to be dumped along or next to the construction site – rocks to be spread in a natural looking manner in the surrounding area	ECO &Contractor
Removed soil is to be used to backfill areas where required (i.e. such as existing and un-rehabilitated gravel pits).	ECO &Contractor
Excavated material is to be stockpiled along the trench within the working servitude, unless otherwise authorised.	ECO &Contractor
Deficiency of backfill material will not be made up by excavation within the protected area. Where backfill material is deficient, it	ECO &Contractor

must be made up by importation from a commercial quarry or otherwise authorised.	

5.3.10 LEVELLING

Mitigation / Management Action	**Responsible Agent**
Excess sand and soil resulting from levelling activities of the work area should be stored in low heaps either on the access road or already disturbed areas.	Contractor
Excess topsoil is to be spread evenly over the area in a manner that blends in with the natural topography.	ECO &Contractor
Once heavy machinery has cleared the bulk of these material stockpiles, the disturbed areas should be levelled and cleared of any foreign material manually e.g. with spades. It is unacceptable to leave foreign material behind with the knowledge that it will become hidden amongst the rejuvenating vegetation with time.	ECO &Contractor

5.3.11 STOCKPILING, HANDLING AND STORAGE OF BUILDING MATERIALS

Mitigation / Management Action	**Responsible Agent**
Stockpiles and storage yards will be demarcated in areas already disturbed or where they will cause minimal disturbance.	ECO &Contractor
No construction materials may be stored or disposed of within the wetlands or within the buffer zone of 30m from the wetlands.	
Clearly indicate which activities are to take place in which areas within the site e.g. the mixing of cement, stockpiling of materials etc. Limit these activities to single sites only. This may not always be possible for example for heaps of topsoil, but should definitely be the case for other building materials.	ECO &Contractor
Stockpiles of expensive materials such as cement bags should be such that they can easily be removed from the site over weekends or during rainy weather.	Contractor
Specific sites should be allocated for construction waste e.g. empty cement bags, discarded planks, etc. A low temporary fence may be erected around such a site in order to contain the waste and assist the effective removal thereof from the site.	ECO & Contractor

Cement bags will be placed in wind and spill proof containers as soon as they are empty. The Contractor will not allow closed, open or empty bags to lie around the site.	ECO & Contractor
The Contractor will ensure that all operations that involve the use of cement and concrete are carefully controlled.	ECO & Contractor
Concrete may not be mixed directly on the ground. No mixed concrete may be deposited directly onto the ground prior to placing. A board or other suitable platform / surface are to be provided onto which the mixed concrete can be deposited before placing.	ECO & Contractor
All visible remains of excess concrete will be deposited in a designated area awaiting removal to an approved landfill site.	ECO & Contractor

5.3.12 SERVICING AND RE-FUELLING OF CONSTRUCTION EQUIPMENT

Mitigation / Management Action	**Responsible Agent**
All maintenance and repair work will be carried out at the main Construction camp within an area designated for this purpose, equipped with the necessary pollution containment measures.	ECO & Contractor
No refuelling may take place within the wetlands or within the buffer zone of 30m from the wetlands.	ECO & Contractor
The ground under the servicing and refuelling areas must be protected against pollution caused by spills and / or tank overfills (bunded / lined).	ECO & Contractor
The Contractor may only change oil or lubricants at agreed and designated locations, except if there is a breakdown or emergency repair, and then any accidental spillages must be cleaned up / removed immediately.	ECO & Contractor
In such instances the Contractor will ensure that he has drip trays available to collect any oil or fluid.	ECO & Contractor
Construction vehicles are to be maintained in an acceptable state of repair. No vehicles or equipment with leaks or causing spills will be permitted to operate at any of the construction sites. These will be sent immediately back to the Contractors off-site workshop for repair.	ECO & Contractor
All equipment that leaks must be repaired immediately or must be removed from site.	ECO & Contractor

Fuels required during construction must be stored in a central depot at the construction camp. This storage area should be located on a slab and be contained within a bund capable of containing at least the volume of one of the containers.	ECO & Contractor
Temporary fuel storage tanks and transfer areas also need to be located on an impervious surface adequately bunded to contain accidental spills. Appropriate run-off containment measures must be in place.	ECO &Contractor

5.3.13 SOLID WASTE MANAGEMENT

Mitigation / Management Action	**Responsible Agent**
An adequate number of 'scavenger proof' refuse bins must be provided at the construction sites and at the construction camps.	ECO & Contractor
These bins must be provided with lids and an external closing mechanism to prevent their contents blowing out and must be scavenger-proof to prevent dogs and other animals that may be attracted to the waste.	ECO & Contractor
The Contractor will ensure that all personnel immediately deposit waste in the waste bins provided.	ECO & Contractor
All refuse and solid waste generated at all work sites will be stored in appropriate scavenger proof containment vessels at the relevant site and removed to the main construction camp, where the waste will be sorted and stored within a fenced waste storage area.	ECO & Contractor
All waste must be transported in an appropriate manner (e.g. plastic rubbish bags).	ECO & Contractor
The Contactor may not dispose of any waste and / or construction debris by burning, or by burying.	ECO & Contractor
Discard all construction waste at a registered waste management facility / landfill site, particularly those wastes or products that could impact on surface or groundwater quality by leaching into or coming into contact with water.	ECO & Contractor
The contractor will maintain 'good housekeeping' practises as ensure that all work sites and construction camp are kept tidy and litter free.	ECO & Contractor

5.3.14 LIQUID WASTE MANAGEMENT

Mitigation / Management Action	**Responsible Agent**
The Contractor must take reasonable precautions to prevent the pollution of the ground and / or water resources on and adjacent to the site as a result of his activities.	Contractor
No natural watercourse is to be used for the cleaning of tools or any other apparatus. This includes for purposes of bathing, or the washing of clothes etc.	ECO & Contractor
All washing operations will take place off-site at a location where wastewater can be disposed of in an appropriate manner.	ECO & Contractor
Trucks delivering concrete may not be washed on site or anywhere within the project area.	ECO & Contractor
No spills may be hosed down into a storm water drain or sewer, or into the surrounding natural environment.	ECO & Contractor
Adequate ablution facilities are to be provided at each construction site, conveniently located near to work areas to avoid localised water pollution from camp sewerage.	ECO & Contractor
All soil contaminated, for example by leaking machines, refuelling spills etc. is to be excavated to the depth of contaminant penetration, placed in 200 litre drums and removed to an approved landfill site.	ECO & Contractor

5.3.15 HAZARDOUS MATERIALS

Mitigation / Management Action	**Responsible Agent**
The Contractor must comply with all national, regional and local legislation with regard to the storage, transport, use and disposal of petroleum, chemicals, harmful and hazardous substances and materials.	Contractor
The Contractor will furthermore be responsible for the training and education of all personnel on site who will be handling the material about its proper use, handling and disposal.	Contractor
The Contractor will be responsible for establishing an emergency procedure for dealing with spills of petroleum, chemical, etc.	Contractor
Storage of all hazardous material is to be safe, tamper proof and under strict control.	ECO & Contractor

Petroleum, chemical, harmful and hazardous waste throughout the site must be stored in appropriate, well maintained containers.	Contractor
Exercise extreme care with the handling of diesel and other toxic solvents so that spillage is avoided or minimised.	ECO & Contractor
Any accidental chemical / fuel spills to be corrected immediately.	ECO & Contractor
Timber products should be treated off-site prior to use in construction.	ECO & Contractor
Periodic on-site application of timber treatment products (for maintenance purposes) should take place with due care for the nature of the product (toxicity) and for potential spillages that may occur. Areas where timber is to be treated should have secondary containment measures instituted, such as the placement of a plastic layer (some form of covering) over soils, beneath the timber structures to prevent contamination of the soil surface.	ECO & Contractor

5.3.16 RUN-OFF FROM CONSTRUCTION CAMPS

Mitigation / Management Action	**Responsible Agent**
The Contractor must ensure that rainwater containing pollutants does not run-off into natural areas and thus result in a pollution threat.	ECO/Contractor
A drainage diversion system is to be installed to divert runoff from areas of potential pollution, e.g. batching area, vehicle maintenance area, workshops, chemical and fuel stores, etc.	ECO/Contractor

5.3.17 FIRE

Mitigation / Management Action	**Responsible Agent**
The Contractor must take all the necessary precautions to ensure that fires are not started as a result of activities on site.	Contractor
No fuels or chemicals may be stored under trees.	ECO/Contractor
Gas and liquid fuel may not be stored in the same storage area.	ECO/Contractor

The Contractor must ensure that there is adequate fire-fighting equipment at the fuel stores.	ECO/Contractor
No open fires for heating or cooking will be permitted on site, unless otherwise agreed and then only in designated areas.	Contractor
The Contractor will supply all living quarters, site offices, kitchen areas, workshop areas, material stores and any other areas identified with suitable, tested and approved fire fighting equipment.	Contractor
The construction site must be protected against fire, and a sufficient fire break must be constructed, on advice by the ECO around each construction site and the construction camp where necessary.	ECO/Contractor

5.3.18 DUST

Mitigation / Management Action	**Responsible Agent**
The Contractor shall take precautions to the satisfaction of the ECO to limit the production of dust and damage caused by dust. Use of watering truck is recommended.	ECO/Contractor

5.3.19 NOISE

Mitigation / Management Action	**Responsible Agent**
Machinery and vehicle silencer units are to be maintained in good working order. Offending machinery and / or vehicles will be banned from use on site until they have been repaired.	Contractor
Noise levels must be kept within acceptable limits for a residential area.	Contractor

5.3.20 VISUAL

Mitigation / Management Action	**Responsible Agent**

Security lighting must be placed such that it is not a nuisance to residents and visitors to the area. Shields may be required to prevent lights from being visible from other parts of the residential area.	ECO/Contractor
Care will be taken when positioning the lights to ensure the least visual impact, while still providing a safe work environment for construction staff.	ECO/Contractor
The Contractor shall not establish any activities which, in the opinion of the ECO, are likely to adversely affect the scenic quality of the area. The ECO may direct the Contractor to refrain from such activities or to take corrective actions to reduce the adverse effects of such activities.	ECO/Contractor
No painting or marking of natural features shall take place. Marking for surveying and other purposes shall only be done with pegs and beacons.	ECO/Contractor
All packed rock and exposed rock cuttings shall be treated in order to blend their colour with the colours of the natural weathered rocks of the adjacent environment.	ECO/Contractor

5.3.21 SITE CLEAN-UP AND REHABILITATION

Mitigation / Management Action	**Responsible Agent**
The Contractor must ensure that all temporary structures, materials, waste and facilities used for construction activities are removed upon completion of the project.	Contractor / ECO
Fully rehabilitate (e.g. clear and clean area, rake, pack branches etc.) all disturbed areas and protect them from erosion.	Contractor / ECO
Only indigenous plants which are able to establish easily and will need less maintenance because they have already adapted to the local conditions should be considered.	Contractor / ECO
Before final decisions about the choice of plant species are taken the ECO should be approached for their advice.	Contractor / ECO

5.4 Monitoring of EMP Implementation

The correct and successful implementation of impact mitigation measures in order to reduce adverse impacts on environmental conditions needs to be ensured by a proper monitoring programme. Monitoring of the general implementation of/adherence to the EMP shall be the responsibility of the ECO. Reporting on adherence/compliance to stipulations as communicated to contractors, shall take place during scheduled site meetings.

5.5 Checklist:

A list of environmental issues addressed in the EMP has been drawn up where a tick box monitoring checklist is compiled to make provision for compliance or non-compliance to the EMP requirements for each environmental issue. This checklist provides for a brief description of the non-compliance(s). The issues identified on the checklist must be discussed in detail with the Contractor and the PM. A reasonable date of completion of the remedial action must be jointly agreed upon, between the Contractor, ECO and PM. This checklist must be signed by all parties and a copy be provided to the PM.

5.6 Conclusion

The application of the measures outlined in this Management Plan (program) will ensure that the operation will have a minimized impact on the environment. If the measures outlined are not strictly adhered to, the contractor or responsible party will be prosecuted in terms of the applicable legislations. This Management Plan (program) will govern all activities on the project site and the actions of all employees and agents of the Contractor, be these actions during working hours or after working hours, in the vicinity of the site. The overall responsibility for ensuring the implementation of this environmental management plan rests with the PM.

6 ANNEXURE 1: EMP ASSESSMENT CHECK LIST

IMPLEMENTATIONS	ACTION	FREQUENCY	COMPLIENCE YES/NO	PRE-CONSTRUCTION AND SITE ESTABLISHMENT	PERSON RESPONSIBLE	ACTION REQUIRED	DATE OF IMPLRMRNTATION
pre-Construction	Has an environmental liaison officer (elo) been nominated?	Once-off					
	Is the ELO aware of his responsibility	Once-Off					
	Has the EMP been included in contracts/terms of reference for sub-contractors and suppliers in all tender documentation related to the project?	Once-Off					
	Has the construction staff been given enough environmental training?	Once-Off					
	Are procedures in place for dealing with acts of no-compliance with the EMP?	Once-Off					
	Has a fire Management procedure been drawn up?	Once-Off					
Site establishment	Has a suitable location for construction activities been selected?	Once-Off					
	Have project Layout plans for construction camps been established?	Once-Off					
Construction							
General	Has the Environmental Incidents register been kept up to dated?	Continuous					
	Is there commitment to the implementation of the EMP?	Continuous					
	Are construction activities conducted as per the approval Project Layout Plans?	Continuous					
Natural resources	Has site clearance been kept to a minimum?	Regular					

	Have wild animals, anthills or termite mounds and bird nesting sites remained undisturbed?	Continuous					
Stop and go's	Has a suitable number of rubbish bins and litter fencing been provided?	Regular					
	Have bins been provided with lids/netting?	Regular					
	Has signage discouraging littering been provided?	Regular					
	Are rubbish bins & litter fences being maintained?	Regular					
Vegetation clearance	Has the vegetation clearance been according to what was laid out in the clearing plan?	Regular					
	Has the minimum amount of vegetation clearing possible taken place?	Continuous					
	Has vegetation outside the demarcated boundary lines	Continuous					

Issue.	Action	Frequency	Compliance (yes/no)	Person Responsible	Action Required	Date of Implementation	Implementations Successful
	Been left undisturbed?						
	Is tagged alien vegetation being destroyed and appropriate measures taken to prevent the further spread of aliens?	Continuous					
Topsoil	Is topsoil being stripped from the specified areas only?	Continuous					
	Is the minimum amount of topsoil being stripped from areas affected by construction?	Continuous					
	Is topsoil being properly stripped?	Continuous					
	Is topsoil being properly stored?	Continuous					
River	Is site staff prevented from using the rivers for bathing, washing of clothing/equipment?	Continuous					
	Are the rivers off-limits in terms of construction activities or disposal of waste?	Continuous					
	Have adequate sedimentation control measures been instituted?	Regular					

	Has adequate bank protection been provided?	Once-off					
	Has sediment traps been provided?	Once-off					
	Are the sediment traps being maintained?	Regular					
Water Abstraction	Is water being abstracted from approved points/sources?	Once-off					
	Is daily monitoring being conducted?	Continuous					
	Is water use below level of limits set by DWA?	Continuous					
Erosion	Have the areas of disturbance been minimized?	Continuous					
	Have disturbed areas been re-vegetated timeously?	Regular					
	Has existing erosion been stabilized?	Regular					
	Are cut and fill slopes appropriately stabilized?	Regular					
Fire Risk & Burning	Has firefighting equipment been supplied?	Regular					
	Is the firefighting equipment in good working order?	Regular					
	Is the construction staff aware of the Fire Management Procedure?	Regular					
	Are all fire prevention measures being adhered to?	Continuous					
Site & Route Housekeeping	Are all work areas clean and tidy?	Continuous					
Waste management	Have construction personnel been instructed on the importance and correct methods of waste	Once-off					