ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)
PRE-CONSTRUCTION, CONSTRUCTION & OPERATIONAL

THE PROPOSED LANSERIA COMMERCIAL CROSSING

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ABBREVIATIONS

CLO ..... Community Liaison Officer
DEA ..... Department of Environmental Affairs
DWA .....Department of Water Affairs
EA ..... Environmental Authorisation
EAP..... Environmental Assessment Practitioner
ECO ..... Environmental Control Officer
EIA.....Environmental Impact Assessment
ELO..... Environmental Liaison Officer
EMP ..... Environmental Management Programme
EO.....Environmental Officer
ESO .....Environmental Site Officer
GDARD……Gauteng Department of Agriculture and Rural Development
I&AP .....Interested and Affected Party
NEMA..... ....National Environmental Management Act, 1998 (Act No. 107 of 1998)
SANS…….....……..……South African National Standard
SEF…….....……..…….Strategic Environmental Focus (Pty) Ltd

DEFINITIONS

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.

Built environment - Physical surroundings created by human activity, e.g. buildings, houses, roads, bridges and harbours.

Basic Assessment Report - A report presenting the findings of the basic assessment impact assessment process. This report is primarily aimed at reaching closure on the issues and alternatives to be addressed in the BAR.

Conservation - Protecting, using and saving resources wisely, especially the biodiversity found in an area.

Contamination - Polluting or making something impure.

Corrective (or remedial) action - Response required to address an environmental problem that is in conflict with the requirements of the EMP. The need for corrective action may be determined through monitoring, audits or management review.

Crew Camp – Facility where the construction crew meets and facilities for them are available here.

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 Impact Assessment (EIA) - An Environmental Impact Assessment (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) - Environmental Management Systems (EMS) provide 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.

Hazardous waste – Waste, even in small amounts, that can cause damage to plants, animals, their habitat and the well-being of human beings, e.g. waste from factories, detergents, pesticides, hydrocarbons, etc.

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 - Plants and animals that are naturally found in an area.

Infrastructure - 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.

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.

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.

Over-utilisation - Over-using resources - this affects their future use and the environment.

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 Environmental Management Programme (EMP).

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.

Section 24G Rectification Process – Section 24G Rectification Process (S24G) refers to the process of rectification of unlawful commencement activities listed in terms of the NEMA EIA Regulations. The process involves identifying and assessing the positive and negative social, economic and biophysical impacts of the illegal commencement of activities. The assessment includes an evaluation of recommendations for appropriate management actions for minimising or avoiding negative impacts and for enhancing positive impacts; as well as proposed monitoring measures.

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 management – Strategies implemented to control the surface flow of storm water such that erosion, sedimentation and 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.

REFERENCES

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

DEAT (2004a): Environmental Management Plans, Integrated Environmental Management, Information Series 12, Pretoria: Department of Environmental Affairs and Tourism (DEAT).

Lochner, P. (2005): Guideline for Environmental Management Plans, CSIR Report No ENV-S-C 2005-053 H, Cape Town: Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning.

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

National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) as amended in 2007 [NEMBA].

SECTION 1: INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF), as independent environmental managers and impact assessors, has been appointed by Cavaleros Construction Company (Pty) Ltd to compile and submit an Environmental Management Programme (EMP) for the proposed Lanseria Commercial Crossing to the decision making authority; the Gauteng Department of Agriculture and Rural Development (GDARD).

This document is compiled in accordance with the Integrated Environmental Management (IEM) philosophy which aims to achieve a desirable balance between conservation and development (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 EMP.

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

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

These principles are in line with NEMA and are focussed primarily on co-operative governance, public participation and sustainable development. The EIA Regulations 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.

1.2 SCOPE

The general principles contained within this document apply to all **pre-construction**, **construction** and **operational** activities.

1.2.1 PRINCIPLES OF THIS EMP

This EMP 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 EMP to be successful and effective.
- Flexible and responsive. The implementation of the EMP must respond to new and changing circumstances, i.e. rapid short-term responses to problems or incidents. The EMP is a dynamic "living" document and thus regular planned review and revision of the EMP must be carried out.
- Integration across operations. This EMP 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.

1.2.2 SITE SPECIFIC INFORMATION

A. PROPOSED ACTIVITY AND LOCAL CONTEXT

The proposed Lanseria Commercial Crossing is located to the east and partly adjacent to Malibongwe Drive (K29) between the national road N14 to the south and provincial road K33 to the north. The central coordinates are 25°58.398'S and 27°55.698'E. The site can be accessed of Malibongwe Drive (K29) at an approved intersection on Portion 163 of the Farm Nooitgedacht.

It is the intention to develop a township consisting of seven (7) erven that vary in size between approximately 4, 78 hectares (ha) and 10, 55 ha. The following is proposed for each Erf:

- Erf one (1) to five (5) on the Farm Nietgedacht 535-JQ : "Special" land rights for commercial and related industrial uses, retail, places of refreshments, public garage (excluding sale of fuel), a hotel and offices.
- Erf six (6) to seven (7) on the Farm Nietgedacht 535-JQ: "Special" land uses for commercial, industrial uses, showrooms and related retail and motor showrooms and workshops.
- Erf one (1) and two (2) on the Farm Nooitgedacht 534-JQ: "Special" land uses for commercial and related industrial uses, retail, places of refreshment, public garage (excluding the sale of fuel), a hotel, businesses and offices.

The proposed properties (owned by the applicant) will be developed over a period of time for land uses for which a demand exists and which will benefit from the locational characteristics that will complement and support existing and proposed developments in the area. Due to the regional accessibility and the site's location in relation to Lanseria Airport, which is planned to become a major cargo airport, the site is highly suitable for a development that consists of major warehouse and distribution facilities. No site alternatives were investigated.

While the proposed development layout plan is fixed, various alternatives were investigated for the provision of necessary services, including water, sewage and electrical connections. However, the alternatives investigated/ discussed were not feasible due to the absence of bulk infrastructure within the greater area. Thus, interim solutions had to be sought until such a time as the service providers (i.e. Johannesburg Water and Eskom SOC Limited) implement their Master Plans for the provision of water, sewage and electricity for the area. The following solutions are proposed:

Water Supply:
Mogale City Local Municipality indicated that they have recently upgraded their bulk water infrastructure and that a temporary connection can be made to the existing DN160 pipeline to the west of the proposed development. The future water supply (ultimate solution) for the proposed development will be supplied by a Johannesburg Water's connection at the Sonneglans Reservoir, near Beyers Naude / Marina Road intersection. From there a new 700mm diameter pipeline will supply water to the proposed new 15Ml Lion Park Reservoir next to Malibongwe Drive and a 450mm diameter pipeline will link to the reservoir. From the Lion Park Reservoir a planned 600mm diameter feeder line will supply water to the Lion Park Reservoir District, in which the site is situated. The supply pipeline is routed next to the R512 (in its new position) and therefore runs through the development site on the boundary of Mogale City Local Municipality and City of Johannesburg's Metropolitan Municipality.

Electricity Supply:
As an interim measure electricity for the proposed development will be sourced from the existing Eskom powerline that runs parallel to Malibongwe Drive (K29), by means of two 11KV cables. In future electricity will be supplied by Eskom's new bulk substation (Ithuba) in the nearby area (north of the proposed development) as outlined in Eskom's 2010-2012 Master Plan.

Road Upgrades:
A Traffic Impact Study was conducted by Messer's Transport and Traffic Technology Africa (Pty) Ltd for the proposed township development. To accommodate the anticipated traffic calculated by the study the following is proposed:

- Priority controlled T-intersection of Road C and the R552 (forms part of the Mogale City side of the development);
- The existing R512/Lanseria CC signalised intersection will be upgraded (forms part of the City of Johannesburg side of the development);
- Improvements to intersection R512-R522; and
- The construction of other internal roads.

Stormwater Management:
It is proposed that the stormwater originating from the proposed development be attenuated to ensure that the pre-development peak flows for the 1:5 and 1:25 year recurrence intervals is not exceeded. In order to accommodate this requirement, two proposed stormwater attenuation ponds are to be located within the first 20m of the 50m wetland buffer on the eastern boundary of the development while one attenuation pond is to be located within the road reserve on the western boundary of the development.

The proposed attenuation ponds will be created by reinforced earth embankments that are intended to provide surface area and a suitable growing medium for the re-establishment of riparian and wetland vegetation. The embankments will not be higher than 1.5m or steeper than 1:3. The attenuation ponds will act as silt traps and accumulated stormwater will be released slowly back into the wetland buffer on the eastern boundary of the site. On the western boundary stormwater will be released into the existing stormwater system located in the K29 (Malibongwe Drive) road reserve. During a storm event water will be

discharged by means of an emergency spill-over. The force of stormwater will be broken by means of an energy dissipater and reno-mattresses in order to prevent erosion from occurring during a storm event.

Alternative 1: Unsurfaced swales direct stormwater to the proposed attenuation ponds
For this alternative three unsurfaced earth channels (swales) will collect run-off water from the site, essentially acting as "cut-off drains". Two swales will be located just inside the 50m wetland buffer along the eastern boundary of the development while one swale will be located in the road reserve on the western boundary. The swales will direct stormwater to the three proposed attenuation ponds.

Alternative 2: Slope paved areas towards the proposed attenuation ponds
The paved areas within the development footprint will be sloped towards the three proposed attenuation ponds (as discussed above). This alternative is subject to design constraints, such as finished levels and materials to be used for paving/ surfacing.

Sewage Treatment:
There is currently no existing bulk sewerage infrastructure in the vicinity of the site. Johannesburg Water proposes to construct a new Waste Water Treatment Works (WWTW) to the east of Lanseria (north of the proposed development) as part of their Master Plan; the proposed development will ultimately connect to this future sewage infrastructure.

Two alternative interim solutions to manage sewage generation on site are proposed.

Alternative 1: On-site Waste Water Treatment Package Plant (WWTPP)
The WWTPP is proposed to be located in the north eastern corner of Development Phase 1 or north western corner of Development Phase 3. The WWTPP will essentially be a Lilliput or similar system that will treat sewage on site and discharge treated water (to approved Department of Water Affairs standards) into holding tanks to be used for irrigation of landscaped areas within the development and/or discharged into the proposed stormwater attenuation system.

A separate Basic Assessment application is currently underway to obtain a Waste Management License for this facility – as such the EMP of that application will be implemented for the WWTPP, thus this EMP only address mitigation and management measures associated with Alternative 2.

Alternative 2: Pump Station and Outfall Sewer to the Zandspruit Pump Station
The alternative to the on-site WWTPP is to construct a pump station (at the same location) connected to an outfall sewer line which will transport the sewage to the existing Zandspruit Pump Station, approximately 5km south-east of the proposed development. There are three (3) alternative routes for the proposed outfall sewer line, namely:

Alternative 2.1: Outfall sewer (less than 100mm diameter) runs north along the cadastral boundary, then eastward within the road reserve of 6th Road (R552), then south-west within the R114's road reserve, then continues in a south-easterly direction (within the road reserves of Howard Avenue, Kindred Avenue, Rietvallei Road), where after it is connected to a gravity pipeline (160mm diameter) (within the road reserves of Nicholls and Watercombe Roads) to the existing outfall sewer to the Zandspruit Pump Station.

Alternative 2.2: (Preferred): Outfall sewer (less than 100mm diameter) runs south within the existing Johannesburg Water servitude, then south-west within the N14 road reserve, then south within Malibongwe Drive's road reserve until the high point, where after it will be connected to a gravity pipeline (160mm diameter) to the existing outfall sewer to the Zandspruit Pump Station.

Alternative 2.3: Outfall sewer (less than 100mm diameter) runs north along the cadastral boundary, then eastward within the road reserve of 6th Road (R552), then south-east towards the Zandspruit Pump Station within the road reserves of Cladon Street, 3rd Road and Sevenoaks Road. Then the outfall sewer follows along two property boundaries to the Pump Station.

1.2.2.1 DETAILS OF CONSTRUCTION PHASE

The construction of the Lanseria Commercial Crossing is proposed to commence in 2014. The construction period will consist of two phases. The first phase is estimated to be 5 months while the second phase should be approximately 4 months.

The appointed Contractor will be responsible to prepare a Construction Site Development Plan prior to establishing on site. This plan will indicate the boundaries of the site that encompasses all construction related activities, vehicle and pedestrian access points, laydown area/s, offices, stockpile areas, storage areas, ablution facilities, etc. This Site Development Plan must be approved by the appointed Environmental Control Officer (ECO).

The construction programme will reflect the separate work sections, in chronological order, according to the Contractor's intended production sequence, as described on the Construction Site Development Plan.

An estimated $20m^3$ of water per month will be needed during the construction phase and will be sourced from the Mogale City Local Municipality's pipeline and/or a commercial water supplier. This water will be used for various activities on site, including dust suppression on dry, windy days. Electricity will be sourced directly from Eskom by means of two 11KV cables connected to the existing powerline that runs parallel to Malibongwe Drive (K29). Diesel generators will also be utilised on site and stored within the storage area as far away from the wetland/ watercourse boundary as possible (as indicated on the Construction Site Development Plan).

The Contractor will be responsible for the management and removal of all solid waste from site to a designated landfill site. Solid waste generation will be minimal and the contractor will dispose by means of contracting a reputable waste removal company or by entering into an agreement with the local municipality. A method statement for the management of waste must be drafted and signed off by the ECO prior to commencement of construction activities (Refer to section 1.2.9).

1.2.2.2 SUMMARY OF IMPACTS ASSOCIATED WITH THE PROPOSED ACTIVITY

The following impacts associated with the proposed activity where identified. Refer to SECTION F of the EIR for assessment of the impacts.

Biophysical Impacts

- Potential impacts of increased surface water run-off (viz. increased soil erosion) associated with the establishment of hard surfaces into the adjacent wetland/ watercourse system (during the construction phase);
- Potential impacts on ground and surface water quality as well as soils due to potential hydrocarbon spillages from vehicles and other equipment (during the construction and operational phases);
- Destruction of flora within the proposed area and nearby wetland/ watercourse system, stemming from construction activities such as vegetation clearing and topsoil stripping within the site (during the construction phase); and
- Faunal displacement (during the construction phase).

Socio-Economic Impacts

- Increased dust and noise generation (during the construction and operational phases);
- Impacts on heritage resources (during the construction phase);
- Impacts on traffic patterns (during the construction and operational phases);
- Change of visual character (during the construction and operational phases); and
- Job creation (during the construction and operational phases).

Cumulative Impacts

- Increased traffic on the immediate roads network;
- Loss of open space for fauna and flora;
- Possible downstream flooding; and
- Local economic development.

1.2.3 INTERPRETATIONS

The implementation of the EMP is not an additional or "add on" requirement. The EMP is legally binding through NEMA and the relevant EA. The proponent is to ensure that through the project tender process the EMP forms part of the Project Construction Contract Document to be incorporated in line with:

a) General project specifications; and

b) SANS 1200 A or SANS 1200 AA, as applicable.

1.2.4 PROJECT PHASE

This EMP is specifically compiled for the period of time prior to commencement of, and activities associated with construction, together with some operational activities of the proposed development.

1.2.5 ROLE PLAYERS AND RESPONSIBILITY MATRIX

In order for the EMP 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 Officers (EO), Environmental Site Officer (ESO), Environmental Control Officer (ECO), Project Manager (PM), Contractors (C), Environmental Assessment Practitioner (EAP). Further; landowners, interested and affected parties and the relevant environmental and project specialists are also important role players.
Note: *Roles and Responsibilities will be revised pending the EA.*

Table 1: Functions and Responsibilities of the Project Team

KEY	FUNCTION	RESPONSIBILITY
A	**Lead Authority**	The Lead authorities are the relevant environmental department (GDARD) that has issued the Environmental Authorisation. The authorities are responsible for ensuring that the monitoring of the EMP and other authorisation documentation is carried out. This will be achieved by reviewing audit reports submitted by the ECO and conducting regular site visits.
C	**Contractor**	The principle contractor, hereafter known as the 'Contractor', is responsible for implementation and compliance with the requirements of the EMP and conditions of the EA, 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 EMP. The contractor is required, where specified, to provide Method Statements setting out in detail how the management actions contained in the EMP will be implemented.
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 Project Manager on the proponent's behalf (See PM).

KEY	FUNCTION	RESPONSIBILITY
D	**Developer**	The proponent (Cavaleros Construction Company (Pty) Ltd), is ultimately accountable for ensuring compliance to the EMP and conditions contained in the Environmental Authorisation (EA). The ECO must be contracted by the developer (Cavaleros Construction Company (Pty) Ltd), full time or part time depending on the EA, as an independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of EA's, and the EMP 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 an integrated as part of the project team.
EAP	**Environmental Assessment Practitioner**	The definition of an environmental assessment practitioner in Section 1 of NEMA is "*the individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management plans or any other appropriate environmental instruments introduced through regulations."*
ECO	**Environmental Control Officer**	An independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of EA, and the EMP for the project. The ECO must be on site prior to any site establishment and must endeavour to form an integral part of the project team. The ECO must be proactive and have access to specialist expertise as and when required, these include geologists, heritage specialists, etc. The ECO must conduct audits on compliance to relevant environmental legislation, conditions of EA, and the EMP for the project. The size and sensitivity of the development, based on the EIA, and the EA will determine the frequency at which the ECO will be required to conduct audits. (A minimum of a monthly site inspection must be undertaken). The ECO must be the liaison between the relevant authorities and the project team. The ECO must communicate and inform the developer and consulting engineers of any changes to environmental conditions as required by relevant authoritative bodies. The ECO must ensure that the registration and updating of all relevant EMP documentation is carried out. The ECO must be suitably experienced with the relevant environmental management qualifications and preferably competent in construction related methods and practices. The ECO must handle information received from whistle blowers as confidential and must address and report these incidences to the relevant Authority as soon as possible.

KEY	FUNCTION	RESPONSIBILITY
EO / EM	**Environmental Officer / Environmental Manager**	Appointed by the Consulting Engineers (CE) as their environmental representative on site. The EO is not independent but must rather act on behalf of the CE with the mandate to enforce compliance under the project contract, which must include the EMP. The EO has the directive to issue non-conformance and hazard certificates. Further, in terms of accepted industry practice the EO could issue the equivalent of a "cease works" instruction only in exceptional circumstances where serious environmental harm has been or is about to be caused i.e. in cases of extreme urgency and then only when the ER is absent. The EO must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site. On certain types of projects, such as linear developments (fences, pipelines, etc), the EO must also be the liaison between the contractor and landowners. The EO must attend relevant project meetings, conduct daily inspections to monitor compliance with the EMP, and be responsible for providing reports and feedback on potential environmental problems associated with the development to the project team and ECO. The EO must convey the contents of this EMP to the Contractor site team and discuss the contents in detail with the Contractor as well as undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce. The EO must be suitably experienced with the relevant qualifications and preferably competent in construction related methods and practices.
ER	**Engineers Representative**	The consulting engineer's representative 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.
ESO	**Environmental Site Officer**	The ESO is employed by the Contractor as his / her environmental representative to monitor, review and verify compliance with the EMP by the contractor. This is not an independent appointment; rather the ESO must be a respected member of the contractor's management team. Dependent on the size of the development the ESO must be on site one week prior to the commencement of construction. The ESO must ensure that he / she is involved at all phases of the constriction (from site clearance to operation).
OA	**Other Authority**	Other authorities are those that may be involved in the approval process of an EMP. Their involvement may include reviewing EMP's to ensure the accuracy of the information relevant to their specific mandate. Other authorities may be involved in the development, review or implementation of an EMP. 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.
PM	**Project Manger**	The Project Manager (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 EMP in accordance with an agreed warning procedure.

1.2.6 ENFORCEMENT, MONITORING AND AUDITING

The ECO and full time EO must oversee the implementation of the EMP.

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 EMP 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 EMP 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:

1. Complaints received from landowners and actions taken.
2. Environmental incidents, such as oil spills, etc. and actions taken. This excludes litigation.
3. Incidents leading to litigation and legal contraventions.
4. 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 (see 1.2.9 & 1.2.11) 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.

1.2.7 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 in terms of Section 28 of NEMA.
- The study area must be clearly defined, surveyed and demarcated according to the project authorisation. All workforce members and other construction personnel are not to go beyond the fenced footprint. Landowners are not comfortable when strangers come on to their properties. They will look for reasons to interfere with the construction process and may therefore cause delays in the process that can be very costly to the Contractor.
- The Contractors must adhere to agreed and approved access points and haul roads.
- 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 EMP.
- 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.
- 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 (see 1.2.8 below).
- 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.

1.2.8 AWARENESS TRAINING

The EO or ESO, are responsible for ensuring everyone part of the project team - on site or design team - 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.

Refresher courses must be conducted as and when required. 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, as and when necessary.

1.2.9 CONTRACTOR ENVIRONMENTAL METHOD STATEMENTS

Method Statements are written submissions to the Engineer by the Contractor in collaboration with his / her ESO, in response to a request by the EO and or Engineer. The Method Statements set out the plant, materials, labour and method that the contractor proposes using to carry out an activity, identified by the EO and/or Engineer. The Method Statements contain the appropriate detail such that the EO and Engineer are able to assess whether the Contractor's proposal is in accordance with the requirements of the EMP. The contractor must sign each Method Statement along with the EO and Engineer to formalise the approved Method Statement.

All Method Statements including those which may be required as *ad hoc* or emergency construction method statements must be submitted to the Engineer for approval prior to the commencement of the activity. Any changes to the method of works must be reflected by amendments to the original approved Method Statement. Any changes in this regard must be approved by the EO and Engineer on the understanding that such changes are environmentally acceptable and in line with the requirements of this EMP.

The *pro forma* Method Statements attached must be used and method statements for the following activities must be submitted to the EO, ECO and Engineer for approval before construction commences. These include *inter alia:*

- Waste management;
- Construction Site Development Plan (location of crew camps and construction lay down areas (if applicable));
- Cement and concrete batching;
- Dust control;
- Emergency Response Plan including hydrocarbon and emergency spills procedures (including personnel training);
- Sourcing, excavating, transporting and dumping of fill and spoil material;
- Erosion Control; and

- Emergency fire procedure.

1.2.10 SITE DOCUMENTATION

The following is 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 Authorisation and Environmental Management Programme (EMP);
- Complaints register; and
- Method statements.

1.2.11 PRO FORMA DOCUMENTATION

1.2.11.1 PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES

The following attached *pro forma* documentation is to be filled out and is binding to the EMP 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.

1.2.11.2 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.

1.2.12 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.

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. *GDARD, Directorate: Environmental Management of the relevant, Local Authorities.*

National Water Act, 1998 (Act No. 36 of 1998) & Water Services Act, 1997 (Act No. 108 of 1997)
The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. According to the NWA, the

proposed Lanseria Commercial Crossing will trigger the following water uses listed in Section 21 due to the adjacent wetland/ watercourse system:

(i) altering the bed, banks, course or characteristics of a watercourse;
(e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1); and
(g) disposing of waste in a manner which may detrimentally impact on a water resource.

Accordingly, the proposed Lanseria Commercial Crossing thus requires a water use licence, which is administered by the *Department of Water Affairs (DWA).*

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National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
Aims to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. In terms of the List of Waste Management Activities promulgated in terms of the Act (GN No. 718 of July 2009), the proposed on-site Waste Water Treatment Package Plant (WWTPP) will treat effluent, wastewater and sewage above the annual throughput capacity threshold of 2 000m3, and thus require a Waste Management License (WML) prior to construction and operation. *GDARD.*

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

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

National Heritage Resources Act, 1999 (Act No. 25 of 1999)
This Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 hectares (ha) and where linear developments (including roads) exceed 300 metres in length. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the *South African Heritage Resources Agency (SAHRA)* or their subsidiary bodies.

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*

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

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*

SECTION 2: CONSTRUCTION PHASE EMP – IMPLEMENTATION

2.1 PREAMBLE

The point of departure for this EMP is to ensure a proactive rather than reactive 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 EMP is to provide management measures that must be implemented by Developers, Engineers and Contractors alike to ensure that the potential impacts of a proposed development are minimised. It must also be ensured that the EMP 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 following tables (from page 15) form the core mitigation measures appropriate to the pre-construction, construction, operation and decommissioning phases. 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 EMP, refers to the period of time leading up to and prior to commencement of construction activities (post Environmental Authorisation), and is included to ensure proactive environmental management measures with the goal of identifying further avoidable environmental damage 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 EMP contains specific mitigation requirements and requested contractor method statements stipulated where required.

The "***operational***" 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.

2.2 STRUCTURE AND CONTENTS OF TABLES

The tables consist of seven parts as follows:

Phase of development - This row will identify either pre-construction (planning) or actual construction phase etc.

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.

2.3 TABLES

Phase of development	**PRE-CONSTRUCTION**
Impact / issue	**GENERAL PLANNING (A)**

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
A1 Project contract and programme i. The EMP must be included as part of the tender documentation (and included within any service level agreements made) thereby making it part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract. ii. A copy of this EMP 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 EMP.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase • Ensure environmental awareness and formalise environmental responsibilities and implementation	• Contract records • Signed declaration pro forma's	-	
A2 Appointments and duties of project team i. The contact details for the ECO, ER, EO, Contractor and ESO (as applicable) must be recorded and a copy kept on site. This document must be made available to the approving authority on request. ii. Before construction activities commence, role players must have a clear indication of their role in the implementation of this EMP as indicated in section 1.2.5 Table 1. iii. Subcontractor(s) contracts with the principle contractor must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMP.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Contract records • Signed declaration pro forma's	-	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
A3 Method statements i. As required in section 1.2.9, certain method statements must be provided by the contractor. All activities which require method statements may only commence once the method statements have been approved by the engineer and or ECO as applicable. ii. Where applicable, the contractor will provide job-specific training on an ad hoc basis when workers are engaged in activities, which require method statements.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Approved method statements and relevant pro forma documents • Training records	As and when required	
A4 Site demarcation and development i. The surveys for the overall project area and construction footprint as approved in the EA must be complete and clearly demarcated before the contractors set up their crew camps or begin construction. ii. All relevant 'general' and 'specific' conditions contained in the EA will be included in the space provided below and included as part of this EMP when the "declaration of understanding" is signed by the Developer, Engineer and Contractor. The proponent is to sign the space provided.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Demarcated area's • Filled in section of this document	As and when required	
A5 Emergencies, non-compliance and communication i. The contractor must provide method statements on the protocols to be followed, and contingencies to be put in place for the items listed in section 1.2.9 above. ii. Communication in emergencies must follow the prescribed lines of communication. iii. The contractor understands that failure to adhere to the requirements of the EMP will result in the contractor being responsible for over and above the costs incurred for any remediation required as result of the specific non-compliance.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Method statements	As and when required	

Phase of development	**GENERAL PLANNING**	**EA reference number**	
Impact / issue	**EA Conditions (B1)**	**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	**GENERAL PLANNING**	**WUL reference number**	
Impact / issue	**Water Use License Conditions (B2)**	**Proponents signature**	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
All relevant 'general' and 'specific' conditions contained in the Water Use License issued by the Department of Water Affairs (DWA) 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
C1 Stockpiles (where applicable) i. All stockpiled material must be easily accessible without any environmental damage. ii. All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised. iii. The stockpiles may only be placed within the demarcated areas the location of which must be approved by the ER, EO or ESO. iv. Storm water run-off from the stockpile 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). v. Stockpiles are to be stabilised if signs of erosion are visible. vi. Soils from different horizons must be stockpiled such that topsoil stockpiles do not get contaminated by sub-soil material. vii. No plant, workforce or any construction related activities may be allowed onto the topsoil stockpiles. viii. Topsoil stockpiles must be clearly demarcated as no-go areas. ix. Stockpiles must not be higher than 2m to avoid compaction thereby maintaining the soil integrity and chemical composition (for the topsoil stock piles that will be used for re-vegetation). x. All stockpiles should be stored on surfaces that will be paved or developed over.	• Minimise scaring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Minimise sedimentation of nearby drainage lines • Maintain the integrity of topsoil's for landscaping and rehabilitation • Containment of invasive plant growth • Minimise contamination of storm water run-off	• No visible erosion scars once construction is completed. • The footprint has not exceeded the agreed site in terms of EA, etc. • No signs of sedimentation and erosion.	Daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
C2 Oil and chemicals i. The contractor must provide method statements for the "handling & storage of oils and chemicals", "fire", and "emergency spills procedures". ii. These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall. These areas must be imperviously bunded with adequate containment (at least 110% the volume of the fuel – excluding the volume displaced by the tanks) for potential spills or leaks iii. 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. iv. 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. v. 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). 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).	• Prevention of pollution of the environment • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts • No complaints from I&APs • Method statements	Daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
C3 Cement i. The contractors must provide and maintain a method statement for "cement and concrete batching". The method statement must provide information on proposed storage, washing & disposal of cement, packaging, tools and plant. ii. The mixing of concrete must only be done at specifically selected sites on mortar boards or similar structures to contain run-off into soils and/or storm water infrastructure. iii. Cleaning of cement mixing and handling equipment must be done using proper cleaning trays. iv. All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed facility. v. Any spillage that may occur must be investigated and immediate remedial action must be taken. vi. The visible remains of concrete, either solid, or from washings, must be physically removed immediately and disposed of as waste to a registered landfill site. vii. Cement batching areas must be located in consultation with the ER, EO or ECO to ensure residues are contained and that the proposed location does not fall within sensitive areas such as storm water infrastructure, etc.	• Minimise the possibility of cement residue entering into the surrounding environment • Minimise pollution of soil, surface and ground water resources	• No evidence of contaminated soil on the construction site • No evidence of contaminated water resources (when applicable) • Method statement	Monitored daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
C4 Dangerous and toxic materials (Provision of storage facilities) i. Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas. ii. Sufficient care must be taken when handling these materials to prevent pollution. Training on the handling of dangerous and toxic materials must be conducted for all staff prior to the commencement of construction. iii. In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs (DWA) must be informed immediately. iv. Storage areas must display the required safety signs depicting “no smoking”, No Naked lights” and “Danger” containers must be clearly marked to indicate contents as well as safety requirements. v. The contractor must supply a method statement for the storage of hazardous materials at tender stage. vi. Material Safety Data Sheets (MSDS) must be prepared for all hazardous substances on site and supplied by the supplier where relevant. MSDS’s must be updated as required.	• Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No visible signs of pollution • No litigation due to transgression of pollution control acts	Monitor daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
C5 Bulk Storage of Fuel i. Bulk fuel storage tanks on the site shall be on an impervious surface that is bunded and able to contain at least 110% of the volume of the tanks. The valve must have a tap and must be inside the bunded area where possible. The valve must then be connected to a water – hydrocarbon separator. 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). 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.	• Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No visible signs of pollution • No litigation due to transgression of pollution control acts	Monitor daily	
C6 Use of dangerous and toxic materials i. The contractor must keep the necessary materials and equipment on site to deal with spills / fire of the materials present should they occur. ii. The contractor must set up a procedure for dealing with spills / fire, which will include notifying the ECO and the relevant authorities prior to commencing with construction. These procedures must be developed with consultation and approval by the appointed EO. iii. A record must be kept of all spills and the corrective action taken.	• Prevention of pollution of soil, surface and ground water resources in the immediate and surrounding environments • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts	As required	

Phase of development	**CONSTRUCTION**
Impact / issue	**PLANT (D)**

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
D1 Eating areas and camp followers i. 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. ii. 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. iii. The feeding, or leaving of food, for stray or other animals in the area is strictly prohibited. iv. Camp followers / informal traders must not be allowed to congregate outside the construction site. v. Litter (even if originating outside the camp) and concrete bags, etc. must be picked up daily and put into suitably closed bins.	• Control potential influx of vermin and flies • Neat work place and hygienic environment • Minimise negative social impacts to local residents and businesses	• No visual sign of vermin and flies • No complaints from I&APs	Once off, monitor daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
D2 Toilets and ablution facilities (where applicable) i. The contractor is responsible for providing all sanitary arrangements for his and the sub-contractors team. A minimum of one chemical toilet must be provided per 15 persons. ii. Sanitary arrangements must be to the satisfaction of the ECO and the local authority. Toilets must be of the chemical type or access may be given to the existing primary school for utilisation its facilities. The contractor must keep the toilets in a clean, neat and hygienic condition. The contractor must supply toilet paper at all toilets at all times. Toilet paper dispensers must be provided in all toilets. iii. Toilets provided by the contractor must be easily accessible and a maximum of 50m from the works area to ensure they are utilised. All toilets will be located within the contractor's camp. Should toilets be needed elsewhere, their location must first be approved by the ER, EO or ECO. iv. The contractor, who must use a reputable toilet-servicing company, must be responsible for the cleaning, maintenance and servicing of the toilets. The contractor using a reputable toilet-servicing company, must ensure that all toilets are cleaned and emptied before the builders' or other public holidays. v. Toilets out on site must be secured to the ground and have a sufficient locking mechanism operational at all times.	• Ensure proper sanitation is achieved which will encourage the workforce to utilise toilets provided and not the surrounding habitat • Minimise potential of diseases on site • Minimise potential to pollute soils, water resources and natural habitats	• Workforce use toilets provided • No complaints received from I&APs as well as members of the workforce • No visible or measurable signs pollution of the environment (soils, ground and surface water)	As and when required	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
D3 Waste management i. The contractors must provide and maintain a method statement for "solid waste management". The method statement must provide information on a proposed licensed facility to be utilised and details of proposed record keeping for auditing purposes. The method statement must also include: types of waste to be generated, method of generation, generation areas, storage areas and containers, duration of storage and disposal methods. ii. Waste must be separated into recyclable and non-recyclable waste. iii. Any illegal dumping of waste must not be tolerated, this action will result in a fine and if required further legal action will be taken. This aspect must be closely monitored and reported on; proof of legal dumping must be able to be produced on request. iv. Bins must be clearly marked for ease of management. v. Sufficient 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. vi. 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. vii. Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site. viii. A skip, with a cover if possible, must be used to contain refuse from campsite bins, rubble and other construction material.	• Sustainable management of waste by recycling • To keep the site neat and tidy • Minimise litigation and complaints by I&APs • Reduce visual impact • Control potential influx of vermin and flies thereby minimising the potential of diseases on site and the surrounding environment • Minimise potential to pollute soils, water resources and natural habitats	• Disposal of rubble and refuse in an appropriate manner with no rubble and refuse lying on site • Site is neat and tidy • No complaints from surrounding residents and businesses • Sufficient containers available on site • No visible or measurable signs of pollution of the environment (soils, ground and surface water) • Method statement	Daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
D4 Dust i. The contractors must provide and maintain a method statement for "dust control". The method statement must provide information on the proposed source of water to be utilised and the details of the licenses acquired for such usage. ii. The clearing of vegetation must be kept to a minimum and only where required. iii. Potable water should not be used as a means of dust suppression, and alternative measures must be sourced. The use of 'grey' water must be investigated as an alternative. The contractor will be responsible to source this water and obtain the required approvals to utilise this water for the purpose of dust suppression. iv. The construction camp must be watered during dry and windy conditions to control dust fallout. v. Exposed soil stockpiles shall be covered, kept damp or protected using organic binding agents or alternative techniques that are not water intensive. vi. Dust production must be controlled by regular watering of roads and works area, should the need arise. NB: 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. vii. 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. viii. Avoid unnecessary movement of construction vehicles. ix. Excessive dust conditions must be reported to the ECO. x. All forms of dust pollution must be managed in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).	• Reduce dust fall out. • Reduce visual impact. • Minimise loss of valuable soil material.	• No visible signs of dust • No complaints from interested and Affected parties • 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	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
D5 Workshop equipment, maintenance and storage (if applicable) 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 area. Leaking equipment must be repaired immediately / be removed from site to facilitate repair. All wastes must be collected and removed to an appropriate registered waste site. ii. 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. iii. 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. iv. The following must be applied: • All contaminated soil / yard stone shall be removed and disposed of as hazardous waste at a registered facility. • 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).	• Prevent pollution of the environment • Minimise chance of transgression of the acts controlling pollution • Disposal of hazardous substances in an appropriate manner	• No pollution of the environment • No litigation due to transgression of pollution control acts • Method statement	Monitor daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
D6 Noise i. All construction vehicles must be in a good working order to reduce possible noise pollution. ii. All construction equipment or machinery should be switched off when not in use. iii. Noise reduction is essential and Contractors must endeavour to limit unnecessary noise, especially loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc. The use of silent compressors is a specific requirement. iv. Noisy activities must take place only during working hours. The EO must inform the residents of houses and businesses adjacent to the development in writing 24 hours prior to any planned activities that will be unusually noisy or any other activities that could reasonably have an impact on the adjacent sites. These activities could include, but are not limited to, blasting, piling, use of pneumatic jack-hammers and compressors, bulk demolitions, etc.	• Maintain noise levels below "disturbing" as defined in the National Noise Regulations • Minimise the nuisance factor of the development	• No complaints from surrounding landowners or I&APs	As and when required	

Phase of development	**CONSTRUCTION**
Impact / issue	**Construction (E)**

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
E1 Fauna i. All activities on site must comply with the regulations of the Animals Protection Act, 1962 (Act No. 71 of 1962) as amended which deals with the prevention of animal cruelty. ii. All construction workers must be informed that the intentional killing of any animal is not permitted as faunal species are a benefit to society. Poaching is illegal and it must be a condition of employment that any employee caught poaching will be dismissed and/or fined an amount as so decided by the ESO / ECO in accordance with the Animals Protection Act, 1962 (Act No. 71 of 1962) as amended. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal e.g. a snake, a specialist must be called in to safely relocate the animal if the EO or ECO is not able to. iii. Construction should take place in the winter months (where practical) to minimise disturbance to breeding fauna and flora in the surrounding natural area. iv. Construction activities should be restricted to daylight hours when the majority of faunal species are inactive. v. No wild animal may be fed on site. vi. No animals may be snared, captured or wilfully damaged or killed. vii. Burrows most be checked for usages (during the construction period) and animals that have not moved away should be relocated by a qualified zoologist. viii. The development footprint area should be demarcated prior to the commencement of construction activities. The area should only be fenced after a few weeks of construction activities on site. This will provide fauna with the opportunity to move away from the area as activities increase on site.	• Minimise disturbance to animals • Minimise interruption of breeding patterns of birds • Minimise destruction of habitat	• No complaints from Nature Conservation • No litigation concerning applicable animal protection acts • No measurable or visible signs of habitat destruction	Monitor daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
ix. The construction site must be fenced in such a way so as to prevent vehicular as well as pedestrian access to the adjacent wetland buffer area. x. Specific measures for the conservation of Giant Bullfrog individuals and habitat include: a. The 50m wetland buffer area remains open space during all development activities (except for the construction of the attenuation facilities). b. Active removal and nearby release of Giant Bullfrogs unearthed during construction. c. Fencing used on the southern and northern boundary of the subject property should be permeable (palisade fencing) as an alternative to a solid wall, this will provide a migratory corridor for the bullfrogs. d. In order to reduce the potential for individuals to be killed by vehicles, concrete walls must be placed along the western border of the 50m wetland buffer before construction begins, by doing so the migrating bullfrogs will be protected from all roads during construction as well as after utilization of the development begins.				
E2 Flora i. Trees and natural vegetation or any other natural features 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. Any feature defaced by the contractor must be reinstated to the satisfaction of the ECO and penalties / fines may be imposed by the ER. ii. Existing indigenous vegetation should be incorporated into the development landscape as far as possible. Vegetation should be removed only where required, other areas are to be left intact to allow these areas to act as source areas for the re-establishment of species	• 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	• 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	As and when required	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
to disturbed areas, over time. iii. No open fires shall be allowed on site under any circumstances. iv. The existing integrity of flora surrounding the proposed development should be upheld and no activities should be carried out outside the footprint of the construction areas. v. Specimens of *hemerocallidea* and *Boophone disticha* should not be disturbed, or alternatively they should be rescued and relocated to a suitable protected area which has been designated as sensitive as part of the Ecological Assessment (Appendix 6) – i.e. the wetland area. vi. All areas affected by construction should be rehabilitated upon completion of the construction phase of the development. Areas should be reseeded with indigenous grasses as required. vii. Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities. Use of al gravel roads currently located within the wetland zones should be ceased. viii. Construction workers may not tamper or remove natural vegetation form the surrounding areas and neither may anyone collect seed from the plants without permission form the local authority.	• Minimise disturbance and loss of topsoil • Minimise risk of veldt fires • Minimise risk of fauna and flora destruction	exceeded the agreed boundaries • No veldt fires started by contractors work force • No claims from landowners for damages due to veldt fires • Method statement		
E3 Heritage i. In terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), construction personnel must be alert and must inform the local heritage agency should they come across any additional findings of heritage resources within 24 hours. ii. Should any archaeological artefacts be exposed during construction activities, work on the area where the artefacts were found must cease immediately and the ECO must be notified within 24 hours. iii. Upon receipt of such notification, the ECO will arrange for the excavation to be examined by an Archaeologist. iv. Any archaeological sites exposed during demolition or construction activities must not be disturbed prior to authorisation by the South African Heritage Resources Agency or the appropriate provincial	• Limit the destruction of the country's heritage resources • The preservation and appropriate management of new archaeological finds should these be discovered during construction	• No destruction of or damage to newly discovered archaeological sites	Monitor Daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
heritage resource agency. v. Removal of the farmsteads will take into consideration that unknown burials could occur inside or close to these buildings.				
E4 Visual impact i. Shade cloth must be utilised to conceal and minimise the visual impact of contractor camps, lay down and storage areas (where practical). ii. 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. iii. The construction area must at all times be neat and tidy. iv. Equipment and construction vehicles must be stored or parked in designated areas. v. If construction is necessary during night-time, light sources should be directed inwards and downwards to prevent obtrusive lighting and light pollution.	• Minimise visual impact	• No complaints from I&APs	Monitor daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
E5 Crime, safety and security i. The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the National Building Regulations. ii. 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. iii. 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. iv. The nearest emergency service provider must be identified during all phases of the project as well as its capacity and the magnitude of accidents it will be able to handle. The contact details of this emergency centre, as well as the police and ambulance services must be available at prominent locations around the construction site and the construction crew camps.	• Reduce the risk of potential incidences • Minimise the potential impact on the environment	• No incidences reported	Monitor daily	
E6 Traffic i. Avoid movement of construction vehicles and machinery on main access roads during peak times (7:00 – 9:00) & (16:00 – 18:00). ii. If the above is unavoidable – implement traffic control measures such as points-men at busy intersections.	• Minimise the potential impact on existing traffic patterns	• No incidences reported.	Monitor daily	
E7 Hydrology i. In the event of pollution caused as a result of construction activities, the contractor, according to section 20 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) is be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas. ii. The 50m wetland buffer must be strictly adhered too and only activities for the establishment of the stormwater management attenuation facilities are to take place within the buffered area;	• Minimise pollution of soil, surface and ground water resources in the immediate and surrounding environments • Minimise scarring of the soil surface and	• No visible signs of pollution • No visible erosion scaring once construction is completed • Minimum loss of topsoil	As and when required, monitor daily	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
however these activities may not extend more than 20m into the 50m buffered wetland area. iii. No wastewater may enter any of the surrounding naturally vegetated or wetland/ watercourse areas. iv. Approval must be obtained from the DWA for the activities that require authorisation in terms of Section 21 of the NWA. v. The stormwater attenuation facilities must be designed to filter / trap any contaminates prior to water seeping into the ground or adjacent wetland area. vi. Construction should preferably take place during the dry season. vii. A storm water management plan would need to be submitted for the approval by both the Johannesburg Roads Agency and Environmental Management Department prior to the approval of the final Site Development Plan. Such plan would be require to meet the following criteria / Standards: • Peak discharge – no increase in discharge for any event of any duration up to the 25 year RI event. • Volume of runoff – no increase up to the annual 10 year rainfall. • Runoff frequency – no surface runoff for the 1 yr RI event of any duration. • Water Quality – no deterioration. viii. The design of storm water management system should also be based on sustainable urban drainage systems (SUDS) and water sensitive Urban Design approaches (WSUDS) with enhanced natural drainage through permeable surfacing and which integrate landscaping with storm water in line with best practice storm water management. ix. The Water Treatment Package Plant should have bunding walls, overflow containment, etc. in place to deal with any sewer failures and should have 24 hour retention capacity.	land features	• No erosion or silting downstream		
E8 Soil Disturbance and Erosion i. Appropriate mitigation measures (in consultation with the ECO) must be implemented at areas susceptible to erosion (either by wind or	• Ensure stormwater system is functioning optimally	• No blockages within the stormwater system		

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
rain) to decrease and/or cease erosion. ii. Erosion berms should be installed to prevent gully formation and siltation of the wetland resource. The following points should serve to guide the placement of erosion berms: a. Where the track has a slope of less than 2%, berms should be installed every 50m. b. Where the track slopes between 2% and 10%, berms should be installed every 25m. c. Where the track slopes between 10% and 15%, berms should be installed every 20m. d. Where the track has a slope greater than 15%, berms should be installed every 10m. iii. Vegetation clearing should be kept to a minimum and phased where practical. iv. Sheet run-off from paved surfaces and access roads needs to be curtailed. v. Run-off from paved surfaces should be slowed down by the strategic placement of berms. vi. The 50m wetland buffer zone (excluding the 20m within which stormwater attenuation facilities are to be constructed) should be left undisturbed to allow the climax terrestrial grassland community to establish in these areas. vii. As much vegetation growth as possible should be promoted within the proposed development area in order to protect soils and to reduce the percentage of the surface area which is paced. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping. viii. All areas of disturbed and compacted soil need to be ripped and reprofiled before rehabilitation. ix. Concurrent rehabilitation must take place throughout the construction phase.	• Address all areas of soil erosion promptly to reduce silting of the stormwater system • Remove all alien invasive plants from all natural and open space areas.	• No alien plants growing within open space and natural areas on site		

Phase of development	OPERATION	EAP	Strategic Environmental Focus
Impact / issue	Operation of township activities (F)	Proponents signature	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
F1 Soil Disturbance and Erosion i. Monitoring of the culvert / stormwater drainage system must occur regularly. ii. Access roads must be visually inspected at a frequency determined by the relevant SANS standard during operation. iii. If a hydrocarbon spillage occurs these should be cleaned using SUNSORB (or similar product) and the contaminated soils/ materials removed from site and dispose of at an appropriate registered landfill site.	• Ensure stormwater system is functioning optimally • Address all areas of soil erosion promptly to reduce silting of the stormwater system • Minimise scarring of the soil surface and land features	• No blockages within the stormwater system	Monitor monthly	
F2 Hydrology i. In the event of pollution caused as a result of operational activities, the polluter, according to "polluter-pays principle" of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) is be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas. ii. No wastewater may enter any of the surrounding naturally vegetated or wetland/ watercourse areas.	• Minimise pollution of surface and ground water resources in the immediate and surrounding environments	• No visible signs of pollution • No visible erosion scaring once construction is completed • Minimum loss of topsoil • No erosion or silting downstream	As and when required, monitor daily	
F3 Waste Management i. Waste must be separated into recyclable and non-recyclable waste. ii. The Lilliput or similar Waste Water Treatment Package Plant (WWTPP) must be maintained and in good working order. No untreated waste water is allowed to enter the stormwater system or any natural areas on site. iii. Specific conditions with the Waste Management License	• Waste is effectively recycled • No contamination of natural areas or the stormwater system with untreated waste water/ sewage	• Well maintained WWTPP – no complaints from adjacent landowners or learners	Monitor monthly	

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
issued for the WWTPP must be adhered too.				
F4 Ambient Noise i. Implement noise screening measures (by means of trees and/or noise barriers) along the site where noise have an impact on adjacent landowners on the farm Nooitgedacht. ii. Use porous texture for the paving of internal roads close to adjacent landowners on the farm Nooitgedacht. iii. Implement speed limits on internal roads.	• Maintain noise levels below "disturbing" as defined in the National Noise Regulations • Minimise the nuisance factor of the development	• No complaints from surrounding landowners or I&APs	As and when required	
F5 Visual Impact i. Buildings should be painted a colour with a tone similar to that of the prevailing landscape. ii. Steel components should be painted with a matt finish to avoid reflection. iii. The development must at all times be kept neat and tide; all litter must be removed regularly. iv. All lighting to be installed must be down light luminaries.	• Minimise visual impact	• No complaints from I&APs	Monitor daily	
F7 Fauna and Flora i. Fencing used on the southern and northern boundary of the study area should be monitored regularly and checked for missing sections. Any gaps must be repaired as soon as possible. ii. An alien vegetation eradication programme (to be approved by the CoJ: Environmental Regulatory Services Department) must be implemented during the operational phase. iii. Stormwater attenuation facilities may be constructed within the first 20m of the ecological buffer area but may not disturb the mandatory 30m buffer area.	• Minimise disturbance to animals • Minimise interruption of breeding patterns of birds • Minimise destruction of habitat • Minimal disturbance to vegetation where such vegetation does not interfere with construction in terms of approvals from the relevant authority	• No complaints from Nature Conservation • No litigation concerning applicable animal protection acts • No measurable or visible signs of habitat destruction • No litigation due to removal of vegetation without necessary permission • No exotic plants used		

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	NOTES
	• 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. • Remove all alien invasive plants from all natural and open space areas.	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 • No alien plants growing within open space and natural areas on site		

ANNEXURES

ANNEXURE 1	DECLARATION OF UNDERSTANDING BY THE DEVELOPER
ANNEXURE 2	DECLARATION OF UNDERSTANDING BY THE ENGINEER
ANNEXURE 3	DECLARATION OF UNDERSTANDING BY THE CONTRACTOR
ANNEXURE 4A	METHOD STATEMENT: *Waste Management*
ANNEXURE 4B	METHOD STATEMENT: *Crew Camps and Construction Lay Down Areas*
ANNEXURE 4C	METHOD STATEMENT: *Cement and Concrete Batching*
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ANNEXURE 4E	METHOD STATEMENT: *Emergency Response Plan (including Hydrocarbon and Emergency Spill Procedure and personnel training)*
ANNEXURE 4F	METHOD STATEMENT: *Sourcing, Excavating, Transporting and Dumping of Fill and Spoil Material*
ANNEXURE 4G	METHOD STATEMENT: *Emergency Fire Management*
ANNEXURE 4H	METHOD STATEMENT: *Soil Erosion Control*
ANNEXURE 5	INCIDENT AND ENVIRONMENTAL LOG

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: _____

METHOD STATEMENT: 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__

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 **Waste Management**

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__

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**

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)

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__

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**

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)

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__

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**

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)

METHOD STATEMENT: Emergency Response Plan: Hydrocarbon and Emergency Spill Procedure & Personnel Training

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__

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**

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)

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__

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**

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)

METHOD STATEMENT: Emergency 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__

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: **Emergency Fire Management**

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)

METHOD STATEMENT: Soil Erosion Control

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__

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: **Soil Erosion Control**

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 5

INCIDENT AND ENVIRONMENTAL LOG

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