APPENDIX H

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME

THE PROPOSED DELMORE PARK EXTENSION 7 RESIDENTIAL DEVELOPMENT, EKURHULENI METROPOLITAN MUNICIPALITY (EMM), GAUTENG

For submission to:
GAUTENG DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT

Prepared for:

Reiger Park Development Company (Pty)
P.O Box 2232
Cramer View
2060

Tel No.: 011 339 3618
Fax No.: 011 339 3598

Prepared by:

Strategic Environmental Focus (Pty) Ltd
P.O. Box 74785
Lynnwood Ridge
0040

Tel. No.: (012) 349-1307
Fax. No.: (012) 349-1229
Website: www.sefsa.co.za

S · E · F
STRATEGIC ENVIRONMENTAL FOCUS

MARCH 2014

SEF Ref: 505539

GDARD Ref No: GAUT 002/13-14/E0201

COPYRIGHT WARNING
Copyright in all text and other matter, including the manner of presentation, is the exclusive property of the author. It is a criminal offence to reproduce and/or use, without written consent, any matter, technical procedure and/or technique contained in this document. Criminal and civil proceedings will be taken as a matter of strict routine against any person and/or institution infringing the copyright of the author and/or proprietors.

ABBREVIATIONS

A	Authorities
C	Contractors
CE	Consulting Engineers
D	Developer/Proponent
DEAT	Department of Environmental Affairs and Tourism
DWA	Department of Water Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
ELO	Environmental Liaison Officer
EMPr	Environmental Management Programme
EO	Environmental Officer
ER	Engineers Representative
ESO	Environmental Site Officer
GNR	Government Notice Regulation
ha	Hectare
HIA	Heritage Impact Assessment
IEM	Integrated Environmental Management
I&AP	Interested and Affected Party
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM: AQA	National Environmental Air Quality Act, 2004 (Act No. 39 of 2004)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OA	Other Authority
OHSA	Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
PM	Project Manager
SAHRA	South African Heritage Resources Agency
SANS	South African National Standard
SEF	Strategic Environmental Focus (Pty) Ltd

DEFINITIONS

Alien species	Plants and animals which do not arrive naturally in an area - they are brought in by humans. Alien plants often force indigenous species out of the area.
Alternative	A possible course of action, in place of another, that would meet the same purpose and need defined by the development proposal. Alternatives considered in the EIA process can include location and/or routing alternatives, layout alternatives, process and/or design alternatives, scheduling alternatives or input alternatives.
Aspect	Element of an organisation's activities, products or services that can interact with the environment.
Auditing	A systematic, documented, periodic and objective evaluation of how well the environmental management plan is being implemented and is performing with the aim of helping to safeguard the environment by: facilitating management control which would include meeting regulatory requirements. Results of the audit help the organisation to improve its environmental policies and management systems.
Biodiversity	The rich variety of plants and animals that live in their own environment. Fynbos is a good example of rich biodiversity in the Cape.
Built environment	Physical surroundings created by human activity, e.g. buildings, houses, roads, bridges and harbours.
Bi-monthly	Bi-monthly means every second month. Similarly "two- monthly" is assumed to have the equivalent meaning to "bi-monthly"
Conservation	Protecting, using and saving resources wisely, especially the biodiversity found in an area.
Contractor	The main contractor as engaged by the Devco (Pty) Ltd for the construction of the subject infrastructure, including all Subcontractors and service provides appointed by the main contractor of his own volition for the execution of parts of the Works. "Contractor" also includes any other contractor engaged by the Devco (Pty) Ltd directly in connection with any part of the construction operations, which is not a nominated sub-contractor to the main contractor
Contamination	Polluting or making something impure.
Corrective (or remedial) action	Response required addressing an environmental problem that is in conflict with the requirements of the EMPr. The need for corrective action may be determined through monitoring, audits or management review.
Degradation	The lowering of the quality of the environment through human activities, e.g. river degradation, soil degradation.
Ecology	The scientific study of the relationship between living things (animals, plants and humans) and their environment.
Ecosystem	The relationship and interaction between plants, animals and the non-living environment.
Environment	Our surroundings, including living and non-living elements, e.g. land, soil, plants, animals, air, water and humans. The environment also refers to our social and economic surroundings, and our effect on our surroundings.
Environmental Control Officer	A person who is responsible for the monitoring of the implementation of the requirements of an EMPr
Environmental Officer	A person who is responsible for the implementation of the requirements of an EMPr.
Environmental Impact	An environmental change caused by some human act
Environmental Impact Assessment (EIA)	An EIA refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of a proposed development. The EIA includes an evaluation of alternatives; recommendations for appropriate management actions for minimising or avoiding

	negative impacts and for enhancing positive impacts; as well as proposed monitoring measures.
Environmental Management System (EMS)	EMS provides guidance on how to manage the environmental impacts of activities, products and services. They detail the organisational structure, responsibilities, practices, procedures, processes and resources for environmental management. The ISO14001 EMS standard has been developed by the International Standards Organisation.
Environmental policy	Statement of intent and principles in relation to overall environmental performance, providing a framework for the setting of objectives and targets.
Habitat	The physical environment that is home to plants and animals in an area, and where they live, feed and reproduce.
Impact	A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
Indigenous species Infrastructure.	Plants and animals that are naturally found in an area. The network of facilities and services that are needed for economic activities, e.g. roads, electricity, water, sewerage.
Integrated	Mixing or combining all useful information and factors into a joint or unified whole. See Integrated Environmental Management below.
Integrated Environmental Management (IEM)	A way of managing the environment by including environmental factors in all stages of development. This includes thinking about physical, social, cultural and economic factors and consulting with all the people affected by the proposed developments. Also called "IEM".
Land use	The use of land for human activities, e.g. residential, commercial, industrial use.
Method Statement	Setting out in detail how the management actions contained in an EMPr will be implemented, in order to ensure that the environmental objectives are achieved
Mitigation	Measures designed to avoid, reduce or remedy adverse impacts.
Natural environment	Our physical surroundings, including plants and animals, when they are unspoiled by human activities.
Policy	A set of aims, guidelines and procedures to help you make decisions and manage an organisation or structure. Policies are based on people's values and goals. See Integrated Metropolitan Environmental Policy.
Process	Development usually happens through a process - a number of planned steps or stages.
Proponent.	Developer. Entity which applies for environmental approval and is ultimately accountable for compliance to conditions stipulated in the Environmental authorisation (EA) and requirements of the EMPr.
Public Participation Process	A process of involving the public in order to identify needs, address concerns, in order to contribute to more informed decision making relating to a proposed project, programme or development.
Recycling	Collecting, cleaning and re-using materials.
Resources	Parts of our natural environment that we use and protect, e.g. land, forests, water, wildlife, and minerals.
Scoping	A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail
Scoping Report	A report describing the issues identified
Stakeholders	A subgroup of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term includes the proponent, authorities and all interested and affected parties.
Stormwater	Strategies implemented to control the surface flow of storm water such that erosion, sedimentation and

management	pollution of surface and ground water resources in the immediate and surrounding environments are mitigated. This is specifically important during the construction and decommissioning phases of a project.
Sustainable development	Development that is planned to meet the needs of present and future generations, e.g. the need for basic environmental, social and economic services. Sustainable development includes using and maintaining resources responsibly.
Sustainability	Being able to meet the needs of present and future resources.
Waste Management	Classifying, recycling, treatment and disposal of waste generated during construction and decommissioning activities.
Wetlands	An area of land with water mostly at or near the surface, resulting in a waterlogged habitat containing characteristic vegetation species and soil types e.g. vleis, swamps.
Zoning	The control of land use by only allowing specific type development in fixed areas or zones

REFERENCES

Department of Environmental Affairs and Tourism (DEAT) (1992) Integrated Environmental Management Guideline Series, Volumes 1-6, Department of Environmental Affairs, Pretoria.

DEAT (2004a) Environmental Management Plans, Integrated Environmental Management, Information Series 12, DEAT, Pretoria.

Republic of South Africa. 1998. National Environmental Management Act 107 of 1998 (NEMA).

TABLE OF CONTENTS

TABLE OF CONTENTS ..... **VI**
LIST OF FIGURES ..... **VI**
LIST OF TABLES ..... **VI**
SECTION A: INTRODUCTION **7**
A-1 BACKGROUND INFORMATION **7**
A-2 SCOPE **8**
A-2.1 Principles of the EMPr 8
SECTION B: SETTING THE CONTEXT **9**
B-1 OVERVIEW OF THE PROPOSED PROJECT **9**
B-1.1 Background 9
B-1.2 Integration of environmental considerations into the project design 10
B-1.3 Purpose of the Environmental Management Programme 10
B-1.4 Objectives of the Environmental Management Programme 11
B-1.5 Structure of this Document 11
B-1.6 Scope of the Environmental Management Programme 12
SECTION C: ENVIRONMENTAL SPECIFICATIONS **13**
C-1 INTEGRATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME INTO THE CONTRACT **13**
C-2 SPECIFICATION STRUCTURE AND APPLICATION **13**
C-2.1 Method statements 13
C-2.2 Site documentation 14
C-2.3 Pro forma documentation 14
C-2.4 National and Provincial Acts and guidelines 15
C-2.5 Provisions for addressing non-conformance 16
C-2.6 Environmental considerations in adjudication of tender 16
C-3 ENVIRONMENTAL MANAGEMENT MEASURES FOR ALL PHASES OF THE PROJECT **17**
C-3.1 Preamble 17
C-3.2 Structure and contents of tables 18
C-3.3 Planning Phase 18
C-4 SPECIALIST RECOMMENDATIONS **18**
SECTION D: ON-SITE IMPLEMENTATION **19**
D-1 ORGANISATIONAL STRUCTURE **19**
D-2 ENVIRONMENTAL ROLES AND RESPONSIBILITIES MATRIX **19**
D-3 ENFORCEMENT, MONITORING AND AUDITING **22**
D-4 NON-COMPLIANCE **22**
D-5 GENERAL GUIDELINES **22**
D-6 AWARENESS TRAINING **23**
D-7 ENVIRONMENTAL CONTACT PERSONS **23**
D-8 EMERGENCY NUMBERS **23**
SECTION E: ANNEXURES **51**
SECTION F: APPENDICES **59**

LIST OF FIGURES

Figure 1: Environmental Appointments 21

LIST OF TABLES

Table 1: Functions and Responsibilities of the Project Team 19

SECTION A: INTRODUCTION

A-1 BACKGROUND INFORMATION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by RP Devco (Pty) Ltd to compile and submit an Environmental Management Programme (EMPr) to the decision making authority: the Gauteng Department of Agriculture and Rural Development (GDARD); for the proposed Delmore Park Extension 7 Residential Development, Portion 396 of Farm Driefontein 85 IR, Boksburg within the Ekurhuleni Metropolitan Municipality (EMM), Gauteng Province, South Africa.

This document is compiled in accordance with the Integrated Environmental Management (IEM) philosophy which aims to achieve a desirable balance between conservation and development (Department of Environmental Affairs and Tourism (DEAT, 1992)). IEM is a key instrument of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended [NEMA]. NEMA promotes the integrated environmental management of activities that may have a significant effect on the environment, while IEM prescribes a methodology for ensuring that environmental management principles are fully integrated into all stages of the development process. It advocates the use of several environmental management tools that are appropriate for the various levels of decision-making. One such tool is an EMPr.

The IEM guidelines encourage a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels. The basic principles underpinning IEM are that there be:

- Informed decision-making;
- Accountability for information on which decisions are taken;
- Accountability for decisions taken;
- A broad meaning given to the term environment (i.e. one that includes physical, biological, social, economic, cultural, historical and political components);
- An open, participatory approach in the planning of proposals;
- Consultation with interested and affected parties;
- Due consideration of alternative options;
- An attempt to mitigate negative impacts and enhance positive aspects of proposals;
- An attempt to ensure that the ‘social costs’ of development proposals (those borne by society, rather than the developers) be outweighed by the ‘social benefits’ (benefits to society as a results of the actions of the developers);
- Democratic regard for individual rights and obligations;
- Compliance with these principles during all stages of the planning, implementation and decommissioning of the proposals (i.e. from ‘cradle to grave’); and
- The opportunity for public and specialist input in the decision-making process.

These principles are in line with NEMA and are focussed primarily on co-operative governance, public participation and sustainable development. The Environmental Impact Assessment (EIA) Regulations of 2010, promulgated in terms of the NEMA that took effect in August 2010 regulate the procedures and criteria for the submission, processing, consideration and decision on applications for environmental authorisation (EA) of listed activities.

In terms of regulation 31 (2) of Government Notice Regulation (GNR) No. 543 of the NEMA, promulgated in terms of chapter 5 of the Act, the Environmental Impact Assessment Report (EIR) must contain all the information that is necessary for the competent authority, Gauteng Department of Agriculture and Rural Development (GDARD) to consider the application and to reach a decision contemplated in regulation 25 of the Act, and must include an EMPr containing the aspects contemplated in regulation 33 of the Act.

A-2 SCOPE

The general principles contained within this document apply to all **PRE-CONSTRUCTION AND CONSTRUCTION ACTIVITIES**.

A-2.1 Principles of the EMPr

This EMPr is compiled using the following concepts and implementation requirements so that the higher principles of sustainable development are realised:

- Continuous improvement: The project proponent (or implementing organisation) must commit to review and to continually improve environmental management, with the objective of improving overall environmental performance.
- Broad level of commitment: A broad level of commitment is required from all levels of management as well as the workforce in order for the development and implementation of this EMPr to be successful and effective.
- Flexible and responsive. The implementation of the EMPr must respond to new and changing circumstances, i.e. rapid short-term responses to problems or incidents. The EMPr is a dynamic "living" document and thus regular planned review and revision of the EMPr must be carried out.
- Integration across operations. This EMPr must integrate across existing line functions and operational units such as health, safety and environmental departments in a company/ project. This is done to change the redundant mindset of seeing environmental management as a single domain unit.
- Legislation. It is understood that any development project during its construction phase is a dynamic activity within a dynamic environment. The Developer, Engineer, Contractor and Sub-contractor must therefore be aware that certain activities conducted during construction may require further licensing or environmental approval, e.g. river or stream diversions, bulk fuel storage, waste disposal, etc. The Contractor must consult the ER, EO and ECO on a regular basis in this regard.

SECTION B: SETTING THE CONTEXT

B-1 OVERVIEW OF THE PROPOSED PROJECT

B-1.1 Background

The proposed activity entails the establishment of a residential development, Delmore Park Extension 7. The development will consist of 259 stands on approximately 16.4ha of land on Portion 396 of the Farm Driefontein 85 I.R. in Boksburg, Gauteng.

It is the applicant's intention to develop the following:

254 stands, i.e.

- 248 Residential 1;
- 3 Institutional
- 1 Municipal
- 1 Educational
- 1 Private Open Space

3, 14 hectares of land will be allocated for roads.

Currently, access to the site is obtained off Commissioner Street via Du Preez Street which leads to Delmore Extension 2. A line of no access will apply to the western boundary up to the entrance to the township as well as on the southern and eastern boundary of the township as proposed. Internal access roads will be provided. The northern and southern roads being 13m wide and the linking roads being 10,5m wide.

EMM has previously indicated that the development in the area will be supplied with 11kV from the nearby Central Vertical substation.

The proposed site is located to the south of Delmore Park Extension 2 and north of Commissioner Street, Boksburg. The site falls under the jurisdiction of EMM. The northern portion falls under ward 33 and the southern portion falls under ward 34 of EMM.

EMM will be responsible for the bulk infrastructure for the proposed township development (water supply, sanitation, and waste management). Should Stormwater from the proposed township be discharged into the adjacent Elsburg Spruit, the relevant Water Use Licenses should be applied for.

B-1.1.1 Summary of impacts associated with the proposed activity

ENVIRONMENTAL ASPECT	RELEVANT AREA	ENVIRONMENTAL OBJECTIVE	POTENTIAL IMPACTS
Traffic impact	Site	• To reduce the effects of construction activities on the local traffic patterns.	• Traffic congestion due to construction activities.
Ground and Surface water contamination	Site	• Prevent surface- and groundwater contamination and maintain a suitable quality of surface- and ground water to be deposited into hydrological systems.	• Altered flow regimes as a result of hardened surfaces. • Contaminants occurring as a result of construction (e.g. hydrocarbons, sewage and litter) might end up in the hydrological system. • Disruption of natural drainage patterns.

Soil erosion and stability	Site	• Minimise erosion damage. • Minimise impeding the natural flow of water. • Minimise scarring of the soil surface and land features. • Minimise disturbance and loss of topsoil. • Re-growth of disturbed areas.	• Erosion and instability.
Flora and Fauna	Site	• To ensure that species of conservation importance are identified and preserved.	• Loss of species of conservation importance, disruption of natural processes and functionality. • Establishment of alien invasive plant species and declared weeds.
Noise	Site & Local Area	• To minimise the effect of noise on surrounding residents both during construction and operation.	• Noise limits being exceeded.
Employment opportunities	Local and Regional	• To create employment opportunities for the local community during the construction phase of the development and operational phases. • To create short to medium term employment opportunities for skilled and unskilled labourers, as well as training opportunities for unskilled labourers. • To assure that the development is sustainable through employment, transfer of skills and training of local people.	• Impact on the surrounding communities and local economy due to possible skills development and income generation.
Increase in ambient dust level	Regional	• Reduce dust fall out. • Reduce visual impact. • Minimise loss of valuable soil material.	• Complaints from I&APs. • Dust contamination on the surrounding environment. • Baseline targets exceeded.
Visual impact	Regional	• To minimise light and visual pollution. • To ensure that the development blends in with the landscape character. • To minimise unsightly views during the construction phase.	• Visual Impacts to surrounding land users. • Alteration of Landscape Character.
Crime, Safety & Security	Regional	• To ensure safety within the site, particularly to prevent trespassers from neighbouring areas.	• Trespassers. • Threat to safety of residents and tourists to the area.

B-1.2 Integration of environmental considerations into the project design

Associated Infrastructure Layout

The associated infrastructure has been outlined in the Final BAR and also the Layout Plans as attached in Appendix 2. The exact layout of the proposed infrastructure will be finalised post environmental authorisation within the approved site layout and design. The layout will be determined by taking environmental and social sensitivities and technical feasibility into consideration.

B-1.3 Purpose of the Environmental Management Programme

The purpose of this EMPr is to:

- Sketch the background for the development;
- Introduce the structure of the EMPr, particularly in terms of the contractual application of the environmental specifications;
- Highlight the salient features of the EMPr.
- Detail the roles of the various parties with respect to the implementation and monitoring of the EMPr;
- Clarify and streamline the implementation of the EMPr;
- Outline procedures for proactive environmental management and environmental control, in the event of pollution or similar incidents; and
- Provide stakeholders the opportunity to comment on the proposed mitigation measures for the identified environmental impacts.

It should be noted that this EMPr is part of the EIA process being undertaken for the proposed project, and should be read in conjunction with the Final BAR and all associated appendices.

B-1.4 Objectives of the Environmental Management Programme

Environmental management does not end with obtaining the required EA. Rather there is a need to ensure that the remedial requirements identified during the environmental process are effectively realised during project implementation, and this is where EMPrs have a key role to play.

An EMPr is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the project phases are prevented and that the positive benefits of the projects are enhanced”. Impacts range from those incurred during start up (site clearing, erection of the construction camp) and through to those incurred during the construction activities themselves (erosion, pollution of watercourses, noise, and dust).

Specifically, the objectives of this EMPr can be articulated as follows:

- To give effect to the construction related requirements;
- To give effect to the environmental commitments to the various role players;
- To ensure that these requirements / commitments are expressed in a manner that is accessible to all parties and is binding upon those responsible for project implementation;
- To ensure that sufficient resources are allocated to the project budget in order to give effect to the environmental requirements / commitments, and to ensure that the scale of EMPr-related interventions is consistent with the significance of identified impacts;
- To provide a coherent and pragmatic framework for the implementation of the requirements, ranging from the roles and responsibilities of the key project participants to the auditing and reporting of compliance;
- To facilitate appropriate and proactive response to unforeseen events or changes in project implementation that were not considered in the EIA process; and
- To ensure that the construction phase of the project does not result in undue or reasonably unavoidable adverse environmental impacts, and that any potential environmental benefits are enhanced.

B-1.5 Structure of this Document

This document has been divided into four parts, each addressing a different aspect of the EMPr.

Section 1: Provides a brief introduction and overview of the purpose and structure of this guideline

document;

Section 2: Sets the context for the EMPr by providing an overview of the project, summarising the objectives of the EMPr, highlighting the scope of the EMPr and briefly emphasising the Devco (Pty) Ltd's environmental commitments;

Section 3: Provides an introduction to the specification, an overview of the structure and application of the specification and highlights the environmental considerations that should inform the tender adjudication process; and

Section 4: Provides guidance in terms of the on-site implementation of the EMPr, highlighting the organisation structure and various roles and responsibilities, emphasising the importance of awareness training, summarising the requisite approach to monitoring and auditing and addressing the requirement for review and amendment of the environmental specifications.

B-1.6 Scope of the Environmental Management Programme

The scope of the EMPr must ensure that the objectives outlined in Section B-1.4 will be addressed, and is principally determined by the key documentation related to the EIA process, notably the Final EIR and the EA once received. A brief overview of the key issues raised in each of these documents is provided below.

B-1.6.1 Final Basic Assessment Report

In terms of the Final BAR, various construction and operational related environmental impacts have been identified as per the tables below.

B-1.6.2 Environmental Management Programme

Adherence to the environmental management measures for all phases of the project requirements of this EMPr.

B-1.6.3 Environmental Authorisation

Once EA has been received from the GDARD, any additional conditions stipulated in the authorisation will be included into this dynamic EMPr (refer to Appendix 3).

SECTION C: ENVIRONMENTAL SPECIFICATIONS

C-1 INTEGRATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME INTO THE CONTRACT

This EMPr has been written in a form and language that is consistent with the tender / contract documentation used for engineering contracts i.e. the EMPr takes the form of a set of environmental specifications that can integrate in the civil, mechanical and electrical tender / contract documentation. There are various advantages to this approach:

- The Contractor is made aware of the EMPr at the tender stage;
- The Contractor is able to cost for compliance with the EMPr;
- The EMPr is presented to the Contractor in the language and terminology with which he is familiar, and unnecessary duplication and contradiction is eliminated;
- Inclusion of the EMPr within the contract ensures that the EMPr becomes a legally binding document within a well-developed legal framework; and
- The standardised form and structure of the environmental specifications ensures that with time and each new contract, the Contractor becomes increasingly familiar with, and thus more accepting of, the EMPr and implements it with the same diligence as any other set of specifications contained within the contract.

Ultimately, by measuring compliance against an explicit set of environmental controls that are well located within a robust legal framework, the approach has been proven to enhance success in the implementation and enforcement of the EMPr significantly.

C-2 SPECIFICATION STRUCTURE AND APPLICATION

These specifications are not exclusive and could, within reason, be expanded on or amended at any time during the contract by the Environmental Control Officer (ECO).

C-2.1 Method statements

Environmental practitioners are not specialists with regard to construction techniques. Therefore, so as not to hinder construction activities by stipulating elaborate, costly and/ or ineffective mitigation measures, the environmental specification is underpinned by a series of Method Statements, within which the Contractor is required to outline how they propose to mitigate any identified environmental risks. For example, if the specification states that “cement contaminated water shall not be allowed to contaminate the soil or adjacent watercourse”, the Method Statement compiled by the Contractor would be required to outline how he or she intends to achieve this requirement.

In terms of the environmental specifications for the proposed project, the Contractors must submit various written Method Statements to the Engineer and ECO as requested in the Specification. For the purposes of the environmental specifications, a Method Statement is defined as “a written submission by the Contractor to the Engineer in response to the Specification or a request by the Engineer, setting out the materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications”. The Method Statement must cover applicable details with regard to:

- Construction procedures;
- Materials and equipment to be used;

- Getting the equipment to and from site;
- How the equipment/ material will be moved while on site;
- How and where material will be stored;
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- Timing and location of activities;
- Compliance/ non-compliance with the Specifications; and
- Any other information deemed necessary by the Engineer.

The environmental specifications set very stringent requirements in terms of the provision of Method Statements and the commencement of the activities they cover:

- Any Method Statement required by the Engineer or the specification must be produced within the timeframes specified by the Engineer or the specification (typically two weeks);
- The Contractor may not commence the activity covered by the Method Statement until it has been approved, except in the case of emergency activities and then only with the consent of the Engineer;
- The Engineer may require changes to a Method Statement if the proposal does not comply with the specification or if the proposed methodology carries an unreasonable risk of excessive damage to the environment;
- Approved Method Statements must be readily available on the site and must be communicated to all relevant personnel;
- The Contractor is required to carry out the activities covered by the Method Statement in accordance with the proposed approach; and
- Approval of the Method Statement does not absolve the Contractor from their obligations or responsibilities in terms of the Contract.

C-2.2 Site documentation

The following is a list of documentation that must be held on site and must be made available to the ECO and/ or Approving Authority on request:

- Site daily diary / instruction book / incident reports;
- Records of all remediation / rehabilitation activities;
- Copies of EO reports (management and monitoring);
- Environmental Management Programme;
- Complaints register; and
- Method statements.

C-2.3 Pro forma documentation

C-2.3.1 Prior to the commencement of construction activities

The following attached pro forma documentation is to be filled out and is binding to the EMPr and project contract and includes *inter alia*:

- Declaration of understanding by the Developer;
- Declaration of understanding by the Engineer;
- Declaration of understanding by the Contractor;
- Method statements; and
- ECO / Engineer approval for method statements.

C-2.3.2 During construction activities

The following attached pro forma documentation is to be filled out and maintained. These are binding to the EMPr and project contract. They include *inter alia*:

- Amended Method Statements;
- ECO / Engineer approval for amended method statements;
- Environmental incidents; and
- Records of all remediation/ rehabilitation activities.

C-2.4 National and Provincial Acts and guidelines

The common list of legislative references contained herein is by no means exhaustive but is applicable to the general principals of this document.

Advertising on Roads and Ribbon Development Act, 1940 (Act No. 24 of 1940)
Regulates the display of adverts at places visible from public roads. Also controls the depositing of machinery or refuse, and the construction or laying of structures, near public roads. Provincial Authorities

National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004)
Control of noxious and offensive gases, smoke, dust and vehicular emissions. DEAT: Regional Air Pollution Control Office

National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended
Control/ prevention of pollution; combating of noise; activities which may have a detrimental effect on the environment, preparation and contents of environmental impact reports. DEAT, Department of Water Affairs and Forestry, Directorate: Environmental Management of the Provincial Department of Environmental and Cultural Affairs and Sport, Local Authorities

National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) as amended
Amended list of Critically Endangered, Endangered, Vulnerable and Protected species.

Hazardous Substances Act, 1973 (Act No. 15 of 1973)
Provides for the control of substances, which may cause injury or ill health to, or the death of human beings. National Department of Health. Local Authorities may be authorized

Health Act, 1977(Act No. 63 of 1977)
Control of solid, liquid and gaseous wastes that may pose a health hazard. Department of Health and Local Authorities

National Building Regulations and Standards Act, 1977(Act No. 103 of 1977) (SABS 0400)

National Heritage Resources Act, 1999 (Act No. 25 of 1999) & World Heritage Resource Act, 1999 (Act No. 49 of 1999)
Conservation of national heritage and archaeological material. South African Heritage Resources Agency (National Council for Heritage)

National Road Traffic Act, 1996 (Act No. 93 of 1996)
Provides for road traffic matters which apply uniformly throughout South Africa. Department of Transport.

National Water Act, 1998 (Act No. 36 of 1998) & Water Services Act, 1997 (Act No. 108 of 1997)
Diversion or impoundment of rivers. Conservation and use of water. Treatment and disposal of waste,

wastewater and effluent. Pollution and pollution emergencies. Water Users & Associations. Dam safety. Registration of boreholes. Department of Water Affairs and Forestry

Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
Controls the exposure of employees and the public to dangerous and toxic substances or activities. Department of Labour

C-2.5 Provisions for addressing non-conformance

Ultimately, the key to effective environmental management during the construction phase is ensuring that the requirements of the EMPr are adequately and appropriately implemented on site. Accordingly, monitoring performance and addressing non-compliance are key attributes of any environmental interventions. Section 4 addresses the actual process for identifying and addressing non-compliance, whilst this section provides an overview of the provision made for this in the environmental specification.

Broadly, the mechanisms for addressing non-compliance that are provided for in the environmental specifications and associated contract documentation can be divided into the following categories:

- Controlling performance via the certification of payments;
- Requiring the Contractor to “make good”, at their own cost, any unjustifiable environmental degradation;
- Implementing a system of penalties to dissuade environmentally risky behaviours; and
- Removing environmentally non-compliant staff/ equipment from site, or suspending part or all of the activities on site.

C-2.6 Environmental considerations in adjudication of tender

In terms of this EMPr, Devco (Pty) Ltd has an obligation to ensure compliance by various parties with a suite of environmental requirements related to the construction phase. The compilation of the EMPr and its integration into the Tender document, as a suite of environmental specifications, form part of meeting the obligation, however, to ensure that these obligations continue to be fulfilling during the actual construction processes, it behoves Devco (Pty) Ltd to ensure that the appointed Contractors possess the requisite environmental management experience and expertise. Accordingly, it would be prudent for Devco (Pty) Ltd to ensure that environmental considerations form part of the tender adjudication process. Key considerations in this regard would be as follows:

- To request as part of the tender process that the Contractor provide his environmental policy and indicate how this will influence the way the construction process is approached and managed on site. At the tender stage the Contractor would merely be asked to provide the overarching environmental policy for the company or joint venture;
- To request as part of the tender process a list of the Contractor’s previous experience in terms of the onsite implementation and management of environmental requirements;
- To request as part of the tender process an indication of the proposed organisational structure for the contract, and specifically for the Contractor to indicate which staff would be acting in the capacity of Environmental Officer (EO) and which senior staff member would have overall responsibility for ensuring compliance by the Contractor with the specified environmental requirements; and
- To confirm, upon receipt of the Tender, that the Contractor has made sufficient allowance in his Tender Price for meeting the various environmental requirements.
- During the tender adjudication process for each Contract, each Contractor should be scored in terms of the aforementioned considerations and allocated an environmental competency score. This score should form a key consideration in the final decision-making regarding the award of the

various contracts.

C-3 ENVIRONMENTAL MANAGEMENT MEASURES FOR ALL PHASES OF THE PROJECT

The management measures documented in each of the sub-sections below have been compiled using the following information:

- Impact Assessment and mitigation measures documented in the Final BAR for the proposed project.

In addition to the abovementioned information source, the EMPr will be updated to include the conditions documented in the EA to be received upon approval of the Final EIR.

C-3.1 Preamble

The point of departure for this EMPr is to ensure a pro-active rather than re-active approach to environmental performance by addressing potential problems before they occur. This will limit corrective measures needed during the construction phase of the project. Therefore, the purpose of an EMPr is to provide management measures that must be implemented by developers, Engineers and Contractors alike to ensure that the potential impacts of the proposed development are minimised. It must also be ensured that the EMPr is maintained and upheld as a dynamic document in order for the project team to add or improve on issues that might be considered left out or not relevant to the project. In such instances, the approving authority may authorise the ECO to make such changes.

The tables below form the core mitigation measures appropriate to the pre-construction and construction phase. The tables present the objectives to be achieved and the management actions that need to be implemented in order to mitigate the negative impacts and enhance the benefits of the project. Associated responsibilities, criteria/targets and timeframes are clearly specified.

The **'pre-construction'** section of this EMPr, refers to the period of time leading up to and prior to commencement of construction activities, and is included to ensure pro-active environmental management measures with the goal of identifying avoidable environmental damage at the outset and sustain optimal environmental performance throughout the construction phase. Most impacts will occur during the construction phase and must be mitigated through the contingency plans identified in the pre-construction phase.

The bulk of environmental impacts will have immediate effect during the **'construction'** phase (e.g. noise, dust, and water pollution). If the site is monitored on a continual basis during the construction phase, it is possible to identify these impacts as they occur. These impacts will then be mitigated through the measures outlined in this section, together with a commitment to sound environmental management from the project team. The "construction" section refers to all construction and its operation-related activities that will occur within the approved area and access roads, until the project is completed. This "construction" section is divided into three functional areas, namely "materials"; "plant"; and "construction". Each of these functional areas within the EMPr contains specific mitigation requirements and requested contractor method statements stipulated where required.

The **"operation" phase** refers to the period after construction and prior to closure. It includes activities that are deemed to have the most significant effect during this period. This section should be updated as per the relevant EA and during the end of the construction phase of the project once the exact operational procedures are defined.

The **"decommissioning" phase** refers to the period after the end of the operational phase. The impacts associated with this phase are deemed to be less significant than those associated with the construction phase.

C-3.2 Structure and contents of tables

The table consists of seven parts as follows:

Phase of development - This row will identify either pre-construction (planning) or actual construction, operation or decommissioning phases.

Impact /issue - This row will identify the issue being addressed, e.g. Materials, site demarcation, heritage, etc.

Mitigation Measure - This column will include all the necessary mitigation measures for each impact/issue.

Management objectives - This column will indicate what the management objectives to be achieved for each mitigation measure are.

Measurable targets - This column will indicate what evidence is to be used as an indication to whether or not the 'management objectives' have been implemented and hence achieved.

Frequency of action - These columns provide time guidelines for the 'Responsible party' by which he/she is to action or manage the required mitigation.

C-3.3 Planning Phase

To mitigate the negative environmental impacts, a number of measures would have to be addressed in the design of the proposed activities during the planning phase. An inspection must be carried out on the design before commencement of construction to ensure that the mitigation measures have been incorporated in the design.

C-4 SPECIALIST RECOMMENDATIONS

The following specialist studies were conducted and their mitigation measures where applicable are included from page 50:

- Basic Ecological Assessment (Urban Dynamics, November 2007);
- Geotechnical Investigation (Intraconsult Consulting Engineers and Geologists, August 2008);
- Cultural Heritage Impact Assessment (Strategic Environmental Focus, 3 September 2008); and
- Traffic Impact Assessment (Infragen Consulting Engineers (Pty) Ltd, June 2008).

SECTION D: ON-SITE IMPLEMENTATION

This EMPr is specifically compiled for the period of time prior to commencement of, and activities associated with construction of the above mentioned activity.

D-1 ORGANISATIONAL STRUCTURE

The organisational structure identifies and defines the responsibilities and authority of the various role-players (individuals and organisations) involved in the project. All instructions and official communications regarding environmental matters shall follow the organisational structure shown in Figure 1 below. The organisational structure reflected in below has been developed to ensure that:

- There are clear channels of communication;
- There is an explicit organisational hierarchy for the proposed project; and
- Potential conflicting or contradictory instructions are avoided.

D-2 ENVIRONMENTAL ROLES AND RESPONSIBILITIES MATRIX

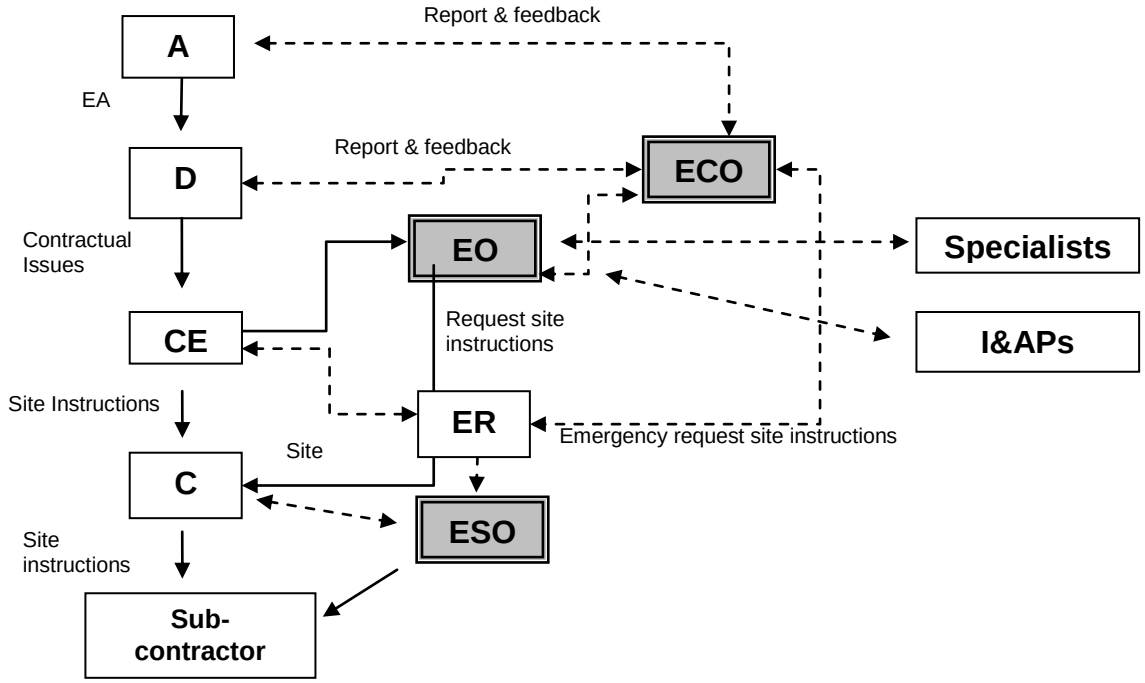
In order for the EMPr to be successfully implemented, all the role players involved in the project need to co-operate. For this to happen, role players must clearly understand their roles and responsibilities in the project, must be professional, form respectful and transparent relationships, and maintain open lines of communication.

[Pre-construction & Construction] - Potential role players or project teams will include the Authorities (A), Other Authority (OA), Developer/Proponent (D), Consulting Engineers (CE), Engineers Representative (ER), Environmental Site Officer (ESO), Environmental Control Officer (ECO), Project Manager (PM), Contractors (C), Environmental Assessment Practitioner (EAP). Further; landowners, interested and affected parties (I&APs) and the relevant environmental and project specialists are also important role players. Roles and Responsibilities will be revised pending authorisation.

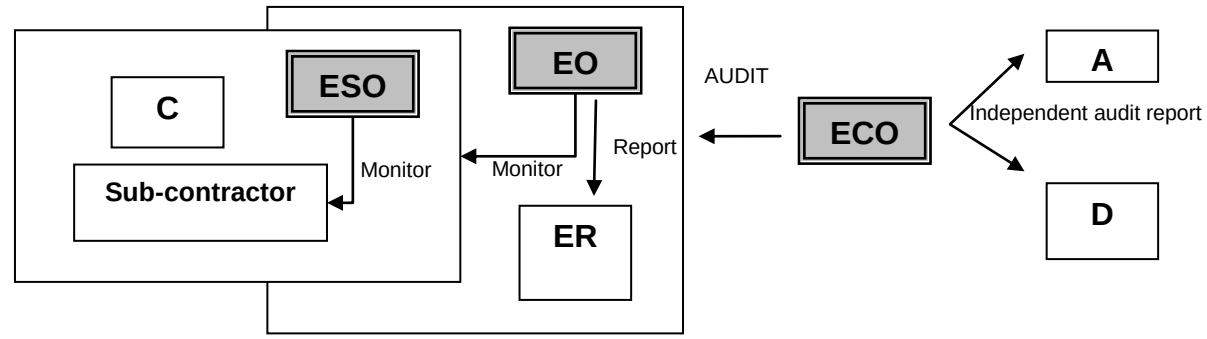
Table 1: Functions and Responsibilities of the Project Team

KEY	FUNCTION	RESPONSIBILITY
D	Developer	Proponent ultimately accountable for ensuring compliance to the EMPr and conditions contained in the EA. The ECO must be contracted by the developer (full time or part time depending on the size of the project) as an independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of Environmental Authorisations (EA's), and the EMPr for the project. The developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities. The developer must ensure that the ECO is integrated as part of the project team.
CE	Consulting Engineer	Contracted by the developer to design and specify the project engineering aspects. Generally the engineer runs the works contract. The CE may also fulfil the role of PM on the proponent's behalf (See PM).
PM	Project Manger	The PM has over-all responsibility for managing the project, contractors, and consultants and for ensuring that the environmental management requirements are met. The CE may also act as the PM. All decisions regarding environmental procedures must be approved by the PM. The PM has the authority to stop any construction activity in contravention of the EMPr in accordance with an agreed warning procedure.
ER	Engineers Representative	The consulting ER on site. Has the power/mandate to issue site instructions and in some instances, variation orders to the contractor, following request by the EO or ECO. The ER oversees site works, liaison with Contractor and ECO.
ECO	Environmental Control Officer	An independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of EA's, and the EMPr for the project. The ECO must be on site prior to any site establishment and must endeavour to form an integral

KEY	FUNCTION	RESPONSIBILITY
		part of the project team. The ECO must be proactive and have access to specialist expertise as and when required, these include botanists, ecologists, etc. Further, the ECO must also have access to expertise such as game capture, snake catching, etc. The ECO must conduct audits on compliance to relevant environmental legislation, conditions of EA, and the EMPr for the project. The size and sensitivity of the development, based on the EIA, will determine the frequency at which the ECO will be required to conduct audits. (A minimum of a monthly site inspection must be undertaken). The ECO must be the liaison between the relevant authorities and the project team. The ECO must communicate and inform the developer and consulting engineers of any changes to environmental conditions as required by relevant authoritative bodies. The ECO must ensure that the registration and updating of all relevant EMPr documentation is carried out. The ECO must be suitably experienced with the relevant environmental management qualifications and preferably competent in construction related methods and practices. The ECO must handle information received from whistle blowers as confidential and must address and report these incidences to the relevant Authority as soon as possible.
C	Contractor	The principle contractor, hereafter known as the 'Contractor', is responsible for implementation and compliance with the requirements of the EMPr and conditions of the EA's, contract and relevant environmental legislation. The Contractor must ensure that all sub-contractors have a copy of and are fully aware of the content and requirements of this EMPr. The contractor is required, where specified, to provide Method Statements setting out in detail how the management actions contained in the EMPr will be implemented.
ESO	Environmental Site Officer	The ESO is employed by the Contractor as his/her environmental representative to monitor, review and verify compliance with the EMPr by the contractor. This is not an independent appointment; rather the ESO must be a respected member of the contractor's management team. Dependent on the size of the development the ESO must be on site one week prior to the commencement of construction. The ESO must ensure that he/she is involved at all phases of the constriction (from site clearance to rehabilitation).
A	Lead Authority	The authorities are the relevant environmental department that has issued the Environmental Authorisation. The authorities are responsible for ensuring that the monitoring of the EMPr and other authorisation documentation is carried out, this will be achieved by reviewing audit reports submitted by the ECO and conducting regular site visits.
OA	Other Authority	Other authorities are those that may be involved in the approval process of an EMPr. Their involvement may include reviewing EMPr's to ensure the accuracy of the information relevant to their specific mandate. Other authorities may be involved in the development, review or implementation of an EMPr. For example if a specific development requires a water use licence for the relevant national authority then that authority should review and comment on the content of the particular section pertaining to that mandate.
EAP	Environmental Assessment Practitioner	The definition of an EAP in Section 1 of NEMA is "*the individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management plans or any other appropriate environmental instruments introduced through regulations".*



MONITORING, AUDITING AND REPORTING (Pre-EA)



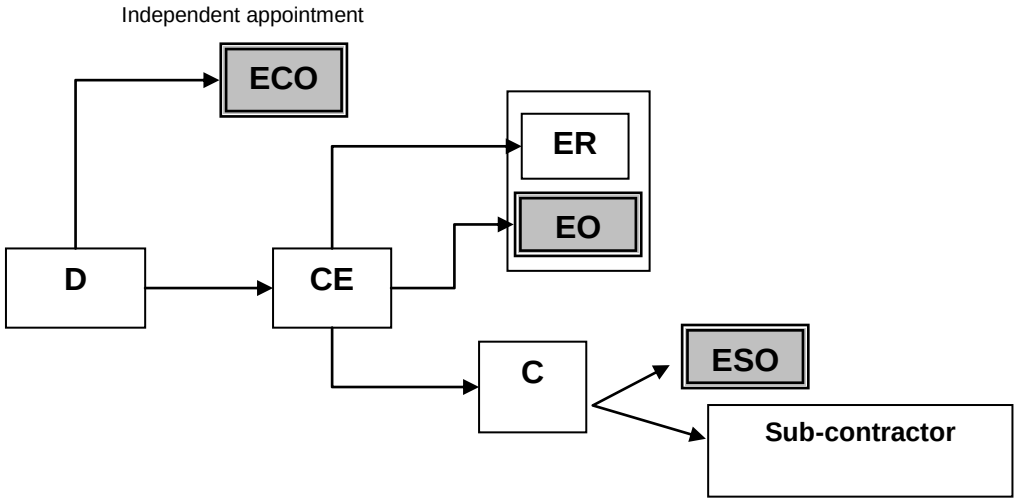


Figure 1: Environmental Appointments

D-3 ENFORCEMENT, MONITORING AND AUDITING

The ECO must conduct, at a frequency as determined by the Department and stipulated in the relevant EA for the project, independent environmental audits. The audits are to verify the projects compliance with the EMPr and conditions of the EA.

Before any construction activities commence, the ECO must compile, for the approval by the Department, an audit checklist based on the contents of this EMPr and conditions of the EA. The ECO must at the request of the Department forward audit reports to the Department at a frequency determined by the Department which must be stipulated in the EA.

Evidence of the following as key performance indicators, must be included in the audit reports where required:

- Complaints received from landowners and actions taken.
- Environmental incidents, such as, concrete spills, etc. and actions taken (litigation excluded).
- Incidents leading to litigation and legal contraventions.
- Environmental damage that needs rehabilitation measures to be taken.

A copy of all ESO and EO monitoring reports, contractor method statements and pro forma documentation must be held by the ESO and/or the EO on site and be made available to the Department and or the ECO upon request.

D-4 NON-COMPLIANCE

The Contractor is deemed NOT to have complied with the EMPr if:

- Within the boundaries of the site there is evidence of contravention of the EMPr confirmed and verified by the ECO;
- Environmental damage ensues due to non-compliance of EMPr requirements;
- The Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time, and
- The Contractor fails to respond adequately to complaints from the public in line with requirements of this EMPr.

D-5 GENERAL GUIDELINES

The following measures provide guideline solutions to frequently anticipated issues on most development activities.

- The prevention of any site degradation due to non-compliance, administrative or financial problems, and inactivity during the construction phase, illegal activities, delays caused by archaeological finds, etc. is ultimately the responsibility of the applicant/developer. Section 28, NEMA.
- The study area must be clearly defined and surveyed according to the project authorisation. All workforce members and other construction personnel are not to go beyond the fenced footprint.
- The Contractors must adhere to agreed and approved access points.
- No camping is allowed on any private property.
- Damage to private or public property such as fences, gates and other infrastructure may occur at any time. All damage to be repaired immediately and to the satisfaction of the owner.
- Relevant landowners and businesses must be informed of the starting date of construction as well as the phases in which the construction shall take place.
- The Contractor must adhere to all conditions of contract including this EMPr.
- Proper planning of the construction process must be undertaken to allow for disruptions due to rain

and very wet conditions.

- Where existing private roads to be utilised as access are in a bad state of repair, such roads' condition must be well documented, including photographs, before they are used for construction purposes. If necessary some repairs must be done to prevent damage to equipment and plant.
- All private and public manmade structures near the project site must be protected against damage at all times and any damage must be rectified immediately.
- Proper site management and regular monitoring of site works.
- Proper documentation and record keeping of all complaints and actions taken.
- Regular site inspections and good control over the construction process throughout the construction period.
- A positive attitude towards Environmental Management by all site personnel must be motivated through regular and effective awareness and training sessions.
- An ESO, on behalf of the Contractor, is to be appointed to implement this EMPr. The EO and not the Contractor or his/her ESO is to deal with any landowner related matters.
- Environmental Audits to be carried out during and upon completion of construction.

D-6 AWARENESS TRAINING

The EO or ESO are responsible for ensuring everyone on site is given an environmental awareness induction session which not only clearly defines what the environment is and gives specifics detailing the local environment but outlines the requirements of the EMPr as a management tool to protect the environment. The EO or ESO must ensure daily toolbox talks include alerting the workforce to particular environmental concerns associated with the tasks for that day or the area/habitat in which they are working. Awareness posters and a hand out must be produced to create awareness throughout the site.

D-7 ENVIRONMENTAL CONTACT PERSONS

Name	Postal Address	Relevant Numbers
Contact person: Harry Gey Van Pittius Kiron Developments (Pty) Ltd	P.O. Box, 786 Edenvale 1610	Tel: 011 607 8000 Fax: 0865196529 E-mail:Bianca@krionprop.co.za

D-8 EMERGENCY NUMBERS

Police:	10111
Ambulance:	10117
Fire Service:	10178
Nearest Hospital:	+27 (0)11 898 8000
Metropolitan Municipality Emergency:	(011) 999 0191

Phase of development	PRE-CONSTRUCTION			
Impact / issue	**GENERAL PLANNING (A)**			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
A1 Project contract and programme i. The EMPr must be included as part of the tender documentation (and included within any service level agreements made) thereby making it part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract. ii. A copy of this EMPr must be available on site. The Contractor must ensure that all the personnel on site, sub-contractors and their team, suppliers, etc. are familiar with and understand the specifications contained in the EMPr.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase • Ensure environmental awareness and formalise environmental responsibilities and implementation	• Contract records • Signed declaration pro forma's	-	
A2 Appointments and duties of project team i. The contact details for the ECO, ER, EO, Contractor and ESO (as applicable) must be recorded and a copy kept on site. This document must be made available to the approving authority on request. ii. Before construction activities commence, role players must have a clear indication of their role in the implementation of this EMPr as indicated in D-2 Table 1. iii. Subcontractor(s) contracts with the principle contractor must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMPr. Proof of this must be submitted to the ECO.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Contract records • Signed declaration pro forma's	-	
A3 Method statements i. As required in C-2.1, certain method statements must be provided by the contractor. All activities which require method statements may only commence once the method statements have been approved by the engineer and or ECO as applicable. ii. Where applicable, the contractor will provide job-specific training on an *ad hoc* basis when workers are engaged in activities, which require method statements.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Approved method statements and relevant pro forma documents • Training records	As and when required	

Phase of development	PRE-CONSTRUCTION			
Impact / issue	GENERAL PLANNING (A)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
A4 Site demarcation and development i. The surveys for the overall project area and construction footprint as approved in the EA must be complete and clearly demarcated before the contractors set up their crew camps or begin construction. ii. All relevant 'general' and 'specific' conditions contained in the EA will be included in the space provided below and included as part of this EMPr when the "declaration of understanding" is signed by the Developer, Engineer and Contractor. The proponent is to sign the space provided.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Demarcated area's • Filled in section of this document	As and when required	
A5 Emergencies, non-compliance and communication i. The contractor must provide method statements on the protocols to be followed, and contingencies to be put in place for the following potential incidents before construction may begin: Contamination of soils from spills and fire. ii. Communication in emergencies must follow the prescribed lines of communication. iii. The contractor understands that failure to adhere to the requirements of the EMPr will result in the contractor being responsible for over and above the costs incurred for any remediation required as result of the specific non-compliance.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Method statements	As and when required	

Phase of development	GENERAL PLANNING	EA reference number			
Impact / issue	EA Conditions (B)	Proponents signature			
MITIGATION MEASURE		**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
All relevant 'general' and 'specific' conditions contained in the EA must be included in the space provided once authorisation has been received.		•	•		

Phase of development	CONSTRUCTION			
Impact / issue	Materials (C)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
Handling				
C1 Stockpiles i. All stockpiled material must be easily accessible without any environmental damage. ii. All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised. iii. The stockpiles may only be placed within the demarcated areas the location of which must be approved by the ER, EO or ESO. iv. Storm water run-off from the stockpile site and other related areas must be directed into the storm water system with the necessary pollution prevention measures such as silt traps and may not run freely into the immediate and surrounding environments (if applicable). v. Stockpiles are to be stabilised if signs of erosion are visible. vi. Soils from different horizons must be stockpiled such that topsoil stockpiles do not get contaminated by sub-soil material. vii. No plant, workforce or any construction related activities may be allowed onto the topsoil stockpiles. viii. Topsoil stockpiles must be clearly demarcated as no-go areas. ix. Stockpiles must not be higher than 2m to avoid compaction thereby maintaining the soil integrity and chemical composition (for the topsoil stock piles that will be used for re-vegetation). x. All stockpiles should be stored on surfaces that will be paved or developed over.	• Minimise scaring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Minimise sedimentation of nearby water courses • Maintain the integrity of topsoil's for landscaping and rehabilitation • Containment of invasive plant growth • Minimise contamination of storm water run-off	• No visible erosion scars once construction is completed. • The footprint has not exceeded the agreed site in terms of EA, etc. • No signs of sedimentation and erosion.	Daily	

Phase of development	CONSTRUCTION			
Impact / issue	Materials (C)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
C2 Oil and chemicals i. The contractor must provide method statements for the "handling & storage of oils and chemicals", "fire", and "emergency spills procedures". ii. These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall. These areas must be imperviously bunded with adequate containment (at least 1.5 times the volume of the fuel) for potential spills or leaks iii. Drip trays (minimum of 10cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised. iv. The surface area of the drip trays will be dependent on the vehicle and must be large enough to catch any hydrocarbons that may leak from the vehicle while standing. v. The depth of the drip tray must be determined considering the total amount/ volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle. vi. Spill kits must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. Spill kits must be made up of material/product that is in line with environmental best practice (SUNSORB is a recommended product that is environmentally friendly). vii. All spilled hazardous substances must be contained in impermeable containers for removal to a licensed hazardous waste site, (this includes contaminated soils, and drenched spill kit material).	• Prevention of pollution of the environment • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts • No complaints from I&APs • Method statements	Daily	

Phase of development	CONSTRUCTION			
Impact / issue	Materials (C)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
C3 Cement i. The contractors must provide and maintain a method statement for "cement and concrete batching". The method statement must provide information on proposed storage, washing & disposal of cement, packaging, tools and plant. ii. The mixing of concrete must only be done at specifically selected sites on mortar boards or similar structures to contain run-off. iii. Cleaning of cement mixing and handling equipment must be done using proper cleaning trays. iv. All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed facility. v. Any spillage that may occur must be investigated and immediate remedial action must be taken. vi. The visible remains of concrete, either solid, or from washings, must be physically removed immediately and disposed of as waste to a registered landfill site. vii. Cement batching areas must be located in consultation with the ER, EO or ECO to ensure residues are contained.	• Minimise the possibility of cement residue entering into the surrounding environment • Minimise pollution of soil, surface and ground water resources	• No evidence of contaminated soil on the construction site • No evidence of contaminated water resources (when applicable) • Method statement	Monitored daily	

Phase of development	CONSTRUCTION			
Impact / issue	Materials (C)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
C4 DANGEROUS AND TOXIC MATERIALS **(Provision of storage facilities)** i. Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas. ii. Sufficient care must be taken when handling these materials to prevent pollution. Training on the handling of dangerous and toxic materials must be conducted for all staff prior to the commencement of construction. iii. In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs (DWA) must be informed immediately. iv. Storage areas must display the required safety signs depicting "no smoking", No Naked lights" and "Danger" containers must be clearly marked to indicate contents as well as safety requirements. v. The contractor must supply a method statement for the storage of hazardous materials at tender stage.	• Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No visible signs of pollution • No litigation due to transgression of pollution control acts	Monitor daily	
C5 Use of dangerous and toxic materials i. The contractor must keep the necessary materials and equipment on site to deal with spills/ fire of the materials present should they occur. ii. The contractor must set up a procedure for dealing with spills/ fire, which will include notifying the ECO and the relevant authorities prior to commencing with construction. These procedures must be developed with consultation and approval by the appointed EO. iii. A record must be kept of all spills and the corrective action taken.	• Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts	As required	

Phase of development	CONSTRUCTION			
Impact / issue	Materials (C)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
C6 Bulk Storage of Fuel i. Bulk fuel storage tanks on the site shall be on an impervious surface with a temporary bunding and be able to contain at least 110% of the volume of the tanks. ii. Bulk fuel storage tanks shall be located such that they do not pose a high risk in terms of water pollution (i.e. they must be located away from drainage lines). iii. Bulk fuel storage tanks shall be placed so that they are out of the way of traffic, so that the risk of the tanks being ruptured or damaged by vehicles is minimised. iv. The combined volume of Diesel and/or dangerous goods stored on site must not be greater than 80 m^3, at any one time.	• Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments	• No pollution of the environment by diesel leaks	As required	

Phase of development	CONSTRUCTION			
Impact / issue	Plant (D)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
D1 Eating areas and camp followers i. The contractors must provide and maintain a method statement for "Crew camps and construction lay down areas". ii. The Contractor must, in conjunction with the EO, or ESO, designate restricted eating areas for eating during normal working hours. Adequate closed refuse bins must be provided and cleaned on a daily basis. iii. No fires are to be lit outside of a facility designed to contain fires. The adequacy and positioning of these structures must be determined in consultation with the EO and ECO. iv. The feeding, or leaving of food, for stray or other animals in the area is strictly prohibited. v. Camp followers/ informal traders must not be allowed to congregate outside the construction site. vi. Litter (even if originating outside the camp) and concrete bags, etc. must be picked up daily and put into suitably closed bins.	• Control potential influx of vermin and flies • Neat work place and hygienic environment • Minimise negative social impacts to local residents and businesses	• No visual sign of vermin and flies • No complaints from I&APs	Once off, monitor daily	

Phase of development	CONSTRUCTION			
Impact / issue	Plant (D)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
D2 Toilets and ablution facilities i. The contractor is responsible for providing all sanitary arrangements for his and the sub-contractors team. A minimum of one chemical toilet must be provided per 15 persons. ii. Sanitary arrangements must be to the satisfaction of the ECO and the local authority. Toilets must be of the chemical type. The contractor must keep the toilets in a clean, neat and hygienic condition. The contractor must supply toilet paper at all toilets at all times. Toilet paper dispensers must be provided in all toilets. iii. Toilets provided by the contractor must be easily accessible. All toilets will be located within the contractor's camp. Should toilets be needed elsewhere, their location must first be approved by the ER, EO or ECO. iv. The contractor (who must use reputable toilet-servicing company) must be responsible for the cleaning, maintenance and servicing of the toilets. The contractor (using reputable toilet-servicing company) must ensure that all toilets are cleaned and emptied before the builders' or other public holidays. v. Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times.	• Ensure proper sanitation is achieved which will encourage the workforce to utilise toilets provided and not the surrounding habitat • Minimise potential of diseases on site • Minimise potential to pollute soils, water resources and natural habitats	• Workforce use toilets provided • No complaints received from I&APs as well as members of the workforce • No visible or measurable signs pollution of the environment (soils, ground and surface water)	As and when required	

Phase of development	CONSTRUCTION			
Impact / issue	Plant (D)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
D3 Waste management i. The contractors must provide and maintain a method statement for "solid waste management". The method statement must provide information on proposed licensed facility to be utilised and details of proposed record keeping for auditing purposes. ii. Waste must be separated into recyclable and non-recyclable waste. iii. Any illegal dumping of waste must not be tolerated, this action will result in a fine and if required further legal action will be taken. This aspect must be closely monitored and reported on; proof of legal dumping must be able to be produced on request. iv. Bins must be clearly marked for ease of management. v. All refuse bins must have a secured lid so that animals cannot gain access. vi. Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, wastes, rubbish, debris, and builder's wastes generated on the site. vii. All solid and chemical wastes that are generated must be removed and disposed of at a licensed waste disposal site. The contractor is to provide proof of such to the EO and ECO. viii. Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site. ix. A skip, with a cover, must be used to contain refuse from campsite bins, rubble and other construction material.	• Sustainable management of waste by recycling • To keep the site neat and tidy • Minimise litigation and complaints by I&APs • Reduce visual impact • Control potential influx of vermin and flies thereby minimising the potential of diseases on site and the surrounding environment • Minimise potential to pollute soils, water resources and natural habitats	• Disposal of rubble and refuse in an appropriate manner with no rubble and refuse lying on site • Site is neat and tidy • No complaints from surrounding residents and businesses • Sufficient containers available on site • No visible or measurable signs of pollution of the environment (soils, ground and surface water) • Method statement	Daily	

Phase of development	CONSTRUCTION			
Impact / issue	Plant (D)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
D4 Dust i. The contractors must provide and maintain a method statement for "dust control". The method statement must provide information on the proposed source of water to be utilised and the details of the licenses acquired for such usage. ii. Potable water should not be used as a means of dust suppression, and alternative measures must be sourced. Chemicals such as "dustex" and "dusticide" should be investigated for dust suppression. iii. Dust suppression within the construction camp must occur during dry and windy conditions to control dust fallout. iv. Concrete dust is toxic and damages soil properties. Therefore watering to prevent dust spread must not be done where concrete dust has fallen or it will infiltrate into the soil. Concrete bags must not be allowed to blow around the site and spread cement dust. v. In addition to the standard dust suppression measures and where these measures are not sufficient, main access roads and site camps must be surfaced with a temporary surface such as gravel to assist with dust suppression. vi. All vehicles transporting material that can be blown off (e.g. soil, rubble, etc.) must be covered with a tarpaulin, and speed limits of 20km/h must be adhered to. vii. Excessive dust conditions must be reported to the ECO. viii. All forms of dust pollution must be managed in terms of the National Environmental Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA).	• Reduce dust fall out • Reduce visual impact • Minimise loss of valuable soil material	• No visible signs of dust • No complaints from I&APs • No incidences reported to ECO • No visible evidence of dust contamination on the surrounding environment • Method statement • Baseline targets not exceeded during regular monitoring of dust counts	Monitored daily	
D5 Workshop equipment, maintenance and storage i. All maintenance and washing of vehicles and equipment must take place in an area that is equipped with a bund wall and grease trap oil separator. During servicing of vehicles/equipment, a suitable drip tray must be used, especially where emergency repairs are done outside the workshop/ camp laydown area. Leaking equipment must be repaired immediately/ be removed from site to facilitate repair. All wastes must be collected and removed to an appropriate registered waste site. ii. Workshop areas must be monitored for oil and fuel spills and such	• Prevent pollution of the environment • Minimise chance of transgression of the acts controlling pollution • Disposal of hazardous substances in an appropriate manner	• No pollution of the environment • No litigation due to transgression of pollution control acts • Method statement	Monitor daily	

Phase of development	CONSTRUCTION				
Impact / issue	Plant (D)				
MITIGATION MEASURE		**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
spills must be cleaned and remediated to the satisfaction of the EO or ER. Cleaning and remediation must be done with products that are in line with best environmental practice i.e. SUNSORB iii. A method statement is required from the Contractor, tendering for the project to show procedures for dealing with possible emergencies that can occur, such as fire, accidental leaks and spillage. iv. The Contractor must be in possession of an emergency spill kit that is complete and available at all times on site. The Contractor must ensure that senior and other relevant members of the workforce are trained in dealing with spills by using emergency spill kits. The following must be applied: • All contaminated soil/yard stone shall be removed and disposed of as hazardous waste at a registered facility or placed in containers to be taken to one central point where bio-remediation can be done. (Bio-remediation should only be an option if an EA has been issued) • A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site. • All spills of hazardous substances must be reported to the ESO, EO, ER or ECO. • The contractor must comply with the regulations of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) (OHSHA).					

Phase of development	CONSTRUCTION			
Impact / issue	Plant (D)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
D6 Noise i. All construction vehicles must be in a good working order to reduce possible noise pollution. ii. Work hours (06:00 – 18:00) during the construction phase must be strictly enforced unless permission is given. Permission must not be granted without consultation with the local residents and businesses by the EO. iii. Noise reduction is essential and Contractors must endeavour to limit unnecessary noise, especially loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc. The use of silent compressors is a specific requirement. iv. Noisy activities must take place only during working hours. The EO must inform the residents of houses and businesses adjacent to the development in writing 24 hours prior to any planned activities that will be unusually noisy or any other activities that could reasonably have an impact on the adjacent sites. These activities could include, but are not limited to, blasting, piling, use of pneumatic jack-hammers and compressors, bulk demolitions, etc.	• Maintain noise levels below "disturbing" as defined in the National Noise Regulations • Minimise the nuisance factor of the development	• No complaints from surrounding landowners or I&Aps	As and when required	

Phase of development	CONSTRUCTION			
Impact / issue	Construction (E)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
E1 Crew camps i. The contractors must provide and maintain a method statement for "Crew camps and construction lay down areas". ii. Accommodation for members of the workforce is not permitted on site unless authorisation has been given in terms of the EA issued for the site. iii. Dedicated wash areas must be situated away from watercourses, areas of shallow groundwater. iv. The contractor's camp must be monitored for dust fallout and dust suppression applied as required. This may include the laying of gravel. v. The contractor's camp, offices and storage facilities must be located within the site boundaries. No person must be allowed to stay on neighbouring sites, unless it is cleared with the owner. In such an event all requirements contained herein for the contractor's camps will apply. vi. The contractor must provide labourers plastic bags to clean up the contractor's camp and construction site on a daily basis. These areas must then be inspected by the contractor or his/her ESO to ensure compliance with this requirement. vii. The contractor is responsible for cleaning the contractor's camp and construction site of all structures, equipment, residual litter and building materials at the end of the construction period and, the topsoil restored in areas where landscaping is to take place.	• Minimise water pollution • Minimise dust fallout • Minimise unwarranted environmental damage outside the footprint • Maintain a clean and healthy working environment • Minimise impact to surrounding environment	• No signs of water or soil pollution • No complaints from surrounding landowners or I&APs • No visible signs of litter • Method statements	Monitor daily	

Phase of development	CONSTRUCTION			
Impact / issue	Construction (E)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
E2 Fires i. The contractors must provide and maintain a method statement for "fires", clearly indicating where and for what fires will be utilised plus details on the fuel to be utilised ii. Absolutely no burning of waste is permitted. iii. Fires will only be allowed in facilities especially constructed for this purpose within fenced Contractor's camps. Wood, charcoal or anthracite are the only fuels permitted to be used for fires. The contractor must provide sufficient wood (fuel) for this purpose. iv. Fires within the designated areas must be small in scale so as to prevent excessive smoke being released into the air. v. No wood is to be collected, chopped or felled for fires from private or public property as well as from no-go or sensitive areas within the site and any surrounding natural vegetation.	• Minimise risk of fires • Minimise destruction of natural fauna and flora • Maintain safety on site	• No fires started by the contractor' s workforce • No claims from landowners for damages due to fires • Method statement	Monitor daily	
E3 Erosion and sedimentation By clearing the vegetation for preparing the site for development and introducing hard surfaces, such as the construction of the access road, internal roads, laydown areas and contractor's camps, the stormwater run-off from the site may increase in volume and velocity. This may lead to an increased amount of soil erosion resulting in increased volumes of silt entering the wetlands which could impact on functionality, however the following must be kept in mind: i. To reduce the loss of material by erosion, the contractor must ensure that disturbance on site is kept to a minimum. The contractor is responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after construction has been completed (where possible). ii. Areas sensitive to erosion must be cordoned off so that vehicles or construction personnel cannot gain access to these areas. iii. Keep all stock piles out of natural water courses/drainage lines iv. Appropriate mitigation measures (in consultation with the ECO) must be implemented at areas susceptible to erosion (either by wind or rain) to decrease and/or cease erosion. v. Existing roads and tracks must be used where feasible.	• Minimise erosion damage • Minimise impeding the natural flow of water • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Re-growth of disturbed areas	• No erosion scars • No loss of topsoil • No interference with the natural flow of water • No visible erosion scars once construction is completed • The footprint has not exceeded the agreed boundaries	As and when required	

Phase of development	CONSTRUCTION			
Impact / issue	Construction (E)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
vi. Areas exposed to erosion due to construction should be vegetated with species naturally occurring in the area. vii. Surface water or stormwater must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being in place. viii. Erosion berms should be installed to prevent gully formation and siltation ix. Sheet run-off from paved surfaces and access roads needs to be curtailed. x. As much vegetation growth as possible should be promoted within the proposed development area in order to protect soils. xi. All areas of disturbed and compacted soil need to be ripped and reprofiled before rehabilitation. xii. Concurrent rehabilitation must take place throughout the construction phase.				
E4 Fauna i. All activities on site must comply with the regulations of the Animals Protection Act, 1962 (Act No. 71 of 1962) as amended which deals with the prevention of animal cruelty. ii. All construction workers must be informed that the intentional killing of any animal is not permitted as faunal species are a benefit to society. Poaching is illegal and it must be a condition of employment that any employee caught poaching will be dismissed and/or fined an amount as so decided by the ESO/ECO in accordance with the Animals Protection Act, 1962 (Act No. 71 of 1962) as amended. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal e.g. a snake, a specialist must be called in to safely relocate the animal if the EO or ECO is not able to. iii. Should any protected or threatened species be uncovered during the construction phase, all construction work should temporarily stop until the suitably qualified Zoologist obtains the necessary permits and approvals for the appropriate actions that are required, prior to construction restarting.	• Minimise disturbance to animals • Minimise destruction of habitat	• No complaints from Nature Conservation • No litigation concerning applicable animal protection acts • No measurable or visible signs of habitat destruction	Monitor daily	

Phase of development	CONSTRUCTION			
Impact / issue	Construction (E)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
E5 Flora i. Trees and natural vegetation or any other natural features inside and outside the work area, which will not be cleared for construction purposes, must be clearly demarcated and not be defaced, removed, painted for benchmarks or otherwise damaged, even for survey purposes. The latter can only be done if stipulated in the EA and must be overseen by the EO and ECO. Any feature defaced by the contractor must be reinstated to the satisfaction of the ECO and penalties/fines may be imposed by the ER. ii. Existing indigenous vegetation should be incorporated into the development landscape as far as possible. iii. No open fires shall be allowed on site under any circumstances, fires will only be permitted in adequate facility within the crew camp.	• Minimal disturbance to vegetation where such vegetation does not interfere with construction in terms of approvals from the relevant authority • Encourage natural habitat fauna • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Minimise risk of fires • Minimise risk of fauna and flora destruction	• No litigation due to removal of vegetation without necessary permission • No exotic plants used for landscaping • No visible erosion scars once construction is completed • The footprint has not exceeded the agreed boundaries • No fires started by contractors work force • No claims from landowners for damages due to fires • Method statement	As and when required	

Phase of development	CONSTRUCTION			
Impact / issue	Construction (E)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
E6 Heritage i. In terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), construction personnel must be alert and must inform the local heritage agency should they come across any additional findings of heritage resources within 24 hours. ii. Should any archaeological artefacts be exposed during construction activities, work on the area where the artefacts were found must cease immediately and the ECO must be notified within 24 hours. iii. Upon receipt of such notification, the ECO will arrange for the excavation to be examined by an Archaeologist. iv. Under no circumstances must archaeological artefacts be removed, destroyed or interfered. v. Any archaeological sites exposed during demolition or construction activities must not be disturbed prior to authorisation by the South African Heritage Resources Agency (SAHRA) or the appropriate provincial heritage resource agency.	• Limit the destruction of the country's heritage resources • The preservation and appropriate management of new archaeological finds should these be discovered during construction	• No destruction of or damage to newly discovered archaeological sites	Monitor Daily	
E7 No-go / sensitive areas i. All construction activities must remain within the boundaries of the development area, as demarcated at the start of construction. ii. The construction footprint must be kept to a minimum and must be clearly fenced (e.g. warning tape) prior to the commencement of construction activities, thus reducing the infringement of the development on surrounding habitats.	• Minimise the potential for the spread of the of the construction footprint • Reduce loss of fauna and flora habitat • Minimise the potential for loss of protected and or endangered fauna and flora species	• No sign of movement through "no go" areas. • Containment of footprint	Monitor daily	

Phase of development	CONSTRUCTION			
Impact / issue	Construction (E)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
E8 Access route/ haul roads i. No unauthorised access is permitted. Any authorised clearing for access roads must be done under the supervision of the ECO. ii. Any damaged or degradation will be investigated and fines issued, the affected areas must be immediately rehabilitated. iii. Access roads for earthmoving-equipment must be clearly designated and be positioned as close as possible to the proposed development site. No driving off from the marked roads is permitted and designated parking areas must be identified and demarcated with applicable signage. iv. Neither the site nor its access roads must be allowed to be utilised for recreational activities, this includes but is not limited to quad bikes, 4x4's and dirt bikes. Security personnel must be informed and ensure that this is enforced. v. All traffic management must be done in accordance with the National Road Traffic Act, 1996 (Act No. 93 of 1996).	• Minimise loss of topsoil and enhancement of erosion • Minimise fauna and flora displacement by destruction of natural habitats • Minimise disturbance to neighbouring areas	• No erosion on access roads after completion of construction • No loss of topsoil due to run-off water on access roads	As required, monitor daily	

Phase of development	CONSTRUCTION			
Impact / issue	Construction (E)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
E9 Crime, safety and security i. No site staff, other than security personnel will be housed on site unless otherwise stipulated in the EA. Security personnel must be supplied with adequate protective clothing, ablution facilities, water and refuse collection facilities, facilities for cooking and heating so that open fires are not necessary. ii. A boundary fence must be erected; this will serve to prevent public access to the site, for public safety and security reasons. The access to the site must be controlled so as to restrict unauthorised personnel from entering the site. The workers on site must retain some means of identification. The ESO and the contractor are responsible for ensuring that only authorised personnel are on site at all times. iii. The site and crew are to be managed in strict accordance with the OHSA and the National Building Regulations. iv. The contractor must ensure that all emergency procedures are in place prior to commencing work. Emergency procedures must include (but not be limited to) fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials, etc. v. The contractor must ensure that lists of all emergency telephone numbers/ contact persons are kept up to date and that all numbers and names are posted at relevant locations throughout the construction site. vi. The nearest emergency service provider must be identified during all phases of the project as well as its capacity and the magnitude of accidents it will be able to handle. The contact details of this emergency centre, as well as the police and ambulance services must be available at prominent locations around the construction site and the construction crew camps.	• Reduce the risk of potential incidences • Minimise the potential impact on the environment	• No incidences reported	Monitor daily	

Phase of development	CONSTRUCTION			
Impact / issue	Construction (E)			
MITIGATION MEASURE	**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
E10 Visual impact i. Shade cloth must be utilised to conceal and minimise the visual impact of contractor camps, lay down and storage areas. ii. Landscaping must enhance the aesthetic appeal of the development (where possible). iii. Rubble and litter must be removed every two weeks or more often as the need arises and be disposed of at a registered landfill site.	• Minimise visual impact	• No complaints from I&APs	Monitor daily	
E11 Geotechnical i. Founding conditions for individual structures must be confirmed by a qualified Geotechnical Engineer / Structural Engineer / Geologist (where required). ii. All trenches and excavation works must be properly backfilled and compacted according to specifications given in sub-clause 5.2.4 of SABS 1200DA. iii. Mechanical methods of rock breaking will have noise and dust impacts that must be managed. Method Statements for chemical breaking must be provided by the ER.	• Minimise potential structural faults • Minimise trench collapse	• No visible signs of backfill deterioration or trench collapse	As and when required	
E12 Hydrology i. Increased run-off during construction must be managed using berms and other suitable structures as required to ensure flow velocities are reduced; this must be done in consultation with the ER as well as the ECO. ii. In the event of pollution caused as a result of construction activities, the contractor, according to section 20 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) is be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas. iii. No wastewater may run freely into any of the surrounding naturally vegetated areas. Run-off containing high sediment loads must not be released into nearby watercourses. If this becomes a problem it is recommended that an attenuation pond be constructed to allow solids to settle prior to run-off leaving the site. iv. Approval must be obtained from the DWA for any activities that	• Minimise pollution of soil, surface and ground water resources in the immediate and surrounding environments • Minimise impeding the natural flow of water • Minimise the impact on natural water flow dynamics • Minimise scarring of the soil surface and land features • Minimise damage to river embarkments • Minimise erosion of	• No visible signs of pollution • No signs of siltation of water courses • No visible erosion scaring once construction is completed • Minimum loss of topsoil • No access roads through river banks • No visible erosion scars on embankments once construction is	As and when required, monitor daily	

Phase of development	CONSTRUCTION				
Impact / issue	Construction (E)				
MITIGATION MEASURE		**MANAGEMENT OBJECTIVES**	**MEASURABLE TARGETS**	**FREQUENCY OF ACTION**	**NOTES**
require authorisation in terms of Section 21 of the National Water Act, 1998 (Act No. 36 of 1998).		embankments and subsequent siltation of rivers • Minimise damage to riverine habitats	completed • No erosion or siltation downstream • No deviation from baseline data during regular sampling		

Phase of development	CONSTRUCTION	EAP	Strategic Environmental Focus
Impact / issue	Specialist requirements (F)	Proponents signature	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
F1 Geotechnical Throughout the site, in its natural state, the soil profile encountered will generally preclude the use of general unreinforced strip foundations and necessitate modified foundations to accommodate mainly collapse settlement movement, but also local differential settlement movement but in the lower lying areas near the water bodies. Extensive quartzite bedrock occurs on the south western flank of the site which will have a large bearing of founding in this zone. The influence of the type of soils found on site is dependent on i. The depth at which foundations are installed ii. Moisture ingress; and iii. Foundation pressures. Large portions of the site are covered with uncontrolled fill deposits which need to be rehabilitated prior to development. i. The founding options appropriate for the proposed development should consider bearing pressure limitations, foundation stiffness, masonry reinforcement and structure under consideration and the guidelines given in the NHBRC's Home Building Manual. ii. Recommended founding solutions, surface drainage, services and plumbing precautions given in Appendix D of the Geotechnical Report in Appendix G of the Final BAR should be adopted in respect of the potentially compressible and collapsible transported aeolian soils. iii. Limited sub-base and relatively freely available selected layer works can be harvested on site, obviating the need for importing these materials. iv. The moderate slope of the site will probably necessitate minor terracing to provide level platforms. v. Terracing for larger structures or any temporary slopes formed	Minimise potential structural faults. Minimise trench collapse. Reduction of water ingress. Minimisation of impact to the geotechnical characteristics of the proposed area.	No visible signs of backfill deterioration or trench collapse. No water ingress. No impact to the geotechnical characteristics of the proposed area.	During construction	

Phase of development	CONSTRUCTION	EAP	Strategic Environmental Focus
Impact / issue	Specialist requirements (F)	Proponents signature	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
during construction should be excavated to angles not exceeding 3H: 2V (3") in the transported soils and 1H: 1V (45°) in the residual soils, failing which a rigorous slope stability analysis should be conducted. vi. Services trenches in the low- lying areas adjacent to the floodplain and water- bodies exhibit a high risk of collapse and will be particularly sensitive to the surcharging, particularly by construction vehicles. vii. Excavations deeper than 1.5m should be individually assessed by a Geotechnical Engineer. The responsibility of all temporary excavations must remain with the contactor who is in the best position to assess conditions during construction.				
F2 Ecological Assessment i. ii. Minimising the loss of flora and fauna in areas that are not directly affected by the new development. iii. Reduce the levels of disturbance on the area during construction. iv. All construction areas should be suitably top soiled and vegetated as soon as is possible after construction. v. Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden. vi. A walled concrete platform, dedicated store with adequate flooring or beamed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas. vii. Storage of potentially hazardous materials should be above any 100-year flood line, or as agreed with the ECO. These materials include fuel, oil, cement, bitumen etc. viii. Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils. ix. Concrete and tar shall be mixed only in areas, which have been specially demarcated for this purpose with all concrete and tar that is spilled outside these areas shall be promptly removed by the Contractor and taken to an approved dumpsite. x. After all the concrete / tar mixing is complete all waste concrete / tar	• Control alien invasive species found on site. • Prevention of destruction of faunal habitat • Reduction of interference with fauna and faunal behavioural activities • Minimal disturbance to vegetation where such vegetation does not interfere with construction in terms of approvals from the relevant authority • Encourage natural habitat fauna • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Minimise risk of fires	• No presence of declared alien invasive species on site. • No litigation due to removal of vegetation without necessary permission • No exotic plants used for landscaping • No visible erosion scars once construction is completed • The footprint has not exceeded the agreed boundaries • No fires started by contractors work force • No claims from landowners for damages due to fires • Method statement	As stipulated by monitoring plan	

Phase of development	CONSTRUCTION	EAP	Strategic Environmental Focus
Impact / issue	Specialist requirements (F)	Proponents signature	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
shall be removed from the batching area and disposed of at an approved dumpsite. xi. Portable septic toilets are to be provided and maintained for construction crews. xii. Maintenance must include their removal without sewage spillage; xiii. No uncontrolled discharges from the construction crew camps to any surface water resources shall be permitted. Any discharge points need to be approved by the relevant authority. xiv. In the case of pollution of any surface or groundwater, the Regional Representative of the DWA must be informed immediately. xv. Store all litter carefully so it cannot be washed or blown into any of the water courses within the study area. xvi. Provide bins for construction workers and staff at appropriate locations, particularly where food is consumed and the construction site should be cleaned daily and litter removed. xvii. Conduct ongoing staff awareness programs so as to reinforce the need to avoid littering. xviii. Provide permeable surfaces to address increased runoff volumes at source allow infiltration of the runoff. xix. Implement an ecologically-sensitive stormwater management plan that includes not allowing stormwater to be discharged directly into the identified buffer zone of the watercourse and drainage lines. xx. Footprint size should be kept at a minimum so as to maintain as much natural vegetation cover as possible. xxi. Only vegetation indigenous to the area should be considered for landscaping purposes; and wastewater limit values applicable to discharge of wastewater into watercourses as stipulated by the DWA should be strictly adhered to.	• Minimise risk of fauna and flora destruction			

Phase of development	CONSTRUCTION	EAP	Strategic Environmental Focus
Impact / issue	Specialist requirements (F)	Proponents signature	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
F3 Traffic Impact Assessment i. Access points to the site must be kept clear to allow for efficient flow in and out of the development. ii. Introduce speed reducing elements at the entrance to the development Speed humps. iii. Appropriate reduction in speed from 80 km/h speed limit prescribed for Du Preez Street and Commissioner Road as you approach the residential development. iv. Ensure that roads in the vicinity of the site are in a good condition and report any damages to the road surface or traffic signs to the responsible authority. v. Vehicular movement beyond the site boundaries must be limited during peak hour traffic, i.e. between 07:00-09:00am, and 16:00-18:00pm. vi. Construction of the access points must take into consideration the width of the current access road, and its limited space. vii. Construct the road network of the residential development according to relevant specifications. viii. Ensure that the necessary signage and traffic measures are implemented for safe and convenient access to the mixed use development. ix. All road infrastructures must be designed and conducted according to the standards of the EMM.	• Minimise loss of topsoil and enhancement of erosion • Minimise disturbance to neighbouring areas • Minimise traffic congestion	• No erosion on access roads after completion of construction • No loss of topsoil due to run-off water on access roads • No traffic congestion	As required, monitor daily	

SECTION E: ANNEXURES

ANNEXURE 1

DECLARATION OF UNDERSTANDING BY THE DEVELOPER

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Plan for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2:

ANNEXURE 2

DECLARATION OF UNDERSTANDING BY THE ENGINEER

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Plan for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 3

DECLARATION OF UNDERSTANDING BY THE CONTRACTOR

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Plan for:

Contract _____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness2: _____

ANNEXURE 4A (Duplicate for all Method Statements)

METHOD STATEMENT: Solid Waste Management

CONTRACT:…… **DATE**:…….

WHAT WORK IS TO BE UNDERTAKEN? [give a brief description of the works to be undertaken on site that will generate waste (hazardous and non-hazardous wastes)]: * Note: please attach extra pages if more space is required.

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

METHOD STATEMENT: Solid Waste Management (contd.)

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:…….. **End Date:**…….

HOW IS WASTE TO BE MANAGED ON SITE? (provide as much detail as possible, including annotated sketches and plans where possible): * Note: please attach extra pages if more space is required

*__Insert additional pages as required__

DECLARATIONS for Method Statement **Solid Waste Management (contd.)**

1) ENGINEER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) ECO

The work described in this Method Statement, if carried out according to the methodology described, is satisfactory to prevent or control environmental harm and is thus approved:

_____ _____

(Signed) (Print name)

Dated:._____

2) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to and with approval by the Engineer, and that the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

_____ _____

(Signed) (Print name)

Dated: _____

ANNEXURE 6

INCIDENT AND ENVIRONMENTAL LOG

ENVIRONMENTAL INCIDENT LOG				
Date	***Env. Condition***	***Comments*** *(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)*	***Corrective Action Taken*** (*Give details and attach documentation as far as possible)*	***Signature***

SECTION F: APPENDICES

APPENDIX 1: LOCALITY MAP

APPENDIX 2: LAYOUT PLANS AND DESIGNS

APPENDIX 3: ENVIRONMENTAL AUTHORISATION