

Environmental Management Programme for the proposed Development of

Leachville x 2 Residential Development

**Located on the Portion 148 of the farm
Rietfontein 115 IR**

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DEVELOPER:

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i. TERMS AND ABBREVIATIONS

Audit Bund	Regular inspection and verification of implementation of the EMPr Enclosure under / around a storage facility to contain any spillage
Batch plant	Concrete or plaster mixing facility and associated equipment and materials
Contractor	Principal person / company undertaking the construction of the infrastructure.
Developer	The developer is the same person as the applicant.
Development site	Boundary and extent of development works and infrastructure
DWA	Department of Water Affairs
ECO	Environmental Control Officer: - Person tasked with implementing and controlling the environmental requirements during construction
EMPr	Environmental Management Programme
Engineer	Person who represents the client and is responsible for enforcing the technical and contractual requirements of the project
ESA	Environmental Site Agent
RE	Resident Engineer: - Person representing the Engineer on site
ROD	Record of Decision

ii. DEFINITIONS

Alien Vegetation: Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations.

Construction Camp: Construction camp (site camp) refers to all storage and stockpile sites, site offices, container sites, workshops and testing facilities, and other areas required to undertake construction activities.

Emergency situation: An incident, which potentially has the ability to significantly impact on the environment, and which, could cause irreparable damage to sensitive environmental features. Typical situations amongst others are:

- Large spills of petroleum products and lubricants on site,
- Potential damage, erosion and slumping of unstable slopes,
- Indiscriminate dumping of construction waste on site, and
- Accessing exclusion zones.

Environmental Site Agent (ESA): An ESA is the site-based designated person responsible for implementing the environmental provisions of the Construction Contract and is appointed by the service provider that carries out construction activities. The ESA shall be the designated responsible person, for implementing any remedial measures as required from time to time and for any authorisations/licences that are required in terms of the service contract. The ESA shall record and communicate environmental issues (as they occur) to the Contractor and maintain records thereof. The ESA shall report concurrently to the contractor and the ECO.

Environmental Control Officer (ECO): A suitably qualified and experienced person or entity appointed for the Construction Works, to perform the obligations specified in the environmental authorisation. The

Environment: Environment means the surroundings within which humans exist and that could be made up of:-The land, water and atmosphere of the earth; Micro-organisms, plant and animal life; Any part or combination of (i) and (ii) and the interrelationships

among and between them; and The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Authorisation: A written statement from the relevant environmental authority, with or without conditions, that records its approval of a planned development proposal, and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

Environmental Impact: An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Environmental Impact Assessment: The process of examining the environmental effects of a proposed development. The assessment requires detailed/specialist studies of significant issues that have been identified during the environmental scoping.

Environmental Management Programme: An environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced.

Interested and Affected Party: Refers to an interested and affected party contemplated in section 24(4)(d) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and which in terms of that section includes – a) Any person, groups of persons, organization interested in or affected by an activity, and; b) Any organ of state that may have jurisdiction over any aspect of the activity.

Method Statement: A written submission by the Contractor in response to the Specification or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the IEC when requesting the Method Statement, in such detail that the ECO is enabled to assess whether the Contractor's proposal is in accordance with the EMP and associated specifications.

Mitigate: The implementation of practical measures to reduce the adverse impacts, or to enhance beneficial impacts of a particular action.

No-Go Area: Areas where construction activities are prohibited.

Pollution: According to the National Environmental Management Act, No. 107 of 1998, pollution can be defined as, "Any change in the environment caused by (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future"

Rehabilitation: To re-establish or restore to a healthy, sustainable capacity or state.

Site: The area in which construction is taking place.

Species of Special Concern: Those species listed in the Rare, Indeterminate, or Monitoring categories of the South African Red Data Books, and/or species listed in Globally Near Threatened, Nationally Threatened or Nationally Near Threatened categories (Barnes, 1998).

Topsoil: The top 100-150mm of soil and may include top material e.g. vegetation and leaf litter.

1. INTRODUCTION AND BACKGROUND

The Leachville x 2 development will consist of a range of housing options mainly aimed at providing housing units to beneficiaries qualifying for the government housing subsidy.

A **medium – high density** housing solution incorporating **Residential 3 and 4** stands is proposed for the development. A total of 810 residential units are proposed in the township to provide freehold ownership to qualifying beneficiaries. A variety of unit typologies will be built on these erven.

There is a large **open space area** that runs through the proposed township that will include wetland areas as well as areas that is not suitable for building as a result of geotechnical restraints.

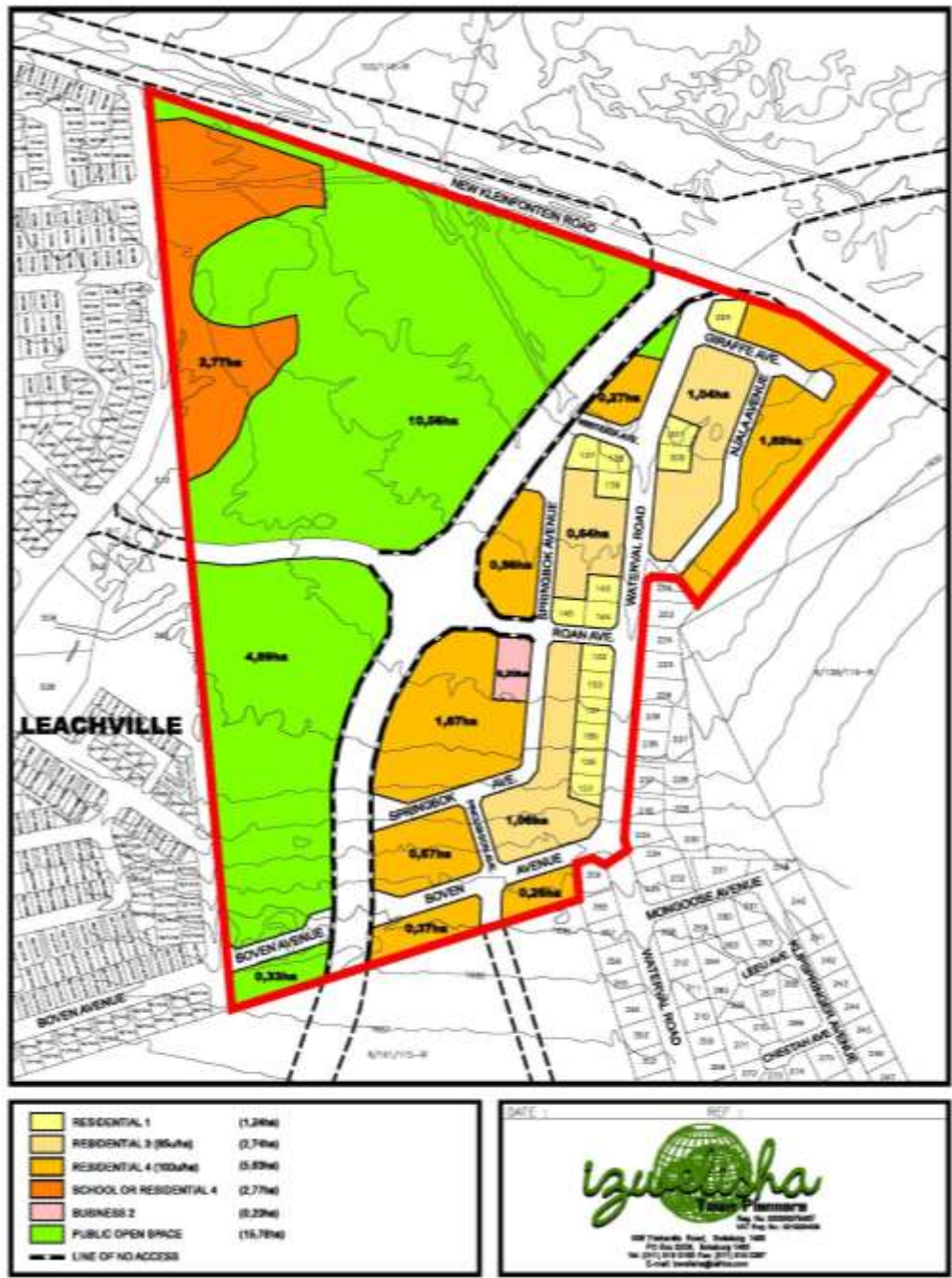


Figure 1: Site layout plan of the development

This document is the specific **Environmental Management Programme (EMPr)** for the proposed development of Leachville X 2 on portion 148 of the Farm Rietfontein 115-IR. Mitigation measures were proposed in the Basic Assessment Report to reduce the impact of this proposed development on the environment and these mitigation measures are included in this EMPr.

2. OBJECTIVES OF THE EMPr

This EMPr has been compiled to provide recommendations and guidelines according to which compliance monitoring can be done during the construction of the proposed township, as This EMPr informs all relevant parties [the Project Coordinator, the Contractor, the Environmental Control Officer (ECO) and all other staff Employed by the proponent at the site] as to their duties in the fulfilment of the legal requirements for the construction and operation of this proposed project, with particular reference to the prevention and mitigation of anticipated potential environmental impacts.

All parties should note that obligations imposed by the EMPr are legally binding in terms of the environmental authorisation granted by the relevant environmental permitting authority.

The objectives of an EMPr are to:

- Encourage good management practices through planning and commitment to environmental issues;
- Define how the management of the environment is reported and performance evaluated;
- Provide rational and practical environmental guidelines to: -Minimise disturbance of the natural environment; -Prevent or minimise all forms of pollution; -Protect indigenous flora and fauna; -Prevent soil erosion and facilitate revegetation of affected areas;
- Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment;
- Adopt the best practicable means available to prevent or minimise adverse environmental impacts.
- Develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of wastes;
- Describe all monitoring procedures required to identify impacts on the environment; and,
- Train employees and contractors with regard to environmental obligations.
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Identify measures that could optimize beneficial impacts;
- Create management structures that addresses the concerns and complaints of I&APs with regards to the development;
- Establish a method of monitoring and auditing environmental management practices during all phases of the activity;
- Specify time periods within which the measures contemplated in the final EMPr must be implemented, where appropriate.

3. IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS

The design team shall identify any likely impacts of the material, product or system selection during the design phase.

The contractor shall identify likely aspects before commencing with any construction activity. Examples of environmental aspects include:

- waste generation
- stormwater discharge
- emission of pollutants into the atmosphere
- chemical use operations
- energy use operations
- water use operations
- use of natural resources
- noise and dust generation

Thereafter the contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified and the activity planned so as to prevent any impact from happening. If prevention is not practicable, or in the event of mishap or misapplication, the contractor shall provide plans and measures for the Principal Agent's and ECO's approval, which will limit and contain the magnitude, duration and intensity of the impact. The contractor shall demonstrate that he is capable of carrying out any repair and reinstatement of the damaged environment. These requirements shall be concurrent with the time constraints to produce an approved construction programme according to the Principal Building Agreement.

Listed below are some environmental impacts that could adversely alter an aspect of the environment through usual construction activities:

- Pollution of atmosphere, soil or water
- Destruction or removal of fauna and flora and effect on biological diversity
- Destruction/pollution of the wetland
- Deformation of the landscape
- Soil erosion
- Destruction of historical/heritage sites
- Effect on the built environment
- Effect on wetlands

Examples of identified key environmental impacts that will primarily occur during the construction and operation phases are:

No	Impact Agent / Activity	Issue	Impact
Construction Phase			
1	Site Preparation (Clearing, grading, excavation, levelling, truck hauling)	Dust generation from construction activities. Noise creation. Impact vegetation cover. Natural organic debris. Domestic waste. Road traffic. Vehicle and equipment maintenance and storage.	Air quality deterioration and noise generation. Impact of biodiversity and habitat. Increased road traffic. Vehicle emissions. Waste can impact ecosystem.
2	Excavation, refilling, loading and transportation of materials. Operation of construction equipment and vehicles.	Dust generation from construction activities. Noise and vibration creation and generation. Air quality deterioration, ground and water pollution.	Air quality deterioration and noise generation. Disturbance to local households and wildlife species. Impact of biodiversity and habitat. Possible loss of productive topsoil. Domestic and construction waste will occur. Dust and debris created during transportation of materials.
3	Site office creation	Site clearing. Construction of new site office. Construction job creation. 'Boom-town' effect where demand for resources is increased eg food during construction.	Increased demand for building materials. Installation requirement for sanitation services. Noise and dust creation. Domestic waste. Change in area routine.
Operation Phase			
4	Daily office routines. Many daily visitors.	Road traffic. More people within the area.	Noise generation due to increased road traffic. Security improvement of area due to visual surveillance and restriction to open 'veld'. Increased vehicle emissions.
5	Site rehabilitation with indigenous planting.	Impact on biodiversity.	Changes to local species and introduction of new species.

4 LEGAL REQUIREMENTS

4.1 GENERAL

Construction will be according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The contractor should note that obligations imposed by the EMP are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail. **This contradiction must be discussed with the Principal Agent and ECO immediately so that the situation can be rectified to the satisfaction of all with the emphasis on protecting the environment.**

4.2 STATUTORY AND OTHER APPLICABLE LEGISLATION

The contractor is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

The contractor shall provide proof of compliance to environmental legal requirements such as licenses, permits etc.

5. MANAGEMENT ACCOUNTABILITY AND ENVIRONMENTAL CONTROL

5.1 ADMINISTRATION

Copies of the EMPr shall be kept at the site office and will be distributed to all senior contract personnel. All senior personnel shall be required to familiarize themselves with the contents of this document.

5.2 ROLES AND RESPONSIBILITIES

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different, but vital role to ensure sound environmental management during the construction phase.

5.3 APPLICANT AND PROJECT CO-ORDINATOR

The applicant remains ultimately responsible for ensuring that implementation of this EMPr complies with the relevant legislation, and that the development is implemented according to the requirements of the EMPr.

Although the applicant has appointed the Contractor to undertake the contract on a design and construct basis, the responsibility still remains with the applicant. The applicant must ensure that sufficient resources (time, financial, labour, equipment, etc.) are available to the other role players (e.g. the Environmental Control Officer (ECO), and contractor, to efficiently perform their tasks in terms of the EMPr. The applicant will be held responsible for restoring the environment in the event of negligence leading to damage to the environment.

- **The applicant must ensure that the EMPr is included in tender documentation** so that the contractor who is appointed is bound to the conditions of the EMPr.
- **The applicant must be familiar with the recommendations and mitigation measures** of this EMPr and implement these measures.
- Monitor the site activities on a daily basis for compliance.
- Conduct internal audits of the construction site against the EMPr.
- Confine the construction site to the demarcated area.
- **Rectify transgressions** through the implementation of corrective action.

5.4 CONTRACTOR

The contractor acts as the applicant's agent on site and is bound to the EMPr conditions through his/her contract with the developer. The contractor is responsible for ensuring that he/she adheres to all the conditions of the EMPr. The contractor must thoroughly familiarise him/herself with the EMPr requirements before coming onto site and must request clarification on any aspect of these documents, should they be unclear. The

contractor must ensure that he/she has provided sufficient budget for complying with all EMP conditions at the tender stage.

The contractor must comply with all orders (whether verbal or written) given by the ECO, project manager or site engineer in terms of the EMP.

5.5 ENVIRONMENTAL SITE AGENT

The Contractor shall appoint a nominated representative of the contractor as the Environmental Site Agent (ESA) for the contract. The ESA will be site-based and shall be the responsible person for implementing the environmental provisions of the construction contract.

There shall be an approved ESA on the site at all times. It may be necessary to have more than one ESA. The ESA's duties will include, *inter alia*, the following:

- Ensuring that all the environmental authorisations and permits required in terms of the applicable legislation have been obtained prior to construction commencing.
- Reviewing and approving construction method statements with input from the ECO and Engineer, where necessary, in order to ensure that the environmental specifications contained within the construction contract are adhered to.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Keeping accurate and detailed records of all activities on site.
- Keeping a register of complaints on site and recording community comments and issues and the actions taken in response to these complaints.
- Ensuring that the required actions are undertaken to mitigate the impacts resulting from non-compliance.
- Reporting all incidences of non-compliance to the ECO and Contractor.

The ESA must have:

- The ability to manage public communication and complaints.
- The ability to think holistically about the structure, functioning and performance of environmental systems, and
- The ESA must be fully conversant with the Environmental impact Report and Environmental Management Plan for the Project and all relevant environmental legislation.
- The ESA must have received professional training, including training in the skills necessary to be able to amicably and diplomatically deal with the public as outlined in bullet point one above.

The ECO shall be in the position to determine whether or not the ESO has adequately demonstrated his/her capabilities to carry out the tasks at hand and in a professional manner. The ECO shall therefore have the authority to instruct the contractor to replace the ECO if, in the ECO's opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the construction contract. Such instruction will be in writing and shall clearly set out the reasons why a replacement is required and within what timeframe.

5.6 ENVIRONMENTAL CONTROL OFFICER

The Environmental Control Officer (ECO) is the person involved with the development project and is responsible for the implementation of the environmental management programme. It may be different parties during the different phases of the project.

This person may be someone from the developer or appointed by the developer. The ECO must, however, be a person with adequate technical and environmental knowledge to understand and implement this management programme. The ECO may not be someone appointed by the contractor or the engineer. The ECO must report to the developer.

The ECO has the authority to stop works during construction if in his opinion there is a serious threat to, or impact on the environment caused directly from the construction operations. This authority is to be *limited to emergency situations* (see definitions) where consultation with the engineer or developer is not immediately available. In all such work stoppage situations the ECO is to inform the engineer and developer of the reasons for the stoppage as soon as possible.

Upon failure by the contractor or his employees to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the engineer to have the contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the contractor.

5.7 ENVIRONMENTAL AUDITS

The ECO will conduct **monthly** environmental monitoring audits during the construction period of the development to ensure that the contractor adheres to the requirements of the Environmental Management Programme. After the environmental audit, the ECO will provide the developer and contractor with a written report with a dated photographic record and the findings of the audit. The ECO shall also keep records of non-compliance and how this was rectified and include it in the monthly report. These audits will be available to GDARD on request.

5.8 ENVIRONMENTAL AWARENESS TRAINING FOR SITE PERSONNEL

All contractor teams involved in work on the development are to be briefed on their obligations towards environmental controls and methodologies in terms of this EMPr prior to work commencing. The briefing will usually take the form of an on-site talk and demonstration by the ECO. The education / awareness programme should be aimed at all levels of management within the contractor team. (See "Do's & Don'ts" summary sheet, Appendix D).

5.9 RECORD KEEPING

All records related to the implementation of this management programme (e.g. environmental site audits) must be kept together in an office where it is safe and can be retrieved easily. These records should be kept for two years and should at any time be available for scrutiny by any relevant authorities.

The EMPr shall be kept on site for easy reference at all times and shall be assessable to all the construction workers on site.

5.9.1 Method Statements

Method statements from the Contractor will be required for specific sensitive actions on request of the authorities or ECO. A method statement forms the base line information on which sensitive area work takes place and is a “live document” in that modifications are negotiated between the Contractor and ECO / Engineer, as circumstances unfold. All method statements will form part of the EMP documentation and are subject to all terms and conditions contained within the EMP main document.

A method statement describes the scope of the intended work in a step-by-step description in order for the ECO and Principal Agent to understand the Contractor's intentions. This will enable them to assist in devising any mitigation measures, which would minimise environmental impacts during these tasks. For each instance wherein it is requested that the Contractor submit a method statement to the satisfaction of the ECO, the format should clearly indicate the following:

- **What** - a brief description of the work to be undertaken;
- **How** - a detailed description of the process of work, methods and materials;
- **Where** - a description/sketch map of the locality of work (if applicable); and
- **When** - the sequencing of actions with due commencement dates and completion date estimates.

The Contractor must submit the method statement before any particular construction activity is due to start. Work may not commence until the method statement has been approved by the Principal Agent in consultation with the ECO (See Appendix A for a Method Statement sheet).

5.9.2 Photographs

It is recommended that photographs be taken of the site prior to, during and immediately after construction as a visual reference. These photographs should be stored with other records related to this EMP.

5.10 ENVIRONMENTAL COMPLETION STATEMENT

An Environmental Completion Statement is a report by the ECO to the relevant authorities stating completion of the project and compliance with the EMP and conditions. This statement replaces the final audit that is normally required for large development projects.

5.11 INSTITUTIONAL MATTERS

Penalties predetermined between the ECO and any other contractors working on the site will be enforced if a contractor does not comply with this EMP.

5.11.1 Non Compliance

According to Appendix 4 of GN R 982, an environmental management programme must include:

- A description of the impact management objectives, including management statements identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including –
 - Planning and design
 - Pre-construction activities
 - Construction activities
 - Rehabilitation of the environment after construction and where applicable post closure; and
 - Where relevant, operation activities
- A description and identification of impact management outcomes required for the aspects contemplated above
- A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated above will be achieved.

A copy of the EMPr must be kept on site at all times during the construction period. The EMPr will be binding on all contractors operating on the site and must be included within the Contractual Clauses.

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the ECO to impose a penalty.

In the event of on-compliance the following recommended process shall be followed:

- The ECO shall issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention.
- The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The Contractor shall provide the ECO with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions.
- In the case of the Contractor failing to remedy the situation within the predetermined time frame, the ECO shall impose a monetary penalty based on the conditions of contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the ECO shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMPr, disagreement regarding the implementation or method of implementation of conditions of the EMPr, etc. any party shall be entitled to require that the issue be referred to specialists for determination.
- The ECO shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

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

- There is evidence of contravention of the EMPr specifications within the boundaries of the construction site ,site extensions and roads;
- There is contravention of the EMPr specifications which relate to activities outside the boundaries of the construction site.
- Environmental damage ensues due to negligence;
- Construction activities take place outside the defined boundaries of the site; and/or the Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time period.

It is recommended that the engineers/contractors institute penalties for the following less serious violations and any other determined during the course of work as detailed below:

- Littering on site.
- Lighting of illegal fires on site.
- Persistent or un-repaired fuel and oil leaks.
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substance on site.
- Any vehicles being driven in excess of designated speed limits.
- Removal and/or damage to fauna, flora or cultural or heritage objects on site.
- Urination and defecation anywhere except at designated facilities.

5.11.1.1 Offences and penalties

Any avoidable non-compliance with the conditions of the EMP shall be considered sufficient ground for the imposition of a penalty.

Possible offences, which should result in the issuing of a contractual penalty, include, but are not limited to:

- Unauthorised entrance into no-go areas.
- Unauthorised damage to natural vegetation.
- Unauthorised camp establishment (including stockpiling, storage, etc.).
- Hydrocarbons / hazardous material: negligent spills / leaks and insufficient storage.
- Ablution facilities: non-use, insufficient facilities, insufficient maintenance.
- Late method statements or failure to submit method statements.
- Insufficient solid waste management (including clean-up of litter, unauthorised dumping, etc.).
- Erosion due to negligence / non-performance.
- Excessive cement / concrete spillage / contamination.
- Insufficient fire control and unauthorised fires.
- Preventable damage to water courses or pollution of water bodies; and
- Non-induction of staff.

5.11.1.2 Spot fines

The ECO shall be authorised to impose spot fines (to the value of R100) for any of the transgressions detailed below:

- Littering on site.
- Lighting of illegal fires on site.
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas.

- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances on site.
- Any vehicles being driven in excess of designated speed limits.
- Unauthorised removal and/or damage to fauna, flora or cultural or heritage objects on site.
- Urination and defecation anywhere other than using the toilet facilities that have been provided.

5.11.1.3 Penalty fines

Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the EMP, the **Contractor** shall be liable to pay a penalty fine. The ECO shall recommend to the Contractor the issuing of penalties for contravention of the EMP, Environmental Authorisation, Contract, or environmental legislation.

The following transgressions shall be penalised:

- Hazardous chemical/oil spill.
- Damage to sensitive environments.
- Damage to cultural and historical sites.
- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas.
- Uncontrolled/unmanaged erosion.
- Unauthorised blasting activities.
- Violation of environmental authorization conditions.

5.11.1.4 Verbal instructions

Verbal instructions are likely to be the most frequently used form of corrective action and are given in response to transgressions that are evident during routine site inspections by the ESA and/or ECO. Verbal instructions are also used to create further awareness amongst employees as often transgressions are a function of ignorance rather than vindictiveness. Workers must obey verbal instructions through formally recording the actions taken to resolve the matter so that the instruction could be successfully finalised and recorded. Maximum allowable response time: 2 working days.

5.11.1.5 Written instructions

Written instructions will be given following an audit. The written instructions will indicate the source or sources of the problems identified on site and propose solutions to those problems. The implementation of solutions will be assessed in a follow-up audit and further written instructions issued if required. Maximum allowable response time: 4 working days.

5.11.1.6 Conclusion

This Environmental Management Programme should be used as an on-site reference document during all phases (Planning & Construction) of this development, and auditing should take place in order to determine compliance with this EMP. Parties responsible for environmental degradation through irresponsible behaviour/negligence should receive penalties.

In order to have records of environmental and Health & Safety incidents and the handling thereof, it is recommended that *incident logs* be filled in by the Environmental Control

Officer (Annexure A and B). The applicant needs to be informed of such incidents and further actions need to be taken, should the need arise.

5.11.2 Environmental Emergency plan

The workshop area shall be monitored for oil and fuel spills and such spills shall be cleaned and remediated to the satisfaction of the ECO. Cleaning and remediation must be done with products that are in line with best environmental practice i.e. SunSorb.

The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site. The Contractor must ensure that senior and other relevant members of the workforce are trained in dealing with spills by using emergency spill kits.

The following shall apply:

- All contaminated soil / yard stone shall be removed and disposed of as hazardous waste at a registered facility or placed in containers to be taken to one central point where bio-remediation can be done (Bio-remediation should only be an option if an Environmental Authorisation has been issued).
- A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site. All spills of hazardous substances must be reported to the RE, ESA or ECO. The contractor must comply with the regulations of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).
- The Contractor shall keep the necessary materials and equipment to deal with spills / fire in the vicinity of the site and in an easily accessible place, should they occur.
- The Contractor shall set up a procedure for dealing with spills / fire, which will include notifying the ECO and/or RE and the relevant authorities prior to commencing with construction. These procedures must be developed with consultation and approval of the appointed ESA, ECO or RE as applicable.
- A record must be kept of all spills and the corrective action taken (See Appendix B for the Incident log sheet).

6. GENERAL SITE ISSUES

6.1 INTRODUCTION

The following section of the EMPr should be read with the construction and design specifications for the development. It focuses on the significant issues to be addressed and mitigated during the construction phase and specifies monitoring and auditing criteria for this phase.

A Basic Assessment (BA) was conducted for the proposed development of Leachville x 2. As part of the fulfilment of the requirements of the Environmental Authority, an Environmental Management Programme (EMPr) has to be prepared for the proposed development. The ROD will make the requirements binding and the conditions from the ROD will be included in this report.

6.2 PERSONNEL

- Working hours will be from 07h00-17h00 Monday to Friday and 07h00 – 13h00 Saturdays only.
- No work shall be undertaken on Sundays or public holidays.
- Where special circumstances require the contractor to work later hours, special arrangements must be made with adjacent landowners before such activities.
- **Warning signs must be placed on and around the site.**
- Gas cooking facilities shall be provided for the construction staff within the confines of the construction camp. No trees or other vegetation shall be permitted to be removed, especially for the making of fires.
- No fires shall be permitted, unless a specifically designated area has been identified and set aside by the Engineer for that purpose and firewood provided by the contractor.
- Where there is a particular fire hazard at any point in the construction works the contractor shall ensure that his employees are properly trained in the use of the appropriate firefighting equipment and that such equipment is on hand at all times.
- The contractor shall refrain from harming or clearing trees, timber and shrubs to any extent other than that indicated by the Engineer for the execution of the contract.
- The contractor shall take all measures necessary to prevent his staff from hunting, capturing or destroying animals and birds in the vicinity of the construction camp and local surroundings.
- The contractor shall take all necessary precautions against trespassing on adjoining properties and shall take care that all livestock, game or vegetation are not interfered with.
- The contractor shall comply with all safety regulations regarding the electricity supply and he shall take every precaution to ensure the safety of all the people on site where needed.
- The contractor shall ensure that as far as practical, suitable arrangements are made on the site for the maintenance of health, the prevention and overcoming of outbreaks of disease and of adequate first aid services.
- The contractor shall be responsible for his own security arrangements and shall comply with any security instructions, which the Engineer may issue from time to time.
- The contractor shall ensure that suitable safety regulations and precautions are established and brought to the attention of the personnel. Approved safety helmets and other protective clothing shall be worn at all times whilst on site.

- The contractor shall at his own cost provide for a constant supply of potable water for human consumption to the site offices and other domestic use on site. The contractor shall allow for chemical testing of water samples on a monthly basis.
- The contractor is responsible for the behaviour and discipline of all personnel while they are present on the site and shall exercise strict supervision over them at all times of the day and night.
- The contractor shall employ local labour as far as possible and establish a skills transfer scheme to train local labour.
- If possible, contractors should assist their labourers with transport to and from the site to reduce loitering in the area.
- Workers should be discouraged to venture into the neighbourhood, and the perimeter fencing will ensure that labourers do not overstep their boundaries.
- Labourers may not be allowed to sleep on site, except for the purposes of security of the building site.
- The contractor shall ensure that vendors are accommodated inside the site fencing and not on the pavement outside the site to reduce loitering and pollution in the area.

6.2.1 Personnel Education

- The contractor shall ensure that his personnel are educated and informed as to the requirements of this EMP.
- The contractor shall ensure that his personnel have a clear understanding of the Health and Occupational Safety aspects of the contract works.
- The contractor shall endeavour to ensure that his staff complies with this EMP's requirements for best practice as described. (See Do's and don't's in appendix D)

6.3 EXCLUSION ZONES AND GUIDELINES FOR ENVIRONMENTALLY SENSITIVE AREAS

The contractor will familiarise himself with the site and development layout and will ensure that all exclusion zones as identified in the Basic Assessment Report are demarcated and fenced before construction commence. All employees and subcontractors will be briefed in this regard and no access will be allowed into these exclusion areas without the written permission of the ECO.

Sensitive areas deemed to be exclusion zones or Environmentally Sensitive Areas include the following:

- Wetland areas on the site and in the surrounding area as well as the associated buffers.
- Geotechnical constraint zones
- **Both the above areas were included in the layout plan for the proposed Leachville X 2 as open space areas (Figure 1).**

In order to minimize adverse impacts to the sensitive areas during construction activities these sensitive areas shall not be entered or used for any purpose unless a written motivation has been submitted to the ECO by the responsible person and a written approval has been received from the ECO.

The Contractor shall exercise special care when working close to the Environmental Sensitive Areas in order to avoid physical disturbance or pollution of these areas. The ECO may instruct the responsible person to restrict the number of construction personnel and equipment operating near these areas.

The Contractor shall note the proximity to the site of any designated Environmental Sensitive Areas. He shall fence any sensitive areas as described under the exclusion zones above, if so instructed by the ECO due to non-compliance.

If any grave sites or archaeological artefacts are uncovered during clearing and grubbing on site, then all activities in that area will be stopped and SAHRA and a qualified archaeologist or palaeontologist will be contacted to determine the significance of the finds. No construction activities may continue in those areas until cleared by SAHRA.

7. ENVIRONMENTAL MANAGEMENT PROGRAMME – CONSTRUCTION PHASE

This section describes mitigation measures and is partly prescriptive, identifying specific people to undertake specific tasks, in order to ensure that impacts on the environment are minimised during the construction and operational phases.

7.1 SITE ESTABLISHMENT – CONSTRUCTION CAMP AND DEVELOPMENT SITES

- The location of the construction camp shall be established on a piece of land where the least disturbance will be caused. No indigenous vegetation shall be disturbed if at all possible without the permission of the ECO.
- All Exotic plants shall be removed from the site and indigenous trees shall be included in the landscaping of the site where possible.
- Access to the site shall be controlled at all times and no harvesting of resources shall be allowed on site.
- Clearing of areas for development shall be kept to the minimum. All siteworks required for the development will be confined to the footprint of the development areas.
- Noise reduction and dust suppression will be incorporated in all construction activities. Noise reduction techniques shall include the maintenance of the vehicles and plant used on site to an acceptable level to reduce engine noise (as well as emissions) and low frequency blasts when blasting is required. The following mitigation measures will be implemented during site establishment:

7.1.1 Dust suppression

- Dust dispersion from construction activities, unsurfaced roads, spoil dumps and other construction locations shall be limited and suppressed to the maximum extent practical. The liberation of dust into the surrounding environment shall be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents.
- Regular dust monitoring and reporting to be undertaken.
- Dust control must be implemented by wetting all bare surfaces with a water bowser.
- Water may not be taken from the wetland but must be sourced from a registered water source.
- Agreements with local authorities are required for the water source. No water may be extracted from streams in the vicinity of the site.
- The contractor must wet down all bare surfaces at least once per day and in windy, dry conditions, more than once where necessary.
- Care must be taken not to over-water the areas and cause erosion and structural damage to the soil.

- Topsoil stockpiles should be seeded with a grass mix to protect the soil from blowing away if the stockpile will not be used within 3 months.
- Other stockpiles and building material should be wetted down if they are prone to dust blowing off these items. Where spraying of water on stockpiles is not adequate for dust control, environmentally benign binding agents shall be used to limit wind-blown dust.
- Site traffic control on temporary haul roads to be implemented. The speed of construction vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.
- Construction roads shall be sprayed with water to limit dust generation by construction vehicles. Where spraying of water on roads is not adequate for dust control, environmentally benign binding agents shall be used to limit dust generation by construction vehicles.
- Construction vehicles to be covered when transporting construction materials from and to the site.

7.1.2 Temporary fencing around the construction camp

- Fencing shall be kept neat at all times, so as not to cause any unnecessary visual influence. The contractor shall be responsible for the maintenance of all fences.
- If temporary fencing is removed temporarily for the execution of work, the contractor shall reinstate it as soon as practicable.
- Breaches in the fencing must be repaired immediately.
- The purpose of the fenced areas is to control construction and personnel activities within the designated areas, and to contain construction camp activities.
- Fencing shall be established and maintained around sensitive area/exclusion zones until construction activities are finished.
- All exclusion areas are strictly out of bounds.
- No clearing or grubbing shall be allowed outside fenced areas to reduce the footprint of the development.
- When the construction phase is complete, the temporary fencing around the construction camp will be removed and the area rehabilitated as described in further sections.

7.1.3 Clearing and Grubbing

- Topsoil shall be cleared of woody vegetation and specifically exotic vegetation before ripping and removing.
- All alien plant material will be removed from the site and be disposed of at a permitted waste disposal facility.
- The topsoil is regarded as the top 100 mm of the soil profile irrespective of the fertility appearance.
- Topsoil is to be stripped when it is in a dry condition in order to prevent compaction.
- The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process.
- The topsoil is to be stripped and stockpiled at a suitable pre-selected site, away from any of the construction activities. This base will be used in the rehabilitation and decommissioning of the construction activities.
- Topsoil stripped from different zones shall be stockpiled separately and clearly identified as such. Under no circumstances shall topsoil obtained from different soil zones be mixed.
- Soil stockpiles shall not be higher than 2.5m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.

- No vehicles shall be allowed access onto the stockpiles after they have been placed.
- Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.
- The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This can include the use of erosion control fabric or grass seeding.
- Should archaeological finds of any nature including fossils, bones or remains of structures be found, the contractor will stop all construction activity in the area. The contractor will not move or remove anything from the area and will notify the ECO. The ECO will contact the South African Heritage Resources Agency (SAHRA) for further investigation and clarification.

7.1.4 Site Buildings

- All site buildings shall be founded on a platform, which will be compacted sub-soil or screed slab. The screed slab and compacted sub-soil will be removed from site on decommissioning of the structures.
- All buildings will be soundly built and will not pose a danger to personnel.
- All wet services to site buildings shall be checked with installation to ensure that no leakages occur that could impact on the wetland, watercourses and soils in the area.
- All structures are to be of a matt colour (same as the surrounding area) finish to mitigate the visual impact of the structures on the surrounding environment.

7.1.5 Initial Earthworks - Platform (If needed)

- The platform is to be established per the specifications of item 2 'Clearing and Grubbing' above.
- The construction platform for the construction camp, as well as the platform for the materials storage camp must be appropriately planned.
- Sumps must be provided for activities that would cause soil erosion and significant environmental damage (volatile substances, including oil and petroleum products.).
- Sedimentation ponds are to be provided to allow for the temporary detention of drainage water prior to discharge into a natural watercourse. Construction of the ponds shall take place prior to topsoil stripping or any other construction activity.

7.1.6 Initial Earthworks - Vehicle Park (If needed)

- All vehicles and plant will be allocated a dedicated parking bay area.
- No storage of plant and vehicles will be allowed outside of the designated area.
- All vehicles and plant shall be maintained to ensure that there are no oil or fuel leakages.
- All vehicles and plant shall be provided with effective mufflers and adhere to SABS noise reduction standards.

7.1.7 Initial Earthworks - Washing Bay

- A dedicated wash bay will be allocated for the washing of vehicles and plant.
- The wash bay must be upon a screed platform to prevent erosion and infiltration of the ground water.
- All run-off from the platform must be channelled into a sump and oil skimming tank system before it is released into a dedicated settling / sedimentation pond.
- Contaminants and oil must be recovered from the system at least once a week, and if necessitated more regularly.
- Contaminants must be stored in drums and removed from site to a permitted waste disposal site.

- All recovered oil must be stored in drums and collected by a ROSE Foundation agent for recycling.
- Effluent discharge from the settling ponds shall not exceed the Department of Water Affairs quality standards.
- The contractor shall provide and maintain bund walls around the wash bay within the site. Drainage from the wash bay platform will firstly be channelled into the skimming tank before being released by drain to the sedimentation pond.
- Where the drain passes through or across the bund wall the contractor shall provide a means of preventing flow so that in event of a leak or overflow from the skimming tanks all liquids can be contained by the bund walls.
- All water released from the settling ponds will be evenly dispersed through, and over grasslands to filter the silt-laden water.
- At least 90% grass cover of minimum height 150mm shall occupy the land down-slope of the discharge area.

7.1.8 Initial Earthworks - Service Area

- The contractor will provide sufficient bunding to prevent erosion and infiltration of the ground water by petroleum products.
- The slab must drain into the conservancy tank / skimming tank.
- The contractor shall provide bunded walls around the maintenance/ service area.
- Drainage from the service area will be channelled into a sump or oil-skimming tank, where it shall be treated to remove oil and/or fuel.
- Where the drain passes through or across the bund wall the contractor shall provide a means of preventing flow so that in the event of a leak or overflow from the skimming tank all liquids can be contained by the bund walls.
- Drainage from the wash bay platform will firstly be channelled into the skimming tank before being released by drain to the sedimentation pond.
- Soil contaminated by oil, fuel or chemical leakages shall be removed and disposed of at a permitted landfill site. To be collected by an appropriate recycle company for decontamination and recycling. Hlangane Recyclers may be contacted for contaminated soil collection on Tel: 011-315 6135 or Cell: 083 3809 998.
- The contractor shall educate workers on the appropriate methods for workshop maintenance and fuel points to prevent fuel and oil being washed out of containment areas.
- Contaminants and oil must be recovered from the system at least once a week, and if necessitated more regularly.
- Contaminants recovered must be stored in drums and removed from site to a permitted toxic waste disposal site.
- All recovered oil must be stored in drums and collected by a ROSE Foundation agent for recycling.
- Effluent discharge from the settling ponds shall not exceed the Department of Water Affairs quality standards.
- All spillage of oil onto concrete surfaces shall be controlled by the use of an approved absorbent material such as Ociansorb or Drizit.
- All old oil shall be retained for re-use by the supplier.
- All major servicing of plant and vehicles will be done off site, at the contractor's premises.

7.1.9 Grease Traps (If needed)

- The contractor shall provide grease and oil skimming tanks at all areas where oil spillage or collection will occur, i.e. workshops, oil storage, vehicle wash areas and fuel points.
- The contractor shall provide a method for oil recovery. Recovered oil shall be collected in drums for collection by a ROSE Foundation agent.

- The contractor will test effluent discharged from the oil skimming tanks. Effluent discharge must conform to DWA standards.

7.1.10 Storage areas

- Heavy vehicles delivering construction materials will only be allowed onto the site if they are maintained properly.
- The heavy vehicles shall be kept to a limited number and drive a maximum of 30km on site.
- Drivers of these delivery vehicles shall be educated on their environmental responsibility and made aware of conservation areas on site that are off bounds.
- All materials shall be stored in areas earmarked for storage or other construction activities in order to reduce the footprint of the construction activity.
- Oil, paint and chemicals that are kept in smaller containers must be kept in a locked room such as the site office with a sign-out register and records of quantities kept to ensure no losses occur.

7.1.10.1 Aggregate Storage

- Fine aggregate shall be stored on a compacted platform.
- The contractor will ensure (and implement steps if required - bunded walls) that no fine aggregate is washed from the storage area onto the rest of the site.
- Coarse aggregate will be stored as a minimum on a surface of compacted inert sub-base material.

7.1.10.2 Cement Silos / Storage

- Cement shall be delivered in sound and properly secured sacks or in approved bulk containers.
- Cement products in sacks shall be stored in an enclosed storage area. The storage facility and surrounding area shall be swept and cleaned regularly as required to ensure that cement products do not enter the surrounding environment.
- Bulk delivered cement products will be stored in approved cement silos.
- Air filters are to be monitored and cleaned and replaced on a regular basis.

7.1.11 Fuel Storage Areas

- The contractor shall provide and maintain bund walls around the fuel storage areas within the site. Such walls shall be of sufficient height to contain 110% of the capacity of the fuel storage facilities.
- Storage of fuel shall only be above the ground.
- All drainage from fuel storage areas shall be treated to remove oil and fuel.
- Where the drain passes through or across the bund wall the contractor shall supply the means of preventing flow so that in the event of a leak all spilt fuel and other liquids will be contained by the bund walls.

7.1.12 Storage of Explosives (If needed)

- The storage of explosives will be permitted under the following circumstances:
 1. Explosives are stored securely off site and brought in each working day as required. All explosives to be used up or returned to the off-site storage area.OR
 2. The contractor may establish a secure explosives and detonator magazine for the storage of explosives on site.

- The contractor shall submit a proposal as to the design and location of such a magazine to the RE before approval and representation is made to the relevant authorising and permitting authority.
- The contractor will be responsible for the safeguarding of such a magazine.

7.1.13 Batching Plant

- Concrete shall only be mixed in areas, which have been specifically demarcated for those purposes.
- All concrete spilt shall be promptly removed by the contractor to an approved disposal site.
- After mixing is complete all waste shall be removed from the batching area and disposed of at an approved disposal site.
- No storm water is permitted to flow through the batching site.
- All residue water from concrete batching plants or the surface run-off from them will be led to specially constructed collection ponds.
- Batching plant is to be enclosed by a bunded wall with dedicated divisions and compartments for the various types of materials.
- Air filters are to be monitored, cleaned and replaced on a regular basis.

7.1.14 Cement/Concrete Washing bay

- Concrete shall only be washed from vehicles or equipment in a designated area.
- This designated area can be a hole in the ground (or similar type of scenario) and when full, the hardened concrete must be taken out and disposed of at a landfill site.
- Water from this area must be allowed to settle all sediments/cement particles and only clean water is allowed to leave this designated area.
- Care must be taken to divert stormwater around this area to ensure that it does not flow through this area and become contaminated.

7.1.15 Paint brush washing area (also see 7.1.17)

- A designated area must be constructed to wash paint brushed, paint drums or other equipment covered in paint.
- The water from this area may not be allowed to enter any municipal or stormwater drains directly.
- The paint must be allowed to settle in a settling pond, dry out and be taken to a designated landfill site.
- Any water from this area must be clean and without paint particles (A filter between the municipal system and the settling area will help with this)

7.1.16 Site Roads and Access Roads

- No new permanent site roads other than as detailed by the RE and ECO as agreed upon in terms of the site layout plan shall be developed by the contractor.
- Topsoil shall be removed as described under 'Clearing and Grubbing' prior to the construction of the road.
- All temporary site roads shall be approved by the RE and ECO and where possible kept on existing roads that are already disturbed.
- All temporary site roads shall be decommissioned by the contractor and rehabilitated using the stockpiled topsoil.
- During construction the contractor shall protect all areas susceptible to erosion by installing all necessary temporary and permanent drainage works as soon as possible.

- Any runnels or erosion channels developing during the construction period or during the operational and maintenance period shall be backfilled and consolidated immediately and the area restored to the proper condition. All erosion damage shall be repaired as soon as possible. Displaced topsoil shall be replaced.
- No waste or polluted soil or any material containing pollutants should be used for backfilling.
- All surface run-off shall be diverted at designated intervals and discharged down-slope. Down slope discharge will be protected by stone pitching until a point where the velocity of the runoff has been dissipated to such an extent that no erosion will occur.
- All stormwater control measures shall be implemented

7.1.17 Sumps / Sedimentation Ponds / Oil Skimming Tanks (If needed)

7.1.17.1 Sumps and Oil Skimming Tanks

- All high-risk areas, which have the potential for fuel, oil or chemical spills, shall be serviced by a sump system.

7.1.17.2 Sedimentation Ponds

- The purpose of the sedimentation ponds is the temporary detention of drainage water prior to discharge into the natural environment.
- Construction of the sedimentation ponds shall take place prior to topsoil stripping or any other construction activity upstream.
- The contractor shall construct, maintain and operate settlement ponds at each point where contaminated water is discharged from the site.
- The separation of oils, fuel and solvents must have taken place at the respective identified high-risk spill areas. All spills outside of these areas will require the speedy containment of the spill, and removal of the contaminated soil.
- The minimum amount of petroleum products will be allowed to pass in to the sedimentation ponds.
- Settlement ponds shall be sized by the contractor for approval by the Supervisory Engineer.
- The outflow from each of the settlement ponds shall be designed so as to prevent any floating oil from leaving the pond.
- Ponds shall be constructed with suitable materials and shall be watertight.
- Sedimentation ponds must be kept empty as long as possible.
- Natural surface flow of uncontaminated storm water across the site must be separated from the drainage channelled into the sedimentation ponds. This shall be achieved by instituting diversion berms and drains to deflect run-off from these structures.
- Sedimentation and settlement ponds shall be constructed and positioned to collect surface water run-off from spoil areas.
- The contractor shall remove sediment from the ponds when in the opinion of the Supervising Engineer; the effectiveness of the ponds are compromised through sediment build-up.
- Removed sediment will be disposed-off at an approved landfill site.
- Run-off and water released from the sedimentation ponds into the natural wetland environment shall meet DWA discharge licence requirements. Measures shall be implemented at these areas to ensure that no erosion takes place that could cause sedimentation into the wetland areas.
- An oil-skimming device shall be provided for the removal of any residual oil from the surface of the ponds.

7.1.18 Sanitation

- Adequate chemical latrines shall be provided for all staff at the construction camp and along the rest of the site where construction activities may take place.
- They shall be serviced once a week to prevent spillages.
- All latrine accommodation provided by the contractor shall be efficient, sanitary and non-offensive.
- All sanitary fees payable to any local authority shall be paid by the contractor.

7.1.19 Cooking Facilities

- The contractor will provide gas cooking facilities or a designated fireplace in the construction camp.
- No fires will be allowed outside the construction camp area and no gathering of firewood will be allowed.

7.1.20 Waste Management Procedures

The contractors must provide and maintain a method statement for “solid waste management”. The method statement must provide information on proposed licensed facilities to be utilized and details of proposed record keeping for auditing purposes.

During the construction phase, waste should be managed according to the following Waste Disposal Management Plan:

The following procedures must be adhered to, in order to control and manage builder’s wastes generated on the premises:

- Rubble material will be removed from the construction site frequently and disposed of a registered Landfill site.
- Sufficient containers will be available on the construction site to handle the amount of litter, wastes, rubbish, debris and builders wastes generated on site.
- These containers will be emptied frequently to avoid rodents, insects or any other organisms accumulating on the site and becoming a health hazard to adjacent properties.
- No waste will remain on the construction site for more than two (2) weeks.
- Material to be used as backfill during a later building phase will be covered with a layer of soil to prevent litter from flying away and unhygienic conditions developing on the rubbish dumps.
- Waste shall be separated into recyclable and non-recyclable waste, and shall be separated as follows:
 - Hazardous waste – including (but not limited to) old oil and paint;
 - General waste - including (but not limited to) construction rubble, reusable construction material.
 - Recyclable waste shall preferably be deposited in separate bins. The contractor is advised that “Collect-a-Can” collect tins, including paint and chemical tins, and “Consol” collect glass for recycling.
- Any illegal dumping of waste will not be tolerated, this action will result in a fine and if required further legal action will be taken. This aspect will be closely monitored and reported on.
- Proof of legal dumping must be able to be produced on request.
- Bins must be clearly marked for ease of management. All refuse bins must have a lid secured so that animals cannot gain access.
- Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, waste, rubbish, debris and builders waste generated on the site.

- Subcontractors must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved landfill site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMPR.
- Proof of this undertaking must be issued to the ECO. 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 ECO.
- Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site.

7.1.20.1 Construction/Hazardous Waste

- Temporary storage of construction spoil will be limited on the site, and within the designated areas.
- The contractor will be responsible to remove and transport all waste material off site to an approved landfill site.
- All hazardous wastes will be stored in sealed and suitably marked containers for removal to a hazardous waste landfill site by the contractor.
- Hazardous waste could include used oils and fluorescent light tubes.
- The contractor should refer to the relevant Department of Water Affairs guidelines for the classification of hazardous waste.

7.1.20.2 Domestic Waste

- No littering will be allowed on site.
- The contractor will conduct regular site cleanups to keep the site litter free.
- All domestic waste from the bins in the construction camp and that collected on site will be stored in a covered skip in the construction camp for removal to a municipal solid waste dumpsite by the contractor on a weekly basis.
- Domestic waste such as paper, glass, tins and plastic should be collected for recycling.

7.2 INSTALLATION OF EXTERNAL AND INTERNAL SERVICES – WATER, SEWAGE & UNDERGROUND ELECTRICITY

- All services shall be installed and take cognisance of the above EMPr schedule.

7.2.1 Earthworks

- All earthworks for the establishment of services are to be followed as per section 7.1.4 of SITE ESTABLISHMENT.

7.2.2 Drilling (If needed)

- The contractor shall comply with all legislation covering rock drilling in terms of worker health and safety.
- Drilling shall commence at specified times agreed to and approved by the Supervisory Engineer, in order to minimise the noise influence on the surrounding landowners.

7.2.3 Mucking and Trenching Operations (Infrastructure)

- Excavations and trenches shall be undertaken in a safe manner in compliance with the Occupational Health and Safety Act (Act 85 of 1993). Safety operations to be observed by the contractor shall include the sloping, stepping or benching or shoring, timbering or otherwise supporting the sides of the excavations or any other provision as stipulated in Regulation 13 of the afore mentioned act, with which the contractor declares himself to be conversant.
- Maintaining the sides of the excavations and trenches in a safe condition shall at all times be the sole responsibility of the contractor. No under-cutting of the sides will be allowed.
- Natural surface drainage shall be deflected around the trenches by the placement of berms and interception drains. All clean storm water shall be kept separate from water soiled from construction activities.
- Water and runoff collected in the trenches will be pumped out of the excavation and released through a sump system into one of the sedimentation ponds before being released into the natural environment.
- Trenched areas shall be fenced with diamond mesh fencing or netting and filled as soon as possible to ensure that no animals or people fall into the trenches and drown.
- Warning signage must be placed at these excavations warning people to stay clear.

7.2.4 Blasting

Blasting shall only be used in extreme cases if there are no other means of reaching prescribed depths for services. If possible, blasting will be kept to a minimum.

- All blasting shall be conducted in terms of the relevant South African safety regulations
- Where blasting will take place, neighbours should be notified of this at least 24 hours in advance of the blasting operations.
- Blasting shall be limited to a specific period of the day so as to minimise disturbance. This time schedule is to be determined and approved with the RE. It is recommended that blasting take place between 12h00 and 15h00.
- All surrounding communities shall be informed of the blasting time schedule.
- The blasting time period must be announced prior to blasting by siren.

- Where blasting is required every precaution shall be exercised to protect the works and people, animals and properties in the vicinity of the site.
- The contractor shall complete pre- and post-blast surveys in the vicinity of the site with the assistance of the RE.
- In his survey he will check for injured people, injured animals, damaged property and damaged vegetation identified earlier as being of conservation significance and will take note of fly rock that has exceeded the influence sphere.
- The contractor shall be responsible, and compensate for all injury and damage occasioned by any blasting operations.
- All workmen engaged on blasting at the site shall be experienced in this work and shall be familiar with any explosives regulations.
- The contractor shall take measures to limit fly rock. This may be achieved by matching the charge to the rock type, by using milli-second delay detonators or by using rubber blasting mats etc.
- No blasting shall be carried out until permission has been obtained in writing from the Engineer; who may prohibit the use of explosives near pipelines, cables, roads and concrete already placed and who may restrict the size of charges.
- At all times blasting shall be carried out such that ground vibration, air blast and scatter are kept within such limits as to avoid damage to adjacent structures or concrete already placed at the works. Peak particle velocity may be restricted to 50 mm/sec or less at the discretion of the Engineer.
- Where there is a possibility of shattering rock, the Engineer may order the contractor to cease blasting and continue to excavate the rock without the use of explosives, by barring, breaking, wedging, line drilling or other approved methods.

7.2.5 Stock Piling

- All possible suitable materials excavated shall be used in the construction of the works.
- Suitable material shall be stockpiled on a sub-base platform, which has been cleared of topsoil as per above. The sub-soil will be compacted to accommodate the spoil stockpile.
- All spoil rock shall be removed from the site to a landfill site, to be negotiated by the contractor and approved by the Engineer, dumped, spread and levelled, all to the satisfaction of the Engineer.
- No spoil material shall be stockpiled in violation of any Statute or ordinance or to obstruct any watercourse or drainage channel.
- The top surface of all permanent spoil dumps shall be left smooth and even and side-slopes, where required, are to be stable for the material concerned. Adequate drainage to the top surface and side-slopes shall be provided to prevent future erosion.

7.2.6 Concrete Construction

- All cement and concrete batching shall take place within the designated batching plant area. Smaller sites for concrete/cement mixing must be done on platform areas, on plastic sheeting or within steel cement troughs.
- Concrete and cement products shall be transported to the construction site with due care. Any spills will be removed and stockpiled on the construction waste area to be removed from site to an approved landfill site.
- Temporary storage of construction spoil will be limited on the site, and within the designated areas.
- The contractor will be responsible to remove and transport all waste material off site to an approved landfill site.

7.2.7 Backfilling

- No waste or polluted soil or any material containing pollutants should be used for backfilling.
- All material remaining after backfilling has taken place will be removed from site to an approved landfill site or used for rehabilitation of the dumping areas / erosion channels situated on the site.

7.2.8 Topsoil Placement

- Topsoil shall be placed to a minimum depth of 100 mm over all areas that have been disturbed by the construction activity. This will include all areas where it has been stripped and stockpiled, access and site roads, platforms, storage platform areas, batching plant, and sedimentation ponds.
- Topsoil placement shall follow as soon as construction in an area is finished.
- All compacted areas shall be ripped parallel to the contours to a minimum depth of 300mm.
- All areas onto which topsoil is to be spread shall be graded to the approximate original landform with minimum slopes of 1:2,5 and shall be ripped prior to placement.
- Topsoil shall be placed in the same soil zone from which it had been stripped. If there is insufficient topsoil available for a particular soil zone, additional topsoil may be brought from other soil zones at the approval of the Supervisory Engineer.
- Where topsoil that has been stripped by the contractor is insufficient to provide the minimum depth, the contractor shall obtain suitable substitute material from other approved sources.
- No vehicles shall be permitted access onto the topsoil after it has been placed.
- After topsoil placement is complete, cleared and stockpiled vegetative material shall be spread over the topsoiled area.

7.2.9 Revegetation / Landscaping

- Indigenous plant species shall be used in the landscaping of the development as far as possible to enhance the biodiversity and the large indigenous trees conserved on site;
- Forage and host plants required by pollinator species in the area should also be used in landscaped areas.
- Flat and gently sloping areas shall be ripped in lines 300mm centre to centre and to a depth of at least 300mm parallel to the contours, and seeded.
- The contractor shall add fertilizers to the soil in the topsoil placement process. The application will be determined by the existing soil fertility.
- The contractor shall be solely responsible for the cost of replanting or re-seeding, outside formal landscape areas, where acceptable cover is not obtained.
- Rehabilitation – Indigenous seeding and grasses.

7.3 ACCESS AND SITE ROADS

7.3.1 Earthworks

- No new permanent access roads other than as detailed by the RE and ECO as agreed upon in terms of the site layout plan shall be developed by the contractor. Existing access roads will be used as far as possible.
- Topsoil shall be removed as described under 'Clearing and Grubbing' prior to the construction of the road.
- All temporary roads shall be decommissioned by the contractor and rehabilitated using the stockpiled topsoil.

- All cut and fill slopes are to be revegetated with plant species as per the general specifications for revegetation / landscaping.
- Areas of the access road requiring cut and fill will be contoured and sharp crests of cut and fill will be contoured and smoothed-off to an acceptable landscape form.

7.3.2 Storm water Management

- Storm water channels and berms shall be constructed to allow for easy vehicular crossing.
- During construction the contractor shall protect all areas susceptible to erosion by installing all necessary temporary and permanent drainage works as soon as possible.
- Any runnels or erosion channels developing during the construction period or during the operational and maintenance period shall be backfilled and consolidated immediately and the area restored to the proper condition. All erosion damage shall be repaired as soon as possible. Displaced topsoil shall be replaced.
- No waste or polluted soil or any material containing pollutants should be used for backfilling.
- All surface run-off shall be diverted diagonally across the road at 30-60m intervals and discharged down slope. Down-slope discharge will be protected by stone pitching until a point where the velocity of the run-off has been dissipated to such an extent that no erosion will occur.

7.3.3 Surfacing and Maintenance

- The road surface shall be constantly monitored. All surface cracking and perishing shall be reported to the Engineer immediately and repaired to prevent further degradation of the surface.
- The contractor shall be liable for all unnecessary and unreasonable damage caused by his equipment and/or transport to the permanent roads. The cost of repair and reinstatement of unnecessary and unreasonable damage to these roads will be deducted from moneys due to the contractor should the roads not be repaired.

7.3.4 Traffic Numbers

7.3.4.1 Plant (Machinery)

- Adequate and appropriate traffic warning signage will be placed along the route to be used by the construction vehicles.
- All plant will be maintained in perfect working condition to prevent accidental spillage of fuel and oil products.

7.3.4.2 Deliveries

- Adequate and appropriate traffic warning signage will be placed along the route to be used by the construction vehicles.
- All vehicles delivering materials to the site shall have said material covered by tarpaulins to prevent the delivery operations from producing dust in amounts damaging to property, or causing a nuisance to persons in the vicinity.
- Deliveries shall be scheduled for off-peak hour traffic time schedules. i.e. between 7am and 9am and again between 4pm and 6pm on weekdays.
- Construction vehicles must adhere to all road regulations and the safety of the public must be a priority during construction.
- Construction vehicles must adhere to a 40km/h maximum speed at all times.

- Any damage to the road surface around the access point must be repaired as soon as it occurs.
- No speeding may take place and public safety must be of utmost importance.

7.3.4.3 Spoils Removal

- All trucks and vehicles removing spoil from the site shall comply with national regulations and the load areas shall be covered by a tarpaulin to prevent rocks and spoil from falling out of the load onto the road surfaces, or causing a nuisance to persons in the vicinity.
- Adequate and appropriate traffic warning signage will be placed at the junction with public roads to be used by the construction vehicles.

8. ENVIRONMENTAL MANAGEMENT PROGRAMME – OPERATIONAL PHASE

This section describes mitigation measures and is partly prescriptive, identifying specific tasks, in order to ensure that impacts on the environment are minimised during the operational phase. These specific guidelines have to be adhered to by the landowners to ensure that the sensitive environment on site is protected from degradation and pollution.

8.1 BOUNDARY FENCING OF THE SITE

- The final type of fencing/walling around the property will be as specified in the ROD or EIA and must be negotiated with the ECO.
- The final type of fencing shall be environmentally friendly to allow for the maximum free movement of small fauna between the properties.

8.2 PRESERVATION OF THE WETLAND AREAS

- The wetland areas around and on the development site shall be cleaned of any domestic waste on a regular basis;
- Care shall be taken to reduce impacts from stormwater run-off into the wetland areas to reduce potential for erosion or pollution of the wetlands.

8.3 LANDSCAPING

- Indigenous plant species shall be used in the landscaping of the proposed development as far as possible to enhance the biodiversity and the large indigenous trees conserved on site;
- Forage and host plants required by pollinator species in the area should also be used in landscaped areas.

8.4 INSECTICIDES AND FERTILISERS

- All fertiliser shall be stored in plastic bags. Fertiliser mixtures used shall comply with the specification in Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No 36 of 1947).
- Biodegradable fertilisers shall be used on site and care shall be taken not to overdose plants that could kill sensitive fauna or flora or be leached into the wetland.
- The use of insecticides at the development site will be minimised to the absolute essential. All insecticides will be applied strictly as per the manufacturer's guidelines by trained operators or staff that is suitably equipped with protective clothing. Care will be taken not to spill undiluted insecticides on the site. Biodegradable, selective insecticides shall be used.
- **Excess insecticide will be disposed as per the manufacturer's instructions and it will not be flushed into the sewerage or drainage systems.**

APPENDIX A: METHOD STATEMENT SHEET

METHOD STATEMENT

CONTRACT: DATE:

WHAT WORK IS TO BE UNDERTAKEN (provide a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

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 details as possible, including annotated sketches and plans where possible):

DECLARATIONS FOR METHOD STATEMENT

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) 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 of the Engineer, and thus the SHE Coordinator, Construction Manager and ECO will audit my compliance with the contents of this Method Statement

(Signed)

(Print name)

Dated:

APPENDIX B: ENVIRONMENTAL INCIDENT LOG SHEET

ENVIRONMENTAL INCIDENT LOG SHEET

Date	Environmental Condition	Comments (Explanation for current condition and responsible parties)	Corrective Action Taken	Signature

APPENDIX C: COMPLAINTS RECORD SHEET

Complaint	Name and Contact details of person lodging complaint	Signature

APPENDIX D: ENVIRONMENTAL TRAINING

BASIC RULES OF CONDUCT

The following list represents the basic Do's and Don'ts towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid.

NOTE: **ALL new site personnel must** attend an environmental awareness presentation. Please inform your foreman or manager if you have not attended such a presentation or contact the ESA.

DO:

- USE THE TOILET FACILITIES PROVIDED – REPORT DIRTY OR FULL FACILITIES.
- CLEAR YOUR WORK AREAS OF LITTER AND BUILDING RUBBISH AT THE END OF EACH DAY – use the waste bins provided and ensure that litter will not blow away.
- REPORT ALL FUEL OR OIL SPILLS IMMEDIATELY & STOP THE SPILL CONTINUING.
- DISPOSE OF CIGARETTES AND MATCHES CAREFULLY. (Littering is an offence.)
- CONFINE WORK AND STORAGE OF EQUIPMENT TO WITHIN THE IMMEDIATE WORK AREA.
- USE ALL SAFETY EQUIPMENT AND COMPLY WITH ALL SAFETY PROCEDURES.
- PREVENT CONTAMINATION OR POLLUTION OF STREAMS AND WATER CHANNELS.
- ENSURE A WORKING FIRE EXTINGUISHER IS IMMEDIATELY AT HAND IF ANY “HOT WORK” IS UNDERTAKEN e.g. Welding, grinding, gas cutting etc.
- REPORT ANY INJURY OF AN ANIMAL.
- DRIVE ON DESIGNATED ROUTES ONLY.
- PREVENT EXCESSIVE DUST AND NOISE.

DO NOT:

- REMOVE OR DAMAGE VEGETATION WITHOUT DIRECT INSTRUCTION.
- MAKE ANY FIRES.
- INJURE, TRAP, FEED OR HARM ANY ANIMALS – this includes birds, frogs, snakes, lizards etc.
- ENTER ANY FENCED OFF OR MARKED AREA.
- ALLOW CEMENT OR CEMENT BAGS TO BLOW AROUND.
- SPEED OR DRIVE RECKLESSLY.
- ALLOW WASTE, LITTER, OILS OR FOREIGN MATERIALS INTO THE STREAM.
- SWIM IN THE DAM.
- LITTER OR LEAVE FOOD LAYING AROUND.

Notes:

1. Should any animals such as tortoises, chameleons or snakes be encountered then do not harm them. The ESSO or RE should be contacted to remove these safely. The harming of any animal will result in disciplinary action.
2. Construction and heavy machine operators must be particularly sensitive to staying within access routes and prevention of unnecessary damage. Dust and noise is also of particular concern. Ensure that vehicles and machinery do not leak fuel or oils. Refuelling or maintenance must be done within the maintenance camp area only.
3. Alien plant clearing and control work teams must be closely supervised.