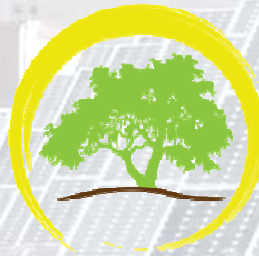


APPENDIX 9

ENVIRONMENTAL MANAGEMENT PROGRAMME

THE PROPOSED MAREETSANE BATHO-BATHO SOLAR PV FACILITY

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STRATEGIC ENVIRONMENTAL FOCUS

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ABBREVIATIONS

A	Authorities
C	Contractors
CE	Consulting Engineers
D	Developer/Proponent
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DEDECT	Department of Economic Development, Environment, Conservation 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
KPEVC	Kgatelopele Private Equity and Venture Capital (Pty) Ltd
MW	Mega Watt
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
OHSHA	Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
PM	Project Manager
PV	Photovoltaic
SAHRA	South African Heritage Resources Agency
SANS	South African National Standard
SEF	Strategic Environmental Focus (Pty) Ltd
VIA	Visual Impact Assessment

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 Kgatelopele Private Equity and Venture Capital (Pty) Ltd (KPEVC) for the construction of the subject infrastructure, including all Subcontractors and service providers 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 KPEVC 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.
Storm water		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.

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SECTION A: INTRODUCTION

A-1 BACKGROUND INFORMATION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by Kgatelopele Private Equity and Venture Capital (Pty) Ltd (KPEVC) to submit the Environmental Management Programme (EMPr) for the proposed Mareetsane Batho-Batho Solar Photovoltaic (PV) Facility and associated infrastructure (i.e. powerline), to the Department of Environmental Affairs (DEA).

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 result 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 (DEA) 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, OPERATIONAL MAINTENANCE ACTIVITIES AND DECOMMISSIONING** (should the contract to produce renewable electricity not be renewed).

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 Mareetsane Batho-Batho Solar PV Facility will be located on Tribal Land approximately 10 km south-west of the Batho-Batho Village within the jurisdiction of the Ratlou Local Municipality (RLM), Ngaka Modiri Molema District Municipality (NMMDM) in the North West Province and falls within the Quarter Degree Grid Cell 2625AB (refer to the Locality Map in Appendix 1).

The proposed site for the solar facility is approximately 140 hectares (ha) in extent and is estimated to generate approximately 30 Mega Watts (MW) of electricity which will be fed into the National Grid via one of the two existing Eskom substations. The proposed overhead powerline will fall within the existing Eskom powerline servitudes, and will be associated with an approximate 50 m servitude (i.e. 25 m on either side of the powerline centre line). Two high voltage Eskom substations and associated high and medium voltage powerlines are located to the north-east and north-west of the proposed site. The substations are approximately 10-12km from the proposed solar facility site. A railway line runs along the south-eastern boundary of the proposed site (please refer to the Locality Map in Appendix 1).

The technology that is proposed for the solar facility is “**fixed Polycrystalline PV module**” technology. With this technology it is estimated that approximately 1 MW of electricity can be generated for every 1.9 ha (in optimal conditions) of solar panels. Polycrystalline panels use solar cells that are cut from multifaceted silicon crystals. They are less uniform in appearance than monocrystalline cells, but are more efficient at converting direct sunlight into electricity than thin-film technology. The solar panels will all be north facing and will be approximately 3m in height and at an angle of 30°. Each solar panel is envisaged to be made up of either 2 X 5 or 2 X 10 individual PV modules; with each PV module being 1.65 m long and 0.99 m wide. Solar panels will be mounted on steel columns and secured *in situ* into the soil. As per industry norms, all solar plant equipment will be raised 200mm above natural ground level to combat stormwater erosion.

An approximate distance of 4m is proposed between solar panel rows to avoid shading.

Eskom has laid down servitude widths in excess of those required by the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) (OHSA). These building restrictions are constant throughout the length of power line of any particular voltage - conductor size, type of construction and route permitting. These may be reduced in accordance with the above where land values are very high. Current practice within Eskom is that each region has its own standard building restrictions, which are applicable throughout that region.

The building restriction distances given are perpendicular from the centreline of the power line to the edge of the building restriction on one side of the power line. In order to obtain the total building restriction of a single power line the figures should be multiplied by two. Separation distances between power lines that run parallel to each other are necessary in order to avoid excessive induction. The separation distance between two parallel lines is measured perpendicularly from the centre of the one line to the centre of the other line.

Table 1: Guidelines for different voltages and requirements- Applicable separation distances for different operating voltages.

Voltage	Building restriction on each side of centre line	Separation distance between parallel lines
88kV	11 metres	12 to 15 metres

The PV system will be composed of the following components *inter alia*:

- PV modules;
- Inverters;
- MV/LV transformers;
- 35kV/ 88kV substation;
- Electrical wiring;
- Protection system; and
- Electrical Switchgear.

The 35kV/ 88kV substation will have lighting masts associated with it. These masts will be approximately 21m in height. The substation transformers will have transformer oil within them (between 30 – 50 m³) which is necessary for the functioning of the substation. The Substation will be constructed in accordance with the relevant SANS standards and Eskom specific technical specifications. The substation transformers will have a bund wall around them for containing any oil leaks. There will be a concrete reinforced oil dam to hold any spillages should the transformers have a complete breakdown/ failure which results in any oil leakage/ spillage. It is necessary to be able to drain the oil away from the transformer bunding areas, and the oil dam provides for this.

It is important to recognise that such an event has a low probability of occurrence with a transformer rupture (that would result in a spill) being highly unlikely even throughout the entire lifespan of the substation. Because the transformer is exposed to the elements, the bunding around the transformers accumulates rainwater during rainfall events. At the same time there may be small spillages of oil within the bunding area which may be flushed through to the oil dam by the rainwater. As a result a water/ hydrocarbon separator or “oil trap” will be connected to the oil dam. A pump will automatically suck out the water from the “oil dam” from the bottom (as oil floats on top of water). This liquid will then flow through the “oil trap” which is lined with an oil absorbent cushion (which removes the oil (if any)) and releases “hydrocarbon free water”. Any oil that is lost from the transformer is removed, recycled where possible, and if not recycled then disposed of at a suitably licensed waste disposal facility.

Please refer to Appendix 2 for the Layout Plans for the proposed project.

B-1.1.1 Summary of impacts associated with the proposed activity

- Potential impacts on surface water resources that occur in close proximity to the site (the non-perennial Morokwa River is situated to the west and south of the site) and wetlands scattered throughout the site;
- Potential impacts of increased surface water run-off (*viz.* increased soil erosion) associated with the establishment of hard surfaces and vegetation clearing (mainly during the construction phase);
- Potential impacts on ground and surface water quality due to hydrocarbon spillages from vehicles during the construction phase of the development;
- Potential impacts on soils due to hydrocarbon spillages from vehicles during the construction and operational phase of the development;
- Destruction of flora within the proposed area, stemming from construction activities such as vegetation clearing and topsoil stripping within the site;
- Faunal displacement mainly during the construction phase of the project;
- Adverse impacts on avifauna (the Provincially Protected *Afrotis afroides* (Northern Black Korhaan) was confirmed on site) as a result of potential habitat loss, additional overhead powerlines and the potential reflections of the solar panels (during the operation phase);
- Increased dust and noise generation during the construction phase;
- Change in the visual character of the area;
- Potential increased access to electricity by the local community;
- Potential impacts on heritage resources (i.e. grave sites);

- Job creation during the construction and operational phases of the proposed project;
- Broader local economic development benefits for the communities within a 50 km radius as a result of the proposed Solar PV farm;
- Tourism attraction through visitation to the solar facility;
- Development of education and training initiatives to enable the youth to develop skills especially in Science and Technology;
- Renewable supply of electricity; and
- Indirect positive impact on the environment by reducing the demand for electricity generated by coal fired power stations.

B-1.2 Integration of environmental considerations into the project design

Associated Infrastructure Layout

The associated infrastructure has been outlined in the Final EIR 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 EIR 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 EMPs 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 KPEVC'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 Environmental Impact Assessment Report

In terms of the Final EIR, 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 DEA, 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 EMP 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, KPEVC 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 KPEVC to ensure that the appointed Contractors possess the requisite environmental management experience and expertise. Accordingly, it would be prudent for KPEVC 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 EIR 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:

- Soils and Agricultural Potential Assessment;
- Ecological Assessment (Flora and Fauna including Avifauna) Assessment;
- Phase 1: Heritage Impact Assessment (HIA);
- Visual Impact Assessment (VIA);
- Wetland Delineation and Functional Assessment;
- Traffic Impact Assessment/ Statement; and
- Stormwater and Waste Management Plan.

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

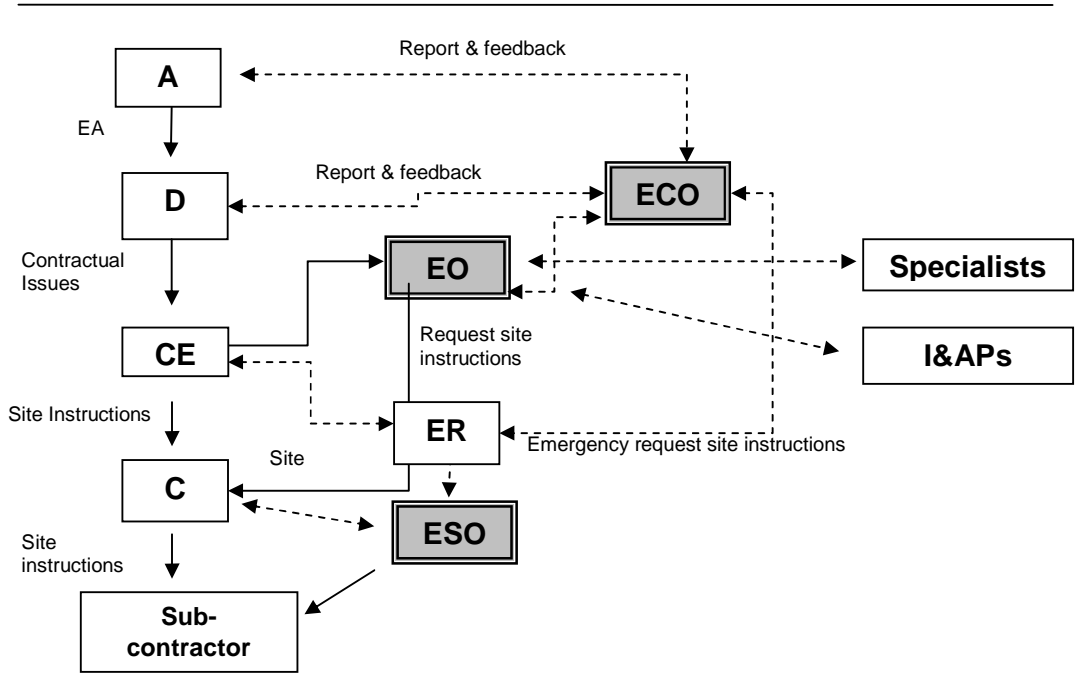
In order for the EMPr to be successfully implemented, all the role players involved in the project need to co-operate. For this to happen, role players must clearly understand their roles and responsibilities in the project, must be professional, form respectful and transparent relationships, and maintain 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 2: 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
		<p>part of the project team.</p> <p>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.</p> <p>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).</p> <p>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.</p> <p>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.</p>
C	Contractor	<p>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.</p> <p>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.</p>
ESO	Environmental Site Officer	<p>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.</p> <p>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 construction (from site clearance to rehabilitation).</p>
A	Lead Authority	<p>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.</p>
OA	Other Authority	<p>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.</p> <p>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.</p>
EAP	Environmental Assessment Practitioner	<p>The definition of an EAP in Section 1 of NEMA is "<i>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</i>".</p>



MONITORING, AUDITING AND REPORTING (Pre-EA)

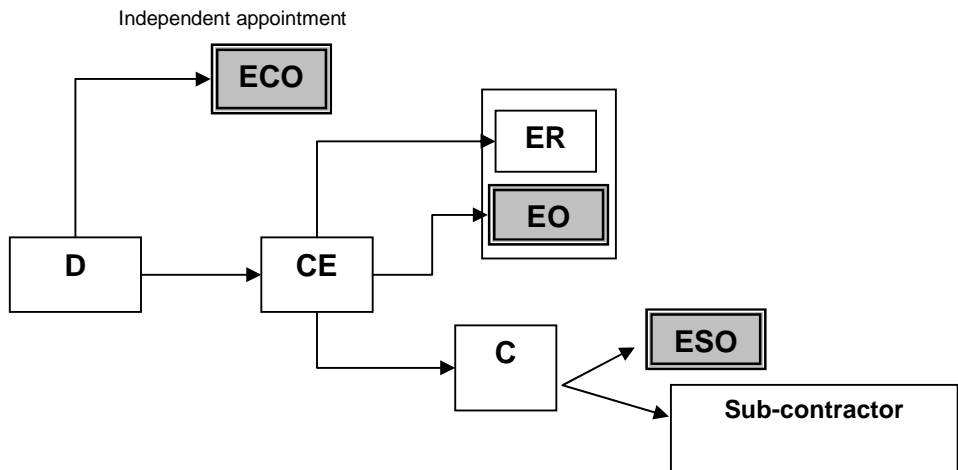
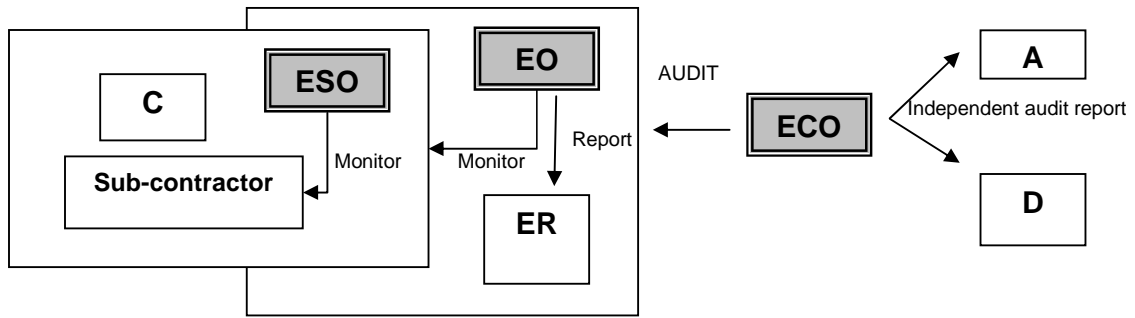


Figure 1: Environmental Appointments

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 EMP. 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 EMP 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
Mr Keobakile Sedupane Kgatelopele Private Equity and Venture Capital (Pty) Ltd (KPEVC)	P.O. Box 32836 Kyalami 1686	Tel: (011) 057 2955 Cell: 083 254 5210 Fax: 086 276 8475 E-mail: keobakiles@kgatelopele.co.za

D-8 EMERGENCY NUMBERS

Police:	10111
Ambulance:	10117
Fire Service:	10178
Nearest Hospital:	018 336 9200
Local Municipality Emergency:	018 330 7000

Phase of development	PRE-CONSTRUCTION				
Impact / issue	GENERAL PLANNING (A)				
MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES	
<p>A1 Project contract and programme</p> <p>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.</p> <p>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.</p>	<ul style="list-style-type: none"> Contingencies for minimising negative impacts anticipated to occur during the construction phase Ensure environmental awareness and formalise environmental responsibilities and implementation 	<ul style="list-style-type: none"> Contract records Signed declaration pro forma's 	-		
<p>A2 Appointments and duties of project team</p> <p>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.</p> <p>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 2.</p> <p>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.</p>	<ul style="list-style-type: none"> Contingencies for minimising negative impacts anticipated to occur during the construction phase 	<ul style="list-style-type: none"> Contract records Signed declaration pro forma's 	-		
<p>A3 Method statements</p> <p>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.</p> <p>ii. Where applicable, the contractor will provide job-specific training on an <i>ad hoc</i> basis when workers are engaged in activities, which require method statements.</p>	<ul style="list-style-type: none"> Contingencies for minimising negative impacts anticipated to occur during the construction phase 	<ul style="list-style-type: none"> 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
<p>A4 Site demarcation and development</p> <p>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.</p> <p>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.</p>	<ul style="list-style-type: none"> Contingencies for minimising negative impacts anticipated to occur during the construction phase 	<ul style="list-style-type: none"> Demarcated area's Filled in section of this document 	As and when required	
<p>A5 Emergencies, non-compliance and communication</p> <p>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.</p> <p>ii. Communication in emergencies must follow the prescribed lines of communication.</p> <p>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.</p>	<ul style="list-style-type: none"> Contingencies for minimising negative impacts anticipated to occur during the construction phase 	<ul style="list-style-type: none"> 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					
<p>C1 Stockpiles</p> <p>i. All stockpiled material must be easily accessible without any environmental damage.</p> <p>ii. All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised.</p> <p>iii. The stockpiles may only be placed within the demarcated areas the location of which must be approved by the ER, EO or ESO.</p> <p>iv. Storm water run-off from the stockpile sites 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).</p> <p>v. Stockpiles are to be stabilised if signs of erosion are visible.</p> <p>vi. Soils from different horizons must be stockpiled such that topsoil stockpiles do not get contaminated by sub-soil material.</p> <p>vii. No plant, workforce or any construction related activities may be allowed onto the topsoil stockpiles.</p> <p>viii. Topsoil stockpiles must be clearly demarcated as no-go areas.</p> <p>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).</p> <p>x. All stockpiles should be stored on surfaces that will be paved or developed over.</p>		<ul style="list-style-type: none"> • Minimise scaring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Minimise sedimentation of nearby drainage lines • Maintain the integrity of topsoil's for landscaping and rehabilitation • Containment of invasive plant growth • Minimise contamination of storm water run-off 	<ul style="list-style-type: none"> • 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
<p>C2 Oil and chemicals</p> <p>i. The contractor must provide method statements for the “handling & storage of oils and chemicals”, “fire”, and “emergency spills procedures”.</p> <p>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</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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).</p> <p>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).</p>		<ul style="list-style-type: none"> • Prevention of pollution of the environment • Minimise chances of transgression of the acts controlling pollution 	<ul style="list-style-type: none"> • 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
<p>C3 Cement</p> <p>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.</p> <p>ii. The mixing of concrete must only be done at specifically selected sites on mortar boards or similar structures to contain run-off into soils, rocky outcrops, streams and natural vegetation.</p> <p>iii. Cleaning of cement mixing and handling equipment must be done using proper cleaning trays.</p> <p>iv. All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed facility.</p> <p>v. Any spillage that may occur must be investigated and immediate remedial action must be taken.</p> <p>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.</p> <p>vii. Cement batching areas must be located in consultation with the ER, EO or ECO to ensure residues are contained and that the proposed location does not fall within sensitive areas such as the salt pans to the north of the proposed development area.</p>		<ul style="list-style-type: none"> • Minimise the possibility of cement residue entering into the surrounding environment • Minimise pollution of soil, surface and ground water resources 	<ul style="list-style-type: none"> • 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	
<p>C4 DANGEROUS AND TOXIC MATERIALS (Provision of storage facilities)</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>v. The contractor must supply a method statement for the storage of hazardous materials at tender stage.</p>	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> No visible signs of pollution No litigation due to transgression of pollution control acts 	Monitor daily		
<p>C5 Use of dangerous and toxic materials</p> <p>i. The contractor must keep the necessary materials and equipment on site to deal with spills/ fire of the materials present should they occur.</p> <p>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.</p> <p>iii. A record must be kept of all spills and the corrective action taken.</p>	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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
<p>C6 Bulk Storage of Fuel</p> <p>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.</p> <p>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 water courses).</p> <p>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.</p> <p>iv. The combined volume of Diesel and/or dangerous goods stored on site must not be greater than 80 m³, at any one time.</p>		<ul style="list-style-type: none"> Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments 	<ul style="list-style-type: none"> 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
<p>D1 Eating areas and camp followers</p> <p>i. The contractors must provide and maintain a method statement for “Crew camps and construction lay down areas”.</p> <p>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.</p> <p>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.</p> <p>iv. The feeding, or leaving of food, for stray or other animals in the area is strictly prohibited.</p> <p>v. Camp followers/ informal traders must not be allowed to congregate outside the construction site.</p> <p>vi. Litter (even if originating outside the camp) and concrete bags, etc. must be picked up daily and put into suitably closed bins.</p>		<ul style="list-style-type: none"> Control potential influx of vermin and flies Neat work place and hygienic environment Minimise negative social impacts to local residents and businesses 	<ul style="list-style-type: none"> 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
<p>D2 Toilets and ablution facilities</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>v. Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times.</p>		<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
<p>D3 Waste management</p> <p>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.</p> <p>ii. Waste must be separated into recyclable and non-recyclable waste.</p> <p>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.</p> <p>iv. Bins must be clearly marked for ease of management.</p> <p>v. All refuse bins must have a secured lid so that animals cannot gain access.</p> <p>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.</p> <p>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.</p> <p>viii. Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site.</p> <p>ix. A skip, with a cover, must be used to contain refuse from campsite bins, rubble and other construction material.</p>		<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
<p>D4 Dust</p> <p>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.</p> <p>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.</p> <p>iii. Dust suppression within the construction camp must occur during dry and windy conditions to control dust fallout.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>vii. Excessive dust conditions must be reported to the ECO.</p> <p>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).</p>		<ul style="list-style-type: none"> • Reduce dust fall out • Reduce visual impact • Minimise loss of valuable soil material 	<ul style="list-style-type: none"> • 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	
<p>D5 Workshop equipment, maintenance and storage</p> <p>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.</p> <p>ii. Workshop areas must be monitored for oil and fuel spills and such</p>		<ul style="list-style-type: none"> • Prevent pollution of the environment • Minimise chance of transgression of the acts controlling pollution • Disposal of hazardous substances in an appropriate manner 	<ul style="list-style-type: none"> • 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
<p>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</p> <p>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.</p> <p>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.</p> <p>i. The following must be applied:</p> <ul style="list-style-type: none"> • 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) (OHS&A). 					

Phase of development		CONSTRUCTION			
Impact / issue		Plant (D)			
MITIGATION MEASURE		MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
<p>D6 Noise</p> <p>i. All construction vehicles must be in a good working order to reduce possible noise pollution.</p> <p>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.</p> <p>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.</p> <p>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.</p>		<ul style="list-style-type: none"> Maintain noise levels below “disturbing” as defined in the National Noise Regulations Minimise the nuisance factor of the development 	<ul style="list-style-type: none"> 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
<p>E1 Crew camps</p> <p>i. The contractors must provide and maintain a method statement for “Crew camps and construction lay down areas”.</p> <p>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.</p> <p>iii. Dedicated wash areas must be situated away from watercourses, areas of shallow groundwater and any drainage lines.</p> <p>iv. The contractor’s camp must be monitored for dust fallout and dust suppression applied as required. This may include the laying of gravel.</p> <p>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.</p> <p>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.</p> <p>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.</p>		<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
<p>E2 Fires</p> <p>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</p> <p>ii. Absolutely no burning of waste is permitted.</p> <p>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.</p> <p>iv. Fires within the designated areas must be small in scale so as to prevent excessive smoke being released into the air.</p> <p>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.</p>		<ul style="list-style-type: none"> • Minimise risk of veldt fires • Minimise destruction of natural fauna and flora • Maintain safety on site 	<ul style="list-style-type: none"> • No veldt fires started by the contractor’ s workforce • No claims from landowners for damages due to veldt fires • Method statement 	Monitor daily	
<p>E3 Erosion and sedimentation</p> <p>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:</p> <p>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).</p> <p>ii. Areas sensitive to erosion must be cordoned off so that vehicles or construction personnel cannot gain access to these areas.</p> <p>iii. Keep all stock piles out of natural drainage lines.</p> <p>iv. The vegetation between the rows of solar panels must remain to reduce the potential soil erosion and reduce surface water run-off.</p> <p>v. Appropriate mitigation measures (in consultation with the ECO) must be implemented at areas susceptible to erosion (either by wind or</p>		<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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	
<p>rain) to decrease and/or cease erosion.</p> <p>vi. An ecologically-sound stormwater management plan must be implemented during construction and vegetation clearing should be kept to a minimum and phased and only where absolutely necessary (where possible).</p> <p>vii. Existing roads and tracks must be used where feasible.</p> <p>viii. During the construction phase, measures must be put in place to control the flow of surface water so that it does not impact on the vegetation, i.e. energy dissipaters and canal flow designs must be used to prevent scouring and erosion.</p> <p>ix. Areas exposed to erosion due to construction should be vegetated with species naturally occurring in the area.</p> <p>x. Surface water or stormwater must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being in place.</p> <p>xi. Erosion berms should be installed to prevent gully formation and siltation of the watercourse</p> <p>xii. Sheet run-off from paved surfaces and access roads needs to be curtailed.</p> <p>xiii. As much vegetation growth as possible should be promoted within the proposed development area in order to protect soils. In this regard special mention is made of the need to use indigenous vegetation species to maintain a high level of biodiversity.</p> <p>xiv. All areas of disturbed and compacted soil need to be ripped and reprofiled before rehabilitation.</p> <p>xv. Concurrent rehabilitation must take place throughout the construction phase.</p>					

Phase of development		CONSTRUCTION			
Impact / issue		Construction (E)			
MITIGATION MEASURE		MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
<p>E4 Fauna</p> <p>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.</p> <p>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.</p> <p>iii. Environmental induction training and awareness must include aspects dealing in safety with wild animals into and on site. Focus on animals such as snakes and other reptiles that often generate fear by telling workers how to move safely away and to whom to report the sighting. Workers should also be informed where snakes most often hide so that they can be vigilant when lifting stones, etc.</p> <p>iv. 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.</p>		<ul style="list-style-type: none"> • Minimise disturbance to animals • Minimise interruption of breeding patterns of birds • Minimise destruction of habitat 	<ul style="list-style-type: none"> • 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
<p>E5 Flora</p> <p>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.</p> <p>ii. Existing indigenous vegetation should be incorporated into the development landscape as far as possible.</p> <p>iii. No open fires shall be allowed on site under any circumstances, fires will only be permitted in adequate facility within the crew camp.</p> <p>iv. With regard to alien invasive species, the alien weeds along with the natural vegetation (which will remain between the rows of solar panels) will be cropped to a length shorter than 0.5m (to prevent obstructing the solar panels).</p> <p>v. Should any weeds establish around the transformers and delivery/gathering cabins (due to the soil being disturbed), these will be manually removed.</p>		<ul style="list-style-type: none"> 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 veldt fires Minimise risk of fauna and flora destruction 	<ul style="list-style-type: none"> 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 veldt fires started by contractors work force No claims from landowners for damages due to veldt 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
<p>E6 Heritage</p> <p>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.</p> <p>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.</p> <p>iii. Upon receipt of such notification, the ECO will arrange for the excavation to be examined by an Archaeologist.</p> <p>iv. Under no circumstances must archaeological artefacts be removed, destroyed or interfered.</p> <p>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.</p>		<ul style="list-style-type: none"> Limit the destruction of the country's heritage resources The preservation and appropriate management of new archaeological finds should these be discovered during construction 	<ul style="list-style-type: none"> No destruction of or damage to newly discovered archaeological sites 	Monitor Daily	
<p>E7 No-go / sensitive areas</p> <p>i. All construction activities must remain within the boundaries of the development area, as demarcated at the start of construction.</p> <p>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.</p> <p>iii. No-go areas (such as the buffer zone) must be demarcated with fencing/ warning tape and signs before any construction activities commence. These areas and the type of fencing/ demarcation must be approved by the relevant specialist involved in the S&EIR process. The EO and ECO must be on site in order to make sure the correct areas are fully demarcated.</p> <p>iv. Refer to Appendix 2 for a map illustrating the sensitive environments on site, the site layout plan of the solar plant, and an overlay of the sensitive environments.</p>		<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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
<p>E8 Access route/ haul roads</p> <p>i. No unauthorised access is permitted. Any authorised clearing for access roads must be done under the supervision of the ECO.</p> <p>ii. Any damaged or degradation will be investigated and fines issued, the affected areas must be immediately rehabilitated.</p> <p>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.</p> <p>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.</p> <p>v. All traffic management must be done in accordance with the National Road Traffic Act, 1996 (Act No. 93 of 1996).</p> <p>vi. Components for the solar facility are relatively small and will subsequently not require special abnormal weight permits (refer to the Traffic Impact Assessment Report) - Appendix 7 of the EIR).</p>		<ul style="list-style-type: none"> • Minimise loss of topsoil and enhancement of erosion • Minimise fauna and flora displacement by destruction of natural habitats • Minimise disturbance to neighbouring areas 	<ul style="list-style-type: none"> • 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
<p>E9 Crime, safety and security</p> <p>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.</p> <p>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.</p> <p>iii. The site and crew are to be managed in strict accordance with the OHSA and the National Building Regulations.</p> <p>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.</p> <p>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.</p> <p>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.</p>		<ul style="list-style-type: none"> • Reduce the risk of potential incidences • Minimise the potential impact on the environment 	<ul style="list-style-type: none"> • No incidences reported 	Monitor daily	

Phase of development		CONSTRUCTION			
Impact / issue		Construction (E)			
MITIGATION MEASURE		MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
<p>E10 Visual impact</p> <p>i. Shade cloth must be utilised to conceal and minimise the visual impact of contractor camps, lay down and storage areas.</p> <p>ii. Landscaping must enhance the aesthetic appeal of the development (where possible).</p> <p>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.</p>		<ul style="list-style-type: none"> Minimise visual impact 	<ul style="list-style-type: none"> No complaints from I&APs 	Monitor daily	
<p>E11 Geotechnical</p> <p>i. Founding conditions for individual structures must be confirmed by a qualified Geotechnical Engineer / Structural Engineer / Geologist (where required).</p> <p>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.</p> <p>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.</p>		<ul style="list-style-type: none"> Minimise potential structural faults Minimise trench collapse 	<ul style="list-style-type: none"> No visible signs of backfill deterioration or trench collapse 	As and when required	
<p>E12 Hydrology</p> <p>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.</p> <p>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 responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas.</p> <p>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 natural drainage systems or 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.</p>		<ul style="list-style-type: none"> 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 embankments Minimise erosion of 	<ul style="list-style-type: none"> No visible signs of pollution No signs of siltation of water courses No visible erosion scarring 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
iv.	Approval must be obtained from the DWA for any activities that require authorisation in terms of Section 21 of the National Water Act, 1998 (Act No. 36 of 1998).	embankments and subsequent siltation of rivers	completed		
v.	Only vegetation required to be removed must be removed. Vegetation that will remain between the solar panel rows will assist in reducing surface run-off and increase infiltration.	<ul style="list-style-type: none"> Minimise damage to riverine habitats 	<ul style="list-style-type: none"> 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	
<p>F1 Soil and Agricultural Potential Assessment</p> <p>i. The destructive construction activities should be preferably carried out during the dry season June - August. This timing is ideal as it allows considerable time to mitigate the impacts of erosion and siltation of streams and wetlands before the intense rainfall season. Establishing and maintaining vegetation as a soil cover is the most common practical technique for controlling erosion on disturbed soils;</p> <p>ii. Seeding sensitive areas with locally adapted perennial seed mixture of grasses is highly recommended;</p> <p>iii. Grasses are preferred for good contact cover compared to woody vegetation;</p> <p>iv. The erosion control mechanism of vegetation cover entails the following:</p> <p style="margin-left: 20px;">a. Stabilisation of soil structure through formation of aggregates;</p> <p style="margin-left: 20px;">b. Protects against detachment of soil particles through strong winds and rain-drop impact; and</p> <p style="margin-left: 20px;">c. Promotes water infiltration for root uptake, and hence reduce surface run-off.</p> <p>v. Pioneer grasses should be selected for first seeding, and then disturbed areas left to self-rehabilitate in the normal course of natural plant succession;</p> <p>vi. Immediate excavation and subsequent disposal of contaminated soil where spills have occurred, and direct soil contact with any potentially hazardous substances e.g. leaks from vehicles, should be prevented using drip trays in order to prevent soil contamination;</p> <p>vii. Water should be sprayed on bare soil surfaces where dust fallout occurs, and maintain low vehicle speed, 40 km/h during the construction/installation phase. This practice of maintaining 40 km/h speed limit on gravel roads has been proven and widely accepted for combating dust in game reserves and national parks.</p> <p>viii. An additional suggestion would be the use of a TLB with a narrow bucket such as that used by Seacom in their nationwide underground cable network. The effective width of the trench is 250 mm and the depth sufficient to discourage cable theft (J. Phipson</p>	<ul style="list-style-type: none"> • Minimise scaring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Minimise sedimentation of nearby drainage lines • Maintain the integrity of topsoil's for future landscaping and rehabilitation • Containment of invasive plant growth 	<ul style="list-style-type: none"> • No visible erosion scars once construction is completed • The footprint has not exceeded the agreed site in terms of EA, etc. • Minimal invasive weed growth • No signs of sedimentation and erosion • Method statement 	<p>Daily</p>		

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	
2013, pers. comm., 20 June).					
<p>F2 Ecological Assessment</p> <p>i. All plant species of conservation concern or species which are nationally or provincially protected which will not be directly affected by the developments should be cordoned off as no go areas during construction. These areas which are cordoned off should however not prevent movement of indigenous fauna;</p> <p>ii. An independent ECO should be appointed to oversee all construction activities;</p> <p>iii. No open fires should be allowed in areas containing natural vegetation, especially during the dry season;</p> <p>iv. Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas;</p> <p>v. A rubble clean-up plan must be implemented throughout the duration of the construction phase;</p> <p>vi. Indigenous vegetation should be retained as far as possible in the state / structure that occurs naturally on the site;</p> <p>vii. Construction should commence in the winter months in order to minimise the impacts on the breeding activities of faunal species;</p> <p>viii. Permits must be obtained from the Issuing Authority (North West Department of Economic Development, Environment, Conservation and Tourism [DEDECT]) if the habitat of provincially protected species such as <i>Afrotis afrooides</i> (Northern Black Korhaan) is to be destroyed;</p> <p>ix. The solar plant site should ideally not be fenced to enable larger faunal species to move through the area and use the plant for shelter and feeding;</p> <p>x. Should a fence prove to be essential, this fence should be designed to enable the movement of faunal species and should therefore not include electrified or barbed wire fences which result in faunal injury and mortality;</p> <p>xi. A monitoring programme should be developed to determine and document the effect of the solar plant on faunal species. This monitoring programme should include detailed baseline information indicating the species and numbers within the solar plant site as</p>	<ul style="list-style-type: none"> • Control alien invasive species found on site. • Reduce bird collisions with high voltage power lines. • 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 veldt fires • Minimise risk of fauna and flora destruction 	<ul style="list-style-type: none"> • 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 veldt fires started by contractors work force • No claims from landowners for damages due to veldt fires • Method statement 	<p>As stipulated by monitoring plan</p>		

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	
<p>well as immediate surroundings. Monitoring should furthermore be conducted by a suitably qualified ecologist;</p> <p>xii. During construction, the construction area and immediate surroundings should be monitored regularly for emergent invasive vegetation;</p> <p>xiii. Surrounding natural vegetation should not be disturbed to minimise chances of invasion by alien vegetation;</p> <p>xiv. All alien seedlings and saplings must be removed as they become evident for the duration of construction and operational phase;</p> <p>xv. Manual / mechanical removal is preferred to chemical control;</p> <p>xvi. All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction site. This should be verified by the ECO;</p> <p>xvii. As far as possible, construction should be limited to the daylight hours in order to minimise the need for lights;</p> <p>xviii. An education programme should be compiled for all contractors, subcontractors and workers to ensure compliance to all aspects of the EMPr as well as educating personnel in the safe and proper conduct within areas of natural habitat;</p> <p>xix. No wild animal may under any circumstance be handled, removed or be interfered with by construction workers;</p> <p>xx. No wild animal may be fed on site;</p> <p>xxi. No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of;</p> <p>xxii. No domesticated animals must be allowed on site;</p> <p>xxiii. To prevent possible collisions with animals, drivers of construction vehicles must remain vigilant to the possibility of animals crossing their paths and a strict speed limit of 30 km/h should be adhered to;</p> <p>xxiv. All food should be securely stored away to prevent attraction of faunal species and all rubbish should be disposed off away from the site. Bins located around the infrastructure should have tightly fitting</p>					

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	
<p>lids to prevent faunal species raiding the bins and thereby becoming habituated to humans;</p> <p>xxv. All jumpers at transformers, T-offs and strain structures should be insulated;</p> <p>xxvi. Only pole structures that are approved as "bird friendly" by Eskom's ENVIROTECH Forum should be used;</p> <p>xxvii. Streams and drainage lines should not be crossed perpendicularly with powerlines where possible;</p> <p>xxviii. Powerlines should be routed alongside existing infrastructure such as existing powerlines, roads, buildings, and railway lines where possible;</p> <p>xxix. Lines traversing open areas must be marked with anti-collision devices. Bird Flight Diverters on the earth wires must be installed as per specifications devised by the Endangered Wild Trust (EWT);</p> <p>xxx. Lines traversing open areas must be marked with anti-collision devices. Bird Flight Diverters on the earth wires must be installed as per specifications devised by the EWT;</p> <p>xxxi. Streams and drainage lines should not be crossed perpendicularly with powerlines where possible;</p> <p>xxxii. Only pole structures that are approved as "bird friendly" by Eskom's ENVIROTECH Forum should be used;</p> <p>xxxiii. Most importantly, powerlines should be routed alongside existing infrastructure such as existing powerlines, roads, buildings, and railway lines;</p> <p>xxxiv. Powerlines should be constructed as close to the road and existing powerlines as possible;</p> <p>xxxv. A qualified botanist should be present at the time when powerlines are constructed to identify any plant species which are of conservation concern, nationally or provincially protected and where possible pylons should be moved to prevent the destruction of these species; and</p> <p>xxxvi. Where possible, powerline servitudes should not be cleared of vegetation to ensure that indigenous species still occurring within these areas are maintained.</p>					
<p>F3 Heritage Impact Assessment</p> <p>i. The footprint of the solar facility should be located such that a buffer</p>	<ul style="list-style-type: none"> Limit the destruction of the country's heritage 	<ul style="list-style-type: none"> No destrcion to the 10 ancestral grave sites 	Monitor Daily		

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	
<p>of at least 20 m exists between the footprint of the solar facility and the outer edge of the grave site;</p> <p>ii. Fence off the grave site with palisade fencing;</p> <p>iii. If the solar facility cannot be shifted due to other sensitivity elements, the graves older than 60 years or of an unknown age, will need to be relocated through SAHRA's grave relocation policy and permit application. This will constitute a Phase II HIA to be undertaken by an archaeologist; and</p> <p>iv. The provisions of the Human Tissue Act, 1983 (Act No. 65 of 1983) as amended, as well as the regulations (22 May 2013) relating to the management of human remains under the National Health Act, 2003 (Act No. 61 of 2003) take precedence if affected graves are younger than 60 years.</p>	<p>resources</p> <ul style="list-style-type: none"> The preservation and appropriate management of new archaeological finds should these be discovered during construction 	<p>found on site.</p> <ul style="list-style-type: none"> No destruction of or damage to newly discovered archaeological sites 			
<p>F4 Visual Impact Assessment</p> <p>i. Utilise the existing screening capacity of the site and improve it by enclosing the construction site and stockyards with a dark green or khaki brown shade cloth of at least 20% density and at least 3 metres high, as an additional screen.</p> <p>ii. Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance.</p> <p>iii. Remove rubble and other construction rubbish off site as soon as possible or place it in containers in order to keep the construction site free from additional unsightly elements.</p> <p>iv. Dust suppression techniques should be implemented especially on windy days, preferably using biodegradable binding agents.</p>	<ul style="list-style-type: none"> Reduce the amount of visual intrusion the construction activities will have on the surrounding receptors. 	<ul style="list-style-type: none"> No complaints from surrounding residents. 	Monitor daily		
<p>F5 Wetland Delineation and Functional Assessment</p> <p>i. The layout and placement of solar panels, substations and other associated infrastructure should take cognisance of the delineated wetland boundaries. The layout design should place infrastructure as far from wetland boundaries as possible, but as a minimum, a 32m buffer should be applied to all wetlands and serve as a no go areas as a minimum;</p> <p>ii. Further, development of the site should not cause negative changes to the hydrology of the wetlands. Uprooting trees and shrubs within especially the southern section of the solar site could expose the soils to accelerated erosion processes as this area forms a</p>	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> No sign of movement through "no go" areas. Containment of footprint 	As per the Wetland Monitoring Programme		

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	
<p>preferential flow path for stormwater. The southern section should preferably not be developed unless a sensitive stormwater management could be developed that would ensure similar or improved site drainage and run-off characteristics to the receiving environment. As a minimum stormwater design will have to include:</p> <p>a. Increased surface roughness across the entire site through increased basal cover;</p> <p>b. Attenuation facilities e.g. attenuation swales; and</p> <p>c. Diffuse water release infrastructure.</p> <p>iii. Linear infrastructure including access roads within the Solar PV Facility site should take cognisance of drainage patterns and incorporate sensitive stormwater management principles to avoid concentrating flow paths which could initiate erosion processes;</p> <p>iv. Good catchment management principles including appropriate stormwater planning need to be applied within the proposed Solar PV Facility site. Vegetation basal cover should be increased through removing grazing pressure and introducing an indigenous and appropriate seeding program. A reduced grazing regime and successful re-establishment of a good basal cover are essential and are likely to result in a positive effect on wetlands through increased surface roughness within the wetlands themselves as well as their associated catchments;</p> <p>v. A wetland monitoring program must be in place to pro-actively detect threats to wetlands before it can cause damage through an adaptive management approach, e.g. the initiation of new concentrated drainage pathways and erosion processes as a result of new access roads etc. It is recommended that a wetland specialist (preferential) or ecologist have at least three visit during the construction process and bi-annual visits for the first 5 years after construction is completed. The wetland specialist needs to ensure that no negative impacts on wetlands have occurred or that processes have been initiated that could harm wetlands in the future, e.g. preferential flow paths or erosion.</p>	<ul style="list-style-type: none"> • Protection of the wetland areas 				

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	
<p>F6 Traffic Impact Assessment</p> <p>i. The local road network is underutilised but is not maintained properly. The development may commence without influencing the levels-of-service for the local road network. However, some remedial work is recommended on the gravel road leading to the site.</p> <p>ii. Remedial work on the road network should take place before the construction phase starts. Portion of road to be upgraded include the farm road leading from the R375 to the solar facility.</p> <p>iii. The power line will intersect national and local roads; wayleave applications will be required at all road intersections. A wayleave application is also required for the portion of road to be upgraded.</p> <p>iv. The site plan must allow for access to the informal graveyard.</p>	<ul style="list-style-type: none"> Minimise loss of topsoil and enhancement of erosion Minimise fauna and flora displacement by destruction of natural habitats Minimise disturbance to neighbouring areas Minimise traffic 	<ul style="list-style-type: none"> 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		
<p>F7 Geotechnical Impact Assessment</p> <p>i. The site would appear to be suited for the development of the proposed solar PV farm.</p> <p>ii. Although the in-situ soils on site have a reasonable bearing capacity, the integrity of the soil structure will be compromised during excavations and therefore the foundations will have to be strengthened to prevent any movement.</p> <p>iii. Building foundations should be reinforced or earth mattresses should be used due to the collapse potential of the soils on site. An allowable bearing pressure of 80 kPa can be used in the design of structural foundations.</p> <p>iv. The excavatability of the soils on site can be considered to be medium to intermediate in terms of earthworks excavations.</p> <p>v. Precautions should be taken in the design of the facility to accommodate the possibility of a perched groundwater table during the rainy season, and</p> <p>vi. Site roads should be constructed with the wearing course consisting of imported gravel (minimum G7).</p>	<ul style="list-style-type: none"> To determine the nature, depth and extent of the different soils underlying the site in order to avoid destruction to soils and its properties To determine if the soil materials are suitable for construction purposes To ensure that the founding conditions for the construction of the facility are suitable To protect groundwater or seepage. 	<ul style="list-style-type: none"> No destruction to soils and its properties No loss of topsoil No damage to the geotechnical properties of the site 	As required, monitor daily		

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	
<p>Civil Engineers Requirements:</p> <p><u>Roads</u></p> <p>i. The vertical alignment for all on-site roads can generally follow the existing site gradients and topography. Roads aligned to the contours on site will require limited side cut and fill.</p> <p>ii. Depending on the requirements for abnormal loads in terms of transporting materials and equipment onto site, the site roads may generally consist of gravel roads.</p> <p style="padding-left: 40px;"><u>The gravel roads may be constructed as follows:</u></p> <ul style="list-style-type: none"> • Grub and clear road width, removing all grass and vegetation and remove topsoil to a depth of 150mm, • Roadbed treatment consisting of rip and compact insitu to 95% Mod AASHTO to a minimum depth of 200mm in the calcrete area, • Roadbed treatment consisting of excavation of the Aeolian sands to a depth of 500mm and then rip and compact insitu to 95% Mod AASHTO to a minimum depth of 200mm, and replace sands compacted to minimum 95% Mod AASHTO, in the Aeolian sand area • Raise the road fill to the required levels using either on-site materials or imported fill, compacted to a minimum 95% Mod AASHTO • Place gravel wearing course (G7), minimum 150mm thick and compacted to 98% Mod AASHTO. <p><u>PV/Substation Foundations</u></p> <p>i. The founding conditions on site can be broadly divided into two areas, namely the ferricrete and calcrete areas.</p> <p>ii. The ferricrete area is overlain by Aeolian sands with the ferricrete occurring at an average depth of 2 to 2.5m, whilst the calcrete area is overlain by clayey sands with the calcrete occurring at an average depth of 0.9m.</p>					

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	
iii. In the calcrete area, structural foundations can be located directly on the calcrete with a bearing capacity of 150kPa. iv. In the ferricrete area, structural foundations can be constructed on soil mattresses constructed within the Aeolian sands with a bearing capacity of 80kPa. <u>MV Cables</u> v. In general, cable trenches may be constructed across the site with depths easily excavated up to 0.9m and 2.0m, respectively, in the calcrete and ferricrete areas. vi. Provision should be made for cable ducts beneath all internal site roads and should be placed at a depth with a minimum cover of 750mm. Cable ducts placed at shallower depths should be adequately encased in concrete.					

Phase of development	OPERATION	EAP	Strategic Environmental Focus
Impact / issue	Maintenance Programme (G)	Proponents signature	
MAINTENANCE ACTIVITY		FREQUENCY OF ACTION	NOTES
G1 Access Gates i. Access gates should be checked for mechanical integrity and rust. ii. The mechanical joints of the access gates should be lubricated to ensure proper functioning.		Integrity of the Access gates will be checked annually and the maintenance will take place as and when necessary.	
G2 Internal Roads i. The condition of the roads will be visually checked. ii. Should the roads require maintenance, all activities that will be conducted will not generate excessive amounts of dust.		Visual inspections will be conducted annually and the maintenance will be conducted as and when necessary.	
G3 Perimeter Fence i. The perimeter fence and supporting poles integrity will be visually inspected. ii. Should sections of the fence be compromised, it will be replaced.		Inspections will occur annually with repairs taking place as and when necessary.	
G4 Vegetation on site i. The vegetation on site will be maintained at a short length (not exceeding 500mm), to ensure that the solar panels are not shaded. ii. During the cropping of the vegetation, a visual inspection will be carried out to ensure that no bird nesting sites (if applicable) will be damaged/ disturbed.		Vegetation should be cut on a monthly basis during the summer months and as and when necessary.	
G5 Photovoltaic Modules i. The PV modules will be inspected for <i>inter alia</i> water seepage, condensation, dust coverage and orientation shift. ii. The PV modules will be cleaned using water and sponges, to help remove dust and dirt build up.		Inspections and cleaning of the PV modules will take place annually.	
G6 Electrical Connections and Cables i. All electrical connections and cables will be inspected for tears, abrasions and breaks. ii. Should repairs be required, this will be done by an appropriately qualified professional.		Inspections will be carried out half yearly, and repairs will be done as and when necessary.	
G7 Alien Invasive Management i. Should alien species establish around the substation and gathering/ delivery cabins due to construction activities (soil disturbance), these weeds must be removed as and when required. ii. Weeds that are established with the natural vegetation on site between the solar panel rows; must be cropped before the weeds set seed.		As required	

Assuming that the contract to produce renewable electricity is not renewed, the following section will apply:

Phase of development	DECOMMISSIONING	EAP	Strategic Environmental Focus
Impact / issue	Decommissioning Activities (H)	Proponents signature	
DECOMMISSIONING ACTIVITY		FREQUENCY OF ACTION	NOTES
H1 Waste Management <ul style="list-style-type: none"> i. All materials (to be disposed of) that can be recycled must be recycled at an appropriate registered facility. ii. Records of materials being delivered to such facilities must be kept. iii. All inert waste (that is not recyclable) must be disposed of at a registered facility and such records must be kept. iv. Hydrocarbons that cannot be reused, must be disposed off at an appropriate registered facility and records of such disposal must be maintained. 		As required	
H2 Soil and Vegetation rehabilitation <ul style="list-style-type: none"> i. The areas where the substation, delivery/ gathering cabins, perimeter road, and construction camp are located must be rehabilitated. The soil in these areas must be ripped. ii. Should any other areas (outside of the fenced development area) be disturbed during the decommissioning of the plant, these areas must be rehabilitated as well. iii. A monitoring plan must be implemented to ensure that vegetation recolonises the area from the surrounding vegetation communities and to ensure that alien plants (that establish due to the disturbance) are regularly removed until the veld has returned to that of the surrounding landscape. 		Once off	

Please note that this section must be updated during the operational phase of the development to adequately address all components of decommissioning.

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

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 4 B

METHOD STATEMENT:

Crew Camps and Construction Lay Down Areas

CONTRACT:..... **DATE:**.....

WHAT CREW CAMPS AND CONSTRUCTION LAY DOWN AREAS ARE REQUIRED ON SITE DURING CONSTRUCTION? (give a brief description of these): * Note: please attach extra pages if more space is required

***Insert additional pages as required**

WHERE ARE THE CREW CAMPS AND CONSTRUCTION LAY DOWN AREAS TO BE LOCATED? (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:

Crew Camps and Construction Lay Down Areas (contd.)

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

Start Date:.....

End Date:.....

HOW ARE CREW CAMPS AND CONSTRUCTION LAY DOWN AREAS TO BE MANAGED? (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
Crew Camps and Construction Lay Down Areas (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 4 C

METHOD STATEMENT: Cement and Concrete Batching

CONTRACT:..... **DATE:**.....

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the works): * 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:

Cement and Concrete Batching (contd.)

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

Start Date:.....

End Date:.....

HOW ARE THE WORKS TO BE UNDERTAKEN? (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

Cement and Concrete Batching (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 4 D

METHOD STATEMENT: **Dust Control**

CONTRACT:..... DATE:.....

WHAT WORK IS TO BE UNDERTAKEN ON SITE THAT COULD GENERATE DUST? (give a brief description of the works): * 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: **Duct Control (contd.)**

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

Start Date:..... End Date:.....

HOW ARE THE WORKS TO BE UNDERTAKEN SO AS TO MINIMISE AND CONTROL DUST GENERATION 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

Dust Control (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 4 E

METHOD STATEMENT:

Hydrocarbon and Emergency Spill Procedure

CONTRACT:..... **DATE:**.....

WHAT HAZARDOUS SUBSTANCES (INCL. FUELS) ARE TO BE STORED ON SITE? (give a brief description of the works): * Note: please attach extra pages if more space is required

***Insert additional pages as required**

WHERE ARE THE THESE SUBSTANCES TO BE STORED ON SITE? (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:

Hydrocarbon and Emergency Spill Procedures (contd.)

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

Start Date:.....

End Date:.....

HOW ARE HAZARDOUS SUBSTANCES TO BE MANAGED TO AVOID SPILLAGES AND WHAT EMERGENCY PROCEDURES ARE TO BE IMPLEMENTED IN CASE OF A SPILLAGE? (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

Hydrocarbon and Emergency Spill Procedures (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 4 F (IF APPLICABLE)

METHOD STATEMENT:

Sourcing, Excavating, Transporting and Dumping of Fill and Spoil Material

CONTRACT:..... **DATE:**.....

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the works): * 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:

Sourcing, Excavating, Transporting and Dumping of Fill and Spoil Material (Contd.)

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

Start Date:..... **End Date:**.....

HOW ARE THE WORKS TO BE UNDERTAKEN? (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

Sourcing, Excavating, Transporting and Dumping of Fill and Spoil Material (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 4 G

METHOD STATEMENT: Fire Management

CONTRACT:..... **DATE:**.....

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the works): * 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:

Fire Management (contd.)

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

Start Date:.....

End Date:.....

HOW ARE THE WORKS TO BE UNDERTAKEN? (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

Fire 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 <i>(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)</i>	Corrective Action Taken <i>(Give details and attach documentation as far as possible)</i>	Signature

SECTION F: APPENDICES

APPENDIX 1: LOCALITY MAP

APPENDIX 2: LAYOUT PLANS AND DESIGNS

APPENDIX 3: ENVIRONMENTAL AUTHORISATION