DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (D/EMPr)
EMADONGENI MUD TRACK UPGRADE

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REVIEW OF THE DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

This Draft Environmental Management Programme is available for a commenting period of 30 days (excluding Public Holidays) from 12 July 2017 until 14 August 2017. A copy of the Draft Environmental Management Programme is available upon request from Hanslab (PTY) Ltd.

The report is also available for viewing on the Hanslab website: www.hanslab.co.za

Please send your comments and queries before 14 August 2017 to:

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<th>Definition</th>
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<tr>
<td>BAR</td>
<td>Basic Assessment Report</td>
</tr>
<tr>
<td>CO</td>
<td>Contractor</td>
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<td>DOT</td>
<td>Department of Transport</td>
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<td>DWS</td>
<td>Department of Water and Sanitation</td>
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<td>EA</td>
<td>Environmental Authorization</td>
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<td>EAP</td>
<td>Environmental Assessment Practitioner</td>
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<td>ECO</td>
<td>Environmental Control Officer</td>
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<td>EO</td>
<td>Environmental Officer</td>
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<tr>
<td>ER</td>
<td>Engineers Representative</td>
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<tr>
<td>DEDTEA</td>
<td>Department of Economic Development, Tourism and Environmental Affairs</td>
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<td>DEAT</td>
<td>Department of Environmental Affairs and Tourism</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<tr>
<td>EA</td>
<td>Environmental Authorization</td>
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<td>EMPr</td>
<td>Environmental Management Programme</td>
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<td>GNR</td>
<td>Government Notice Regulation</td>
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<tr>
<td>I&amp;AP’s</td>
<td>Interested and Affected Parties</td>
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<td>IEM</td>
<td>Integrated Environmental Management</td>
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<td>NEMA</td>
<td>National Environmental Management Act</td>
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<td>NWA</td>
<td>National Water Act</td>
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<td>RE</td>
<td>Resident Engineer</td>
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## Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td>Applicant</td>
<td>Any person who applies for an Authorisation to undertake an activity or to cause such activity to be undertaken as contemplated in sections 24(5), 24M and 44 of the National Environmental Management Act, 19998 (Act No. 107 of 1998).</td>
</tr>
<tr>
<td>Auditing</td>
<td>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.</td>
</tr>
<tr>
<td>Conservation</td>
<td>Protecting, using and saving resources wisely, especially the biodiversity found in an area.</td>
</tr>
<tr>
<td>Construction Camp</td>
<td>The areas used for on-site staff offices (for engineers and contractors etc.). As well as to store materials, plant, equipment and ablution facilities (the location of which is to be agreed to by the developer and ECO). At these offices, administrative duties will be performed.</td>
</tr>
<tr>
<td>Ecology</td>
<td>The study of the interrelationships between organisms and their environments.</td>
</tr>
<tr>
<td>Environment</td>
<td>The surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Environmental Impact Assessment</td>
<td>Systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&amp;EIR.</td>
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<td>Environmental Management Programme</td>
<td>A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.</td>
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<tr>
<td>Integrated Environmental Management (IEM)</td>
<td>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 &quot;IEM&quot;.</td>
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| Mitigation                                | Measures designed to avoid, reduce or remedy adverse impacts.  

The main purpose of an Environmental Management Programme (EMPr) is to prevent avoidable damage and/or minimise or mitigate unavoidable environmental damage associated with any planning construction & maintenance work where there is a risk of environmental damage.

It is imperative that the remedial and mitigation requirements identified during the Basic Assessment Process are effectively addressed during the project life cycle. This EMPr plays a key role in the implementation of continued environmental management and aims to:

➢ Identify project activities that could cause environmental damage (risks) and provides a summary of actions required;
➢ Identify persons responsible for ensuring compliance with the EMPr.
➢ Provide standard procedures to avoid, minimise and mitigate the identified negative environmental impacts and to enhance the positive impact of the project on the environment;
➢ Form a written record of procedures, responsibilities, requirements and rules for contractor/s, their staff and any other person who must comply with the EMPr;
➢ Provide a monitoring and auditing programme to track and record compliance and identify and respond to any potential or actual negative environmental impacts.
1.1 INTRODUCTION

The compilation of this document is in accordance with the Integrated Environmental Management (IEM) philosophy. The objective of the Environmental Management (IEM) philosophy is to attain a suitable 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 could potentially have a significant impact on the environment. IEM recommends a methodology for ensuring that environmental management principles are completely integrated throughout all the stages in the development process. IEM advocates the use of numerous environmental management tools that are suitable for the various levels of decision-making.

1.2 SCOPE

The general principles contained within this document apply to the pre-construction, construction, post-construction & operational phases during the project life cycle.

1.2.1 PRINCIPLES OF EMPr

This EMPr is compiled using the following concepts and implementation requirements in keeping with the principles of sustainable development:

➢ Continuous improvement: The project proponent, or implementing organisation, must commit to review and to continually improve environmental management, with the objective of improving overall environmental performance.

➢ Broad level of commitment: A broad level of commitment is required from all levels of management as well as the workforce in order for the development and implementation of this EMPr to be successful and effective.

➢ Flexible and responsive: The implementation of the EMPr must respond to new and changing circumstances, i.e. rapid short-term responses to problems or incidents. The EMPr is a dynamic “living” document and thus regular planned review and revision of the EMPr must be carried out.

➢ Integration across operations: This EMPr must integrate across existing line functions and operational units such as health, safety and environmental departments in a company / project.
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 PROJECT DESCRIPTION AND PROPOSED ACTIVITIES

- **PROJECT DESCRIPTION**

The KZN Department of Transport (DOT) proposes to upgrade the existing Emadongeni mud track to a type 7A gravel road and associated stormwater structures. The development area is situated near Kleinfontein, approximately 27km north-west of Ladysmith. The upgraded road will be approximately **3.1km in length**, **6m wide** and have a **20m road reserve** which conforms to DOT standards for a local road upgrade. The primary aim of the proposed road upgrade is to improve access to surrounding households while reducing erosion and surface run off. Stormwater measures currently in place are ineffective. The mud track crosses over several watercourses. At the major watercourse, there is an existing pipe culvert structure in place. However, this is severely blocked and requires an upgrade for the ease of water flow. The proposed project will also entail the construction of a causeway structure (portal culvert structure) at the major watercourse and 600mm pipe culverts will be installed at the minor watercourse to allow for the natural flow of water within the channel.
MAP 1: SHOWING AERIAL MAP OF PROPOSED ROUTE – EMADONGENI MUD TRACK
MAP 2: SHOWING LOCALITY MAP
**PROPOSED CONSTRUCTION ACTIVITIES**

The proposed Emadongeni mud track upgrade will envisage the construction of a causeway structure at the major water crossing and pipe culverts at the minor water crossings to allow for the natural flow of water. Based on DOT standard details for a portal causeway the approximate width is 8.45 m and length is 7.4 m which varies according to the stream width. The physical footprint of the structure is > 100 m². The causeway structure will be supported on pad foundation founded on bedrock. Pipe Culvert Structures will be installed at the minor drainage line/channel along the upgraded route. The physical footprint of the structure is < 50 m² in size.
1.2.3 PROJECT PHASES (CONSTRUCTION & OPERATIONAL)

The project will take place in two phases, namely the Construction and Operational Phase. The Construction Phase encompasses the construction related activities on site, until the contractor leaves the site. The Operational Phase encompasses all activities, including the operation and maintenance of the proposed Emadongeni mud track upgrade.

1.2.3.1 Details of the Construction Phase

a) General

Majority of impacts that occur during this phase will have an immediate effect, some of which include: erosion, noise, dust, including the risk of water pollution. If the development site is monitored continuously during this phase it will be possible to identify the impacts as they occur, therefore minimizing the effects. These impacts will then be mitigated through contingency plans identified in the planning phase, together with a commitment to sound environmental management from the Developer/Contractor. 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 construction Site Development Plan must be approved by the appointed Environmental Control Officer (ECO) as provided for within this Environmental Management Programme (EMPr).

The Contractor will be responsible for the management and removal of all solid waste from site during the construction phase, to a designated registered landfill site. A method statement for the management of waste must be drafted and signed off by the ECO prior to commencement of construction activities.

Design, construction, and maintenance will be in accordance with all applicable South African standards, guidelines, and legislation, as well as certain international specifications.

1.2.3.2 Details of the Operational Phase

By ensuring activity measures are employed during the planning and construction phases, potential environmental impacts that would predominantly occur during this phase will be minimized. By minimizing the risk, monitoring efforts will simultaneously be reduced.
1.3 ROLES & RESPONSIBILITIES OF THE PROJECT TEAM

The key to achieving the effective application of the EMPr is the cooperation amongst all the role players involved in the project. To accomplish this all the role players must fully comprehend their roles and responsibilities in the proposed project, as well as act in a professional manner, form respectful and transparent relationships, and maintain open lines of communication.

1.3.1 Pre-Construction and Construction Phase

The potential role players or project teams will include:

- Project proponent (Applicant),
- The construction Project Manager (PM),
- Environmental Control Officer (ECO),
- The Contractor (CO), Environmental Site Officer (ESO),
- Engineering Representative (ER)
- Resident Engineer (RE)

a) Project Proponent (Applicant)

The implementation of the EMPr during the construction and operational phases is the responsibility of the project proponent. The project proponent must appoint a contractor who will be responsible for the construction contract, including the co-ordination and implementation of the EMPr on site during the construction phase.

In terms of this EMPr, the project proponent is required to:

- Designate a Construction Project Manager to take day to day responsibility for the implementation of the development, and in particular this EMPr, on behalf of the company.
- Ensure that the proposed principal contractor has the necessary competencies and resources to carry out the work.
- Provide the principal contractor with the Construction EMPr as well as any other relevant sections of the EMPr document, when requesting the contractor to budget for the proposed work.
- Ensure that the potential contractor has made provision for the cost of implementing the EMPr.
- Ensure that the Construction EMPr in its entirety is implemented by the Contractor and any Sub-Contractors.
➢ Appoint an independent Environmental Control Officer (ECO) to monitor the implementation of the EMPr during construction.
➢ Ensure the manager appointed for the operational phase has the necessary competencies and resources to implement the EMPr.

b) Construction Project Manager (PM)

Department of Transport must designate a Construction Project Manager to take day to day responsibility for implementation of the project including this EMPr and to ensure that all parties fulfil their obligations in terms of this EMPr. The Construction Project Manager is responsible for ensuring that an ECO is employed, and accepts responsibility for the duration of the project before any on-site work may begin.

The construction project manager:
➢ Represents and acts on behalf of Department of Transport regarding the administration of contracts;
➢ In consultation with the Planning Engineer, determines the scope of work;
➢ Provide scheduling, aspects of co-ordination and estimating;
➢ Ensure implementation of the project plan within cost, time, and quality constraints;
➢ Ensure that implementation of EMPr is executed as planned; and
➢ Keep the asset owner informed of progress made during the life cycle of the project.

c) Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) must be appointed by the Project Proponent (applicant) prior to commencement of operations. The ECO must monitor, audit and record compliance with the EMPr by all parties on site. The ECO must upon appointment draw up a detailed EMPr Audit Checklist, which must be completed at site establishment and at each monthly site visit, and keep ad hoc records of any and all incidents or events on site with significant environmental impacts. Significant impacts must be recorded photographically with enough supporting information to locate the image on the site. All records must be dated and accurately catalogued. As the ECO will not be on site on a full-time basis, the ECO will work closely with the Contractor/Site Supervisor/Environmental Health and Safety Officer. The ECO shall also draw up a quick daily checklist that will be of assistance to the Contractor in ensuring that key elements of the EMPr are effectively implemented on a day to day basis. The ECO must immediately communicate any significant contraventions of this EMPr, or undesirable environmental impacts to the Construction Project Manager. The ECO has the authority to recommend the stopping of works or any portion of construction related activity to the Project Proponent if in his/her opinion:
➢ Any activity is in contravention of the requirements of this EMPr;
➢ Any activity is in contravention of relevant environmental legislation/permits/authorisations applicable to the site and/or activity/ies, or;
➢ The activity has caused or will imminently cause significant damage and/or harm to the environment.

If urgent action is required to prevent environmental damage as a result of contravention of the requirements of this EMPr, the ECO has the authority to issue a written instruction to the Contractor, or any person on site to stop works or any portion of construction related activity required to prevent such damage. The ECO may recommend to the Project Proponent and Contractor that any employee(s) consistently not adhering to the requirements of this EMPr be removed from the site. Alternatively, the ECO may recommend that all work on site be suspended until the matter is remedied.

d) The Contractor (CO)

The Contractor (CO) will be appointed by the Project Proponent (client) who will ensure that the Contractor is aware of his obligations in terms of this EMPr during the contract negotiation phase. The Contractor’s obligations in terms of this EMPr are as follows:

➢ The Contractor shall take full responsibility for protecting the natural environment and eliminating or minimizing the negative impacts of construction on the environment during construction. The Contractor shall prevent or limit the occurrence of accidents which may cause damage to the environment, prevent or limit the consequences of such accidents.
➢ The Contractor will assume full responsibility for the on-site actions of all of its sub-contractors, employees, suppliers and agents.
➢ The Contractor will fully adhere to the conditions of this EMPr and ensure that all sub-contractors, employees, suppliers and agents are fully aware of this EMPr, its requirements and the consequences of any breach of the requirements of this EMPr.
➢ The Contractor will complete a rapid daily environmental checklist provided to him by the ECO to monitor and aid in the effective implementation of the EMPr.
➢ The Contractor will report any deviation from the requirements of this EMPr and any pollution or environmental contaminant spill events to the Construction Project Manager and the ECO. An environmental incidence record will be completed in this event.
➢ The Contractor agrees to work stoppage and/or payment of penalties as required by this EMPr and directed by the Project Proponent.
➢ The Contractors agrees to bear full costs for any work stoppage resulting from contravention of the requirements of this EMP and/or the full costs of remedying environmental damage resulting from their or their sub-contractors or employee’s contravention of the requirements of this EMP.

➢ The requirements of this EMP apply to all areas under the Contractor’s control, including but not limited to the working area, the construction camp and offices, all access/haul routes.

➢ Ensure that all employees under his or her control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures before any work commences and thereafter at such times as may be determined by the risk assessment.

➢ Prohibit any employee or person to enter any site unless he or she has undergone health and safety induction training pertaining to the hazards on this site.

➢ Hold toolbox talks on at least a weekly basis. A toolbox talk is a five- to ten-minute session with workers just prior to starting work for the day, which emphasizes and reinforces a safety-conscious attitude. Toolbox talks also give workers and the supervisor a chance to talk about safety problems likely to be encountered, as well as potential solutions to those problems.

➢ Issue a “Stop Work” order when conditions arise that pose an imminent danger to personnel, environment or equipment.

➢ Should the Contractor not be on site on a full-time basis, he/she must appoint a suitably qualified individual (Site Supervisor and/or Environmental Health and Safety Officer) to represent him on site and fulfil the above responsibilities in his absence.

e) Environmental Site Officer (ESO)

The Environmental Site Officer (ESO) will act as a guide and advisor to employees and contractors on environmental issues associated with the construction and operational phase. This will be achieved by ongoing inspections/auditing operations, identification of problem areas and provision of action plans to ensure environmental protection.

The ESO will ensure compliance to the requirements of the EMP by all parties as well as any other requirements related to environmental issues as they become known. Specific responsibilities of the ESO will be as follows:

➢ To thoroughly familiarize him/herself with existing information regarding operations that are to take place and the EMP.

➢ Ensure protection of the environment.

➢ Perform all of the day-to-day tasks necessary to monitor performance with regard to the requirements of the EMP and any other relevant requirements and/or commitments.
➢ Monitor the impact of operations on the environment with particular emphasis on areas of environmental sensitivity.
➢ To liaise with the contractor and site engineer in the case of incidents, non-compliance or any matter where the course of action is unclear.

f) Engineers representative (ER)/Resident Engineer (RE)

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.

1.4 ENFORCEMENT, MONITORING AND AUDITING

➢ The ECO must oversee the implementation of the EMPr.
➢ The ECO and the full time ESO must conduct, at a frequency as determined by the KZN DEDTEA and stipulated in the relevant EA for the project, independent environmental audits. The audits are to verify the projects compliance with the EMPr and conditions of the EA. Before any construction activities commence, the ECO must compile, for the approval by the Department, an audit checklist based on the contents of this EMPr and conditions of the EA. The ECO must at the request of the Department forward audit reports to the Department at a frequency determined by the Department which must be stipulated in the EA.
➢ Evidence of the following as key performance indicators must be included in the audit reports where required:
   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.
   5. A copy of all ESO monitoring reports, and contractor method statements must be held by the ESO and/or the ESO on site and be made available to the Department and or the ECO upon request.
1.5 GENERAL GUIDELINES

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

➢ The prevention of any site degradation due to non-compliance, administrative or financial problems, and inactivity during the construction phase, illegal activities, delays caused by archaeological findings, 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.

➢ 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 the contract including this EMPr.

➢ Proper planning of the construction process must be undertaken to allow for disruptions due to rain and very wet conditions.

➢ Where existing private roads to be utilised as access are in a bad state of repair, such roads’ condition must be well documented, including photographs, before they are used for construction purposes. If necessary, some repairs must be done to prevent damage to equipment.

➢ 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 1.6 below).

➢ An ESO, on behalf of the Contractor, is to be appointed to implement this EMPr.

➢ Environmental Audits are to be carried out during and upon completion of construction.
1.6 AWARENESS TRAINING

The ECO is to conduct an environmental awareness training programme prior to construction with the entire project team. Refresher courses must be conducted as and when required. The ESO must ensure daily toolbox talks which 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 handouts must be produced to create awareness throughout the site, as and when necessary.

1.7 REPORTING PROCEDURES

1.7.1 DOCUMENTATION

The following documentation must be kept on site during construction:

- An Environmental File which includes:
  - EMPr;
  - Environmental Authorization;
  - Licenses/permits related to any other legislation;
  - Specialist rehabilitation plans;
  - Storm Water Management Plan;
  - Flood Assessment Plan;
  - Environmental Method statements compiled by the Contractor;
  - Site Layout Plan;
  - Photos (Before, during and after construction);
  - Letter of appointment of ECO;
  - Written Notice of Commencement of construction;
  - Non-conformance Reports;
  - Environmental register, which must include the following, but not limited to such:
    - Monitoring Results – including environmental monitoring reports, register of audits, Non-Conformance Reports (NCR); and
    - Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record.
    - Safe disposal certificate for all types of waste disposed off-site;
    - Environmental training records;
    - Waste disposal receipts from a registered landfill site;
• Material Safety Data Sheets for all hazardous substances;
• Method Statements; and
• Notification of Emergencies and Incidents

1.7.2 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 ECO 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 ECO and/or Engineer. The Method Statements contain the appropriate detail such that the ECO 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 ECO and Engineer to formalize 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 ECO and Engineer on the understanding that such changes are environmentally acceptable and in line with the requirements of this EMP.

It is a statutory requirement to ensure the wellbeing of employees and the environment. To allow the mitigation measures in this document to be implemented, task-specific method statements should be developed for each set of tasks. A Method Statement details how and when a process will be carried out, detailing possible dangers/risks, and the methods of control required.

➢ Type of construction activity;
➢ Timing and location of the activity;
➢ Construction procedures;
➢ Materials and equipment to be used;
➢ Transportation of the equipment to/from site;
➢ How equipment/material will be moved while on site;
➢ Location and extent of construction site office and storage areas;
➢ Identification of impacts that might result from the construction activity;
➢ Methodology and/or specifications for impact prevention/containment;
➢ Methodology for environmental monitoring;
➢ Emergency/disaster incident and reaction procedures (required to be demonstrated); and
➢ Rehabilitation procedures and continued maintenance of the impacted environment.

The Contractor will be accountable for all actions taken in non-compliance of the approved Method Statements. As a minimum, the following Method Statements are required to be generated:
➢ Bunding;
➢ Blasting;
➢ Construction site and office/yard establishment;
➢ Cement mixing / concrete batching/bentonite mixing;
➢ Contaminated water;
➢ Dust management;
➢ Environmental awareness course(s);
➢ Environmental monitoring;
➢ Erosion control;
➢ Fire, hazardous and/or poisonous substances including their storage;
➢ Personnel, public and animal safety;
➢ Rehabilitation of modified environment(s);
➢ Solid and liquid waste management;
➢ Sources of materials (including MSDSs);
➢ Top-soil management;
➢ Storm water Management.

1.7.3. PUBLIC COMPLAINTS REGISTER
➢ Contain environmental complaints and correspondence received from the public to the Contractor;
➢ Nature of complaint;
➢ Cause of complaint;
➢ Party/parties in responsible for complaint;
➢ Immediate actions undertaken to stop/reduce/contain the causes of the complaint;
➢ Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint;
➢ Timeframes and the parties responsible for the implementation of the corrective or remedial actions.
1.7.4 ENVIRONMENTAL INCIDENTS REGISTER

➢ Nature of incident;
➢ Causes of incident;
➢ Party/parties responsible for causing incident;
➢ Immediate actions undertaken to stop/reduce/contain the causes of the incident;
➢ Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the incident;
➢ Timeframes and the parties responsible for the implementation of the corrective or remedial actions;
➢ Copies of all correspondence received regarding incidents.
➢ The Contractor will ensure that the following information is recorded for all complaints/incidents:
➢ Nature of complaint/incident;
➢ Causes of complaint/incident;
➢ Party/parties responsible for causing complaint/incident;
➢ Immediate actions undertaken to stop/reduce/contain the causes of the complaint/incident;
➢ Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint/incident;
➢ Timeframes and the parties responsible for the implementation of the corrective or remedial actions;
➢ Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented; and
➢ Copies of all correspondence received regarding complaints/incidents.

The above records will form an integral part of the Contractors’ Records. These records will be kept with the EMPr.

1.7.5 NON-CONFORMANCE REPORT

A Non-Conformance Report will be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued by the ECO to the Contractor in writing. Preceding the issuing of an NCR, the Contractor must be given an opportunity to rectify the non-conformance issues.

Should the ECO assess an incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR. The following information should be recorded in the NCR:

➢ Details of non-conformance;
➢ Any plant or equipment involved;
➢ Any chemicals or hazardous substances involved;
➢ Work procedures not followed;
➢ Any other physical aspects;
➢ Nature of the risk;
➢ Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and should take the hierarchy of controls into account;
➢ Agreed timeframe by which the actions documented in the NCR must be carried out; and
➢ ECO should verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and Contractor should sign the Close-Out portion of the Non-Conformance Form and file it with the contract documentation.

1.7.6. ENVIRONMENTAL EMERGENCY RESPONSE

The Contractor’s environmental emergency procedures must ensure appropriate responses to unexpected / accidental actions / incidents that could cause environmental impacts. Such incidents may include:

➢ Accidental discharges to water (i.e. into the watercourse) and land;
➢ Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
➢ Accidental toxic emissions into the air; and
➢ Specific environmental and ecosystem effects from accidental releases or incidents.

The Environmental Emergency Response Plan is separate to the Health and Safety Plan as it is aimed at responding specifically to environmental incidents and must ensure and include the following:

➢ Construction employees shall be adequately trained in terms of incidents and emergency situations;
➢ Details of the organization (i.e. manpower) and responsibilities, accountability, and liability of personnel;
➢ A list of key personnel and contact numbers;
➢ Details of emergency services (e.g. the fire department / on-site fire detail, spill clean-up services) shall be listed;
➢ Internal and external communication plans, including prescribed reporting procedures;
➢ Actions to be taken in the event of different types of emergencies;
➢ Incident recording, progress reporting and remediation measures to be implemented; and
➢ Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

The Contractor and their Sub-Contractor(s) must comply with the environmental emergency preparedness and incident and accident-reporting requirements as per the relevant legal requirements.

1.8 REGULATORY FRAMEWORK:

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

I. NATIONAL ACTS AND GUIDELINES:


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. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level.

The purpose of the Act is to ensure that the nation’s water resources are protected, used, developed, conserved, managed and controlled in responsible ways. Of specific importance to this application is Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and must therefore comply with any prescribed waste standard or management practices.
II. OTHER LEGAL REQUIREMENTS:


The Constitution of the Republic of South Africa has major implications for environmental management. The main effects are the protection of environmental and property rights, the change brought about by the sections dealing with administrative law, such as access to information, just administrative action and broadening of the locus standing of litigants. These aspects provide general and overarching support and are of major assistance in the effective implementation of the environmental management principles and structures of the NEMA. Section 24 in the Bill of Rights of the Constitution specifically states that:

Everyone has the right -

- To an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:
  - Prevent pollution and ecological degradation;
  - Promote conservation; and
  - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

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

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa’s biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

This Act is applicable to this application for environmental Authorisation, in the sense that it requires the project applicant to consider the protection and management of local biodiversity.

c) 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 AMAFA KwaZulu-Natal, the Provincial Heritage Resources Authority.


To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

e) Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)

The Act recognizes that everyone has a Constitutional right of access to any information held by the state and by another person when that information is required to exercise or protect any rights. The purpose of the Act is to foster a culture of transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their rights.

III. NATIONAL AND PROVINCIAL POLICIES AND/OR GUIDELINES:

a) Integrated Environmental Management (IEM)

IEM is a philosophy for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (DEAT, 1992). The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels. The Department of Environmental Affairs (DEA), Integrated Environmental Management Information Series guidelines were also consulted during this BA process.

b) Protected Species – Provincial Ordinances

Provincial ordinances were developed to protect particular plant species within specific provinces. The protection of these species is enforced through permitting requirements associated with provincial lists of protected species. Permits are administered by the KZN Department of Forestry and Fisheries (DAFF).
c) KwaZulu-Natal Heritage Act, 2008 (Act No. 4 of 2008)

KwaZulu-Natal Heritage Act provides for the conservation, protection and administration of both the physical and the living or tangible heritage resources of the Province of KwaZulu-Natal; and to establish a statutory Council to administer heritage conservation in the Province. AMAFA / Heritage KwaZulu-Natal are the provincial heritage conservation agency for KwaZulu-Natal. AMAFA was established as a statutory body in terms of the KZN Heritage Act of 1997, replaced by the KZN Heritage Act of 2008.
2.1 PREAMBLE

The EMPPr has been compiled 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 EMPPr 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 EMPPr is maintained and upheld as a dynamic document for the project team to add or improve on issues that might be considered irrelevant to the project. In such instances, the approving authority may authorize the ECO to make such changes.

The following tables form the core mitigation measures appropriate to the planning, pre-construction, construction and operation phases. The tables represent the objectives to be achieved and the management actions that must be implemented to mitigate the negative impacts and enhance the benefits of the project. Associated responsibilities, criteria/targets and timeframes are clearly specified.

2.2 SPECIALIST REPORTS UNDERTAKEN

2.2.1 Wetland & Riparian Habitat Assessment

Malachite Specialist Services was appointed to conduct a wetland assessment on Emadongeni Road. The wetland assessment initially involved desktop investigations for the presence of wetland and watercourse systems within a 500m buffer around the existing Emadongeni Mud Track. The field investigation identified the presence of two wetland systems within the study site. These wetland systems were classified as a single channelled valley bottom system as well as a seep. The South African classification system categorises wetland systems based on the characteristics of different Hydrogeomorphic Units. An HGM unit is a recognisable physiographic wetland-unit based on the geomorphic setting, water source of the wetland and the water flow patterns (Wetland Report, 2017).

The channelled valley bottom system received a Present Ecological Score (PES) of moderately modified (PES Category C) and the seep received a PES score of largely modified (PES Category D). Both wetland systems have numerous changes within their catchments affecting the health of the wetlands. These
include livestock grazing (i.e. a reduction in basal cover as well as the trampling and compaction of hydrophytic soils), subsistence agriculture and development including road networks and rural residential housing. The seep is used predominantly for subsistence agriculture (Wetland Report, 2017).

The Wetland Specialist risk assessment for the proposed road received a Moderate risk score for construction and operational aspects of the upgrade due largely to the presence of wetland systems. The significance of stormwater runoff from the road into the wetland systems as well as the alteration to the hydrological flow through the wetlands is considered to be moderate. The recommended mitigation measures will aid in the reduction of several impacts to a low risk score, however the upgrade of the road will still have an impact on the delineated wetland systems. In conclusion, the specialist recommended that although the risks are considered moderate, the road upgrade is authorised. A correctly designed road will benefit the area, both environmentally and socially in the long term. (Wetland Report, 2017).

Maps 3: Depicting the HGM Units that were identified along the proposed route
Present Ecological State (PES)
The two wetland systems were each given an HGM number and assessed in terms of their health. The channelled valley bottom received a PES score of moderately modified (PES Category C), while the seep system received a PES score of largely modified.

HGM: UNIT 1
The channelled valley bottom wetland system was identified as being very large and this has allowed the system to cope with changes within its catchment without affecting the health of the wetland to a significant degree. The catchment of the channelled valley bottom is subject to livestock grazing pressures, subsistence agriculture, erosion, and an increase in hardened surfaces as a result of development (in the form of road networks and rural residential housing). Despite these modifications, the vegetation basal cover is high and alien vegetation was limited.

HGM: UNIT 2
The seep system has been subjected to far more pressure, predominantly associated with rural residential development and associated infrastructure, as well as the use of the seep for crop cultivation. Cultivation within and adjacent to wetland systems has a negative impact on the geomorphology and hydrological processes of wetland systems, often resulting in erosion gully formation over extended periods. The cultivation of wetlands also requires the drainage of wetlands leading to the desiccation of hydric soils and a subsequent decline in the health of the wetland systems. A series of erosion gullies were identified within the wetland system.

These disturbances have led to secondary impacts such as the encroachment of alien invasive species and pioneer species into these ecotones. Species identified included Sonchus asper subsp. asper (Spiny Sowthistle), Tagetes minuta (Tall Khaki Bush), Bidens pilosa (Common Blackjack), Conzya bonariensis (Flax-leaf Fleabean), Argemone mexicana (Yellow-flowered Mexican poppy) and Taraxacum officinale (Common Dandelion).
Table 1: Depicting the summary of the PES score.

<table>
<thead>
<tr>
<th>HGM NUMBER</th>
<th>HGM UNIT</th>
<th>HYDROLOGY</th>
<th>GEOMORPHOLOGY</th>
<th>VEGETATION</th>
<th>PES SCORE (CATEGORY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Channelled Valley Bottom</td>
<td>4.0</td>
<td>3.6</td>
<td>3.2</td>
<td>(3.45) (C)</td>
</tr>
<tr>
<td>2</td>
<td>Seep</td>
<td>5.0</td>
<td>5.6</td>
<td>4.8</td>
<td>(5.11) D</td>
</tr>
</tbody>
</table>

- **Ecological Importance and Sensitivity (EIS)**
  According to the wetland report, the EIS score for both wetland systems was categorised as low. The wetland systems are located within a largely disturbed area and these disturbances often deter faunal species from utilising these systems as well as lowers the occurrence of red data floral species due to the degradation of suitable habitats and growth conditions. The higher basal cover and extent of open water within the channelled valley bottom wetland system (HGM 1) provides greater habitat for faunal and floral species, thus increasing the ecological importance and sensitivity of this system. The channelled valley bottom system provides a role as an ecological corridor and provides suitable refugia for faunal species within the catchment. Ecological corridors allow for the movement of species between micro-habitats within the landscape facilitating an increased species richness and genetic diversity within the area. The protection of ecological corridors contributes significantly to the conservation of biodiversity and is particularly important in highly transformed landscapes (Bennett, 2003).

The hydrological functional importance of all the wetlands has been recorded as moderate due to the functionality of these systems and their ability to provide ecological goods and services to the larger landscape. Socio-cultural benefits for the wetland is associated with the use of the wetlands for livestock grazing as well as subsistence agriculture.
Table 2: Summary of the ecological importance and sensitivity.

<table>
<thead>
<tr>
<th>HGM UNIT</th>
<th>EIS</th>
<th>SCORE</th>
<th>CONFIDENCE</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>(HGM 1) Channelled</td>
<td>Ecological Importance and</td>
<td>1.96</td>
<td>3.00</td>
<td>Low to Moderate</td>
</tr>
<tr>
<td>Valley Bottom</td>
<td>Sensitivity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hydrological Functional</td>
<td>2.42</td>
<td>3.00</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Importance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Direct Human Benefits</td>
<td>1.17</td>
<td>3.00</td>
<td>Low</td>
</tr>
<tr>
<td>(HGM 2) Seep</td>
<td>Ecological Importance and</td>
<td>1.41</td>
<td>3.00</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Sensitivity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hydrological Functional</td>
<td>2.17</td>
<td>3.00</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Importance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Direct Human Benefits</td>
<td>1.83</td>
<td>3.00</td>
<td>Low</td>
</tr>
</tbody>
</table>

- **Negative Impacts identified by the wetland specialist**
  - Soil erosion and sedimentation of the wetland systems
  - Pollution of water resources and soil as a result of construction and operational activities
  - The continued spread of alien invasive species as a result of the disturbance.

- **Positive Impacts identified by the wetland specialist**
  - Long-term improvement in the control of surface run-off entering the wetland systems through the upgrade of stormwater control structures along the road as well as the opportunity to utilise Sustainable Drainage Systems (SUDS).
The specialist proposed numerous general as well as specific techniques that can be implemented to mitigate the potential impacts that was identified. Impacts received an overall low to moderate risk score for the construction and operational aspects. While the construction will cause a disturbance within the water resources, the specialist concluded that the upgrade of the track will be anticipated to be a positive development. Both as an environmental and social perspective.

2.2.2 Vegetation Assessment (2017)

Malachite Environmental Specialist Services (Pty) Ltd was appointed to undertake the Desktop Vegetation Survey for the proposed project. The Specialist report provided the information below with respect to vegetation present within the proposed construction area. The proposed study area is located within the Sub-Escarpe Grassland Bioregion and Grassland Biome (Mucina and Rutherford, 2006). The local municipality is comprised of the Grassland (25 0135 ha; 84%) and Savannah Biomes (46 348 ha; 15%) (Alfred Duma IDP, 2016-2017). According to the National Vegetation Map of Southern Africa (2012), the surrounding vegetation associated with the study area is of the Northern KwaZulu-Natal Moist Grassland vegetation type.

**Table 3: Vegetation composition associated with the Northern KwaZulu-Natal moist grassland vegetation unit**

<table>
<thead>
<tr>
<th>Succulent Herbs</th>
<th>Herbs</th>
<th>Graminoids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aloe ecklonis</td>
<td>Acabthospermum australis</td>
<td>Aristida congesta</td>
</tr>
<tr>
<td>Lopholaena segmentata</td>
<td>Erioemma kraussianum</td>
<td>Digitaria ticholaenoides</td>
</tr>
<tr>
<td><strong>Shrubs</strong></td>
<td>Geranium wakkerstroomianum</td>
<td>Ergrostis patentissima</td>
</tr>
<tr>
<td>Anthospermum rigidum subsp. pumilum</td>
<td>Helichrysum caespitum</td>
<td>Elionurus muticus</td>
</tr>
<tr>
<td>Erica oatesii</td>
<td>Senecio inomatus</td>
<td>Ergrostis racemosa</td>
</tr>
<tr>
<td>Hermannia geniculata</td>
<td>Thunbergia atriplicifolia</td>
<td>Hypanthia hirta</td>
</tr>
<tr>
<td>Euphorbia pulvinata</td>
<td>Sebeae grandis</td>
<td>Themeda triandra</td>
</tr>
</tbody>
</table>

Table 3 above indicates the vegetation composition associated with this vegetation unit. This vegetation unit is distributed within the northern and north-western regions of the KwaZulu-Natal Province. This vegetation unit forms a discontinuous rim around the upper Thukela Basin and is situated almost entirely
within the Thukela River Catchment (Mucina and Rutherford, 2006). Moist Grassland veld is comprised of tall tussock grasslands dominated by Themeda triandra and Hyparrhenia hirta. This vegetation unit is typically associated with rolling and hilly landscapes. Encroachment of wooded vegetation (Vachellia spp) is often confined to valleys and disturbed areas embedded within the Sub Escarpment Grassland assemblages (Scott Shaw and Escott, 2011). This vegetation type is considered Vulnerable and is statutorily conserved in the uKhahlamba Drakensberg Park as well as in the Chelmsford, Spioenkop and Wagendrift Nature Reserves (Mucina and Rutherford, 2006). More than 25% of this vegetation type has been transformed due to cultivation, plantations, urban development and the construction of dams (Chelmsford, Driel, Kilburn, Mtoti, Wagendrift, Windsor and Woodstock). Further to this, bush encroachment and the colonisation of alien invasive vegetation including but not limited to Acacia dealbata, Rubus, Eucalyptus and Populus species into grassland communities has impacted on the structure and functionality of the Sub Escarpment Grasslands.

Maps 4: Showing the vegetation type within the proposed study area.
- **Habitat Sensitivity**

Sensitivity of the area was assessed through the interrogation of biodiversity databases. The Provincial Terrestrial Systematic Conservation Plan (CPLAN) is a conservation plan introduced and implemented by Ezemvelo KZN Wildlife. The primary aim of this conservation plan is to ensure that representative biodiversity samples are conserved and biodiversity conservation targets are achieved within KwaZulu-Natal. Areas within the province are categorised based on the sites ecological sensitivity, biological functioning and conservation significance. Sites have been identified as having an optimal or irreplaceable biodiversity area.

Interrogation of the CPLAN indicated that the proposed Emadongeni Road upgrade project does not fall with a conservation planning unit.

*Maps 5: Desktop Sensitivity map for the proposed project area*
2.2.3. Heritage Impact Assessment

Active Heritage CC was appointed to conduct a Heritage Impact Assessment in relation to the palaeontological and archaeological characteristics of the proposed road upgrade for Emadongeni Road. This study aims to identify and assess the significance of any heritage and archaeological resources occurring on the site. The study area was visited on the 11 May 2017. A ground survey following standard and accepted archaeological procedures was conducted. A transect of 50m on either side of the centre of the existing mud track was surveyed.

Although the greater Ladysmith area is rich in archaeological and other heritage sites none were recorded on the actual footprint. Historical period sites relating to the Voortrekker era (1830's), Anglo-Zulu War (1879) and the Anglo-Boer War period of 1899-1901 do occur abundantly in the greater Ladysmith area but none of those listed on national and provincial data bases occur less than 10km from the footprint. Particular care was taken to locate grave sites but none are situated closer than 30m to the proposed road upgrade. A survey of aerial photographs indicates the existence of Later Iron Age structures approximately 600m to the east of the footprint. However, these features are not threatened by the proposed road upgrade and merits no further discussion. No graves occur in association with rural homesteads situated adjacent to the mud track. The proposed road upgrade is also not part of any known cultural landscape.

The proposed upgrade of the Emadongeni mud track may proceed from a heritage perspective as no heritage and/or archaeological sites are threatened by the proposed development. The footprint is also not part of any known cultural landscape.

2.2.4. Paleontological Assessment

A paleontological assessment of the study area was conducted to assess the possibility of fossil occurrences. An aerial survey of the landscape surrounding the proposed development revealed several stone structures, predominantly circular in shape but also including, square, rectangular and linear designs, especially to the north and west of the proposed pathway for the road. These are likely to be date to the Iron Age, but the square and rectangular shapes may be historical in age.
The geological analysis of the proposed development indicates that the pathway of the road will sit on Ecca bedrock. None of the bedrock is directly exposed along the proposed route of the road, and an observed buffer varying in height and comprising of top soil, alluvium and colluvial debris (e.g. dolerite boulders) may serve to protect potential fossils located in underlying bedrock from roadway construction above. Therefore, the construction of this road will not pose any threat to palaeontological resources in the landscape as none were observed and if they are present, are shielded by several metres of overlying younger sediments.

The study concluded that the proposed upgrade of the road can proceed as no palaeontological material was noted along the entire length of the survey. Although it is possible that fossils may occur in the region and some of these may lay buried in the vicinity of the road (based on the SAHRA sensitivity map), the overlying soil horizon may act as a buffer to the disturbance of such material and the fact that no outcrops were found adjacent to the proposed road (within 50 meters) indicates that the probability of any disturbance to any aspects of heritage is insignificant.

Development should exist in balance with environmental and heritage conservation, but this site has no (observable) criteria to warrant protection status. Although there are some possible Iron Age stone-walled structures in the vicinity, none of these are within 50m of the pathway for the proposed road. The community living in this region will benefit from the upgraded road and it will ultimately have a positive impact on many families, whereas no heritage resources are likely to be damaged during the construction process.
2.3 STRUCTURE AND CONTENTS OF TABLES

The tables consist of six parts as follows:

<table>
<thead>
<tr>
<th>Phase of development</th>
<th>This row will identify either pre-construction (planning) or actual construction phase etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact/activity</td>
<td>This row will identify the issue being addressed, e.g. materials, site demarcation, heritage, etc.</td>
</tr>
<tr>
<td>Mitigation measure</td>
<td>This column will include all the necessary mitigation measures for each impact/issue.</td>
</tr>
<tr>
<td>Responsible Party</td>
<td>This column will indicate the party responsible for implementing the mitigation measures.</td>
</tr>
<tr>
<td>Frequency of actions</td>
<td>These columns provide time guidelines for the ‘Responsible party’ by which he/she is to action or manage the required mitigation.</td>
</tr>
</tbody>
</table>

2.4 SUMMARY OF THE IMPACTS ASSOCIATED WITH THE PROPOSED ACTIVITY

The following impacts (negative and positive) associated with the proposed activity where identified. Refer to SECTION D of the Basic Assessment Report for a detailed assessment of the impacts.

▶ A- PLANNING PHASE ACTIVITIES:

- Project contract and programme
- Appointments and duties of project team
- Method statements
- Emergencies, non-compliance and communication
- Construction plans and schedules
- Establishing access roads
- Campsite Establishment
- Handling of hazardous substances
B- CONSTRUCTION PHASE ACTIVITIES: BIOPHYSICAL

IMPACTS ASSOCIATED WITH WETLAND/ RIRIRIAN AREA / WATERCOURSE
- Loss of wetland
- Soil erosion and sedimentation of watercourse
- Pollution of water resources and soil

IMPACTS ASSOCIATED WITH VEGETATION
- Encroachment of alien invasive species

IMPACTS ON FAUNAL LIFE
- Disruption of access to grazing areas

IMPACTS ASSOCIATED WITH HANDLING OF CONSTRUCTION WASTE & HAZARDOUS SUBSTANCES
- Spillages of hazardous substances
- Pollution and contamination of surrounding environment
- Pollution of water resources and soil

IMPACTS ASSOCIATED WITH NOISE POLLUTION
- Noise pollution

IMPACTS ASSOCIATED WITH DUST EMISSIONS
- Dust emissions

C - CONSTRUCTION PHASE ACTIVITIES: SOCIAL

SOCIAL AND ECONOMIC IMPACTS ASSOCIATED WITH THE CONSTRUCTION PHASE
- Positive Impact: Improved living standards
- Safety of locality community
- Disruption of social dynamics within the community
NO-GO OPTION

D - POST-CONSTRUCTION PHASE ACTIVITIES:
- Construction Camp
- Pollution Control Structures
- Waste
- Materials and Infrastructure
- General
- Road Maintenance

E - REHABILITATION PHASE:
- Alien Vegetation
- Re-vegetation
- Land Rehabilitation

F - OPERATIONAL PHASE ACTIVITIES
- Loss of wetland area
- Wetland degradation
- Pollution of water resources and soil
- Encroachment of alien invasive species
## A. PLANNING PHASE ACTIVITIES

<table>
<thead>
<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
<th>MITIGATION/ACTION REQUIRED</th>
<th>RESPONSIBLE PARTY</th>
<th>FREQUENCY</th>
</tr>
</thead>
</table>
| A.1 | Project Contract and Programme       | ➢ The EMPr must be included as part of the tender documentation and included within any service level agreements made, thereby making it part of the enquiry document to make the recommendations & constraints as set out in this document, enforceable under the general conditions of contract.  
➢ A copy of this EMPr must be available on site. The Contractor must ensure that all the personnel on site, subcontractors and their team, suppliers, etc. are familiar with and understand the specifications contained in the EMPr.  
➢ The EMPr will advise the design phase of the project in terms providing the environmental requirements with regards to routing options, construction methodologies, access choices and mitigation/management options.  
➢ The appointments associated with the project team required to implement this EMPr will be made prior to the construction phase of the project. | CO; ECO, ESO      | At the onset, of the project |
<table>
<thead>
<tr>
<th>No.</th>
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</thead>
</table>
| A.2.| Appointments and duties of project team | ➢ 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. The ECO’s details should be displayed on a notice board at the entrance to the site so members of the public can report perceived transgressions of conditions, such as excessive dust after hours.  
➢ Before construction activities commence, role players must have a clear indication of their role in the implementation of this EMPr.  
➢ 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 registered landfill site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMPr. The contractor must keep all copies of waybills to prove that waste was dumped legally at a registered landfill site. | CO; ECO, ESO, PM  | At the onset of the project   |
<p>| A.3.| Method Statements                  | ➢ All activities which require method statements may only commence once the method statements have been approved by the Engineer and or ECO as applicable. Where applicable, the contractor will provide job-specific training on an ad hoc basis when workers are engaged in activities, which require method statements.                                                                                                                                                                                                                              | CO; ECO, ESO      | As and when required          |</p>
<table>
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<tr>
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</thead>
</table>
| A.4 | Emergencies, non-compliance and communication     | ➢ The contractor must provide method statements on the protocols to be followed, and contingencies to be implemented.  
➢ Communication in emergencies must follow the prescribed lines of protocol.  
➢ The contractor understands that failure to adhere to the requirements of the EMPr will result in the contractor being responsible for over and above the costs incurred for any remediation required as result of the specific non-compliance.                                                                                                                                  | CO; ECO, ESO       | As and when required.     |
| A.5 | Construction Plans and Schedules                   | ➢ The contractor is to provide the scheduling for construction that considers, the mitigation measures of the EMPr which affects the timing of the construction activities, such as scheduling working in dust prone areas during the rainy season.  
➢ Appropriate locations for pipe and fabrication yards, site offices and construction camps are to be determined and approved prior to activities occurring.  
➢ Appropriate access routes are to be determined and approved prior to activities occurring.                                                                                                                                                                                                                                                                                                                                                     | CO                | Prior to site establishment and construction |
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<tr>
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</tr>
</thead>
</table>
| A.6.| Establishing Access roads| ➢ Prior to commencement of construction activities, the development area must be demarcated. Construction activities must be confined to the demarcated area.  
➢ No vehicles are to be permitted into the “no-go areas” such as the wetland and drainage lines. These sensitive areas must be clearly marked, fenced and access restricted.  
➢ The contractor must consider all limitations identified and recommendations made during environmental studies.  
➢ Roads for access must be carefully planned and approved by the Engineer before construction activities begin. They must not be created on an adhoc basis.  
➢ No trees/ shrubs/ groundcover may be removed without the prior permission of the Engineer/ ECO. All established alien vegetation must be removed as per agreed alien eradication methods.  
➢ Before construction activities commence, the contractor must take “before” site photos. The site photos must be included in the environmental file to be kept on site. | CO; ECO, ESO            | Prior to establishment and during construction |
<table>
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<tr>
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<th>RESPONSIBLE PARTY</th>
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</table>
| A.7 | Campsite Establishment | ➢ A campsite plan showing layout of buildings and associated infrastructure must be developed and approved by the Engineer.  
➢ The construction camp must be sited in an area already disturbed and 100m away from any water course/drainage lines, and the construction camp must not be situated on a floodplain or on slopes greater than 1:3.  
➢ Vegetation and trees to be retained must not be damaged or felled.  
➢ Accommodation of personnel is to include both kitchen and sanitary facilities.  
➢ Fires will only be allowed in facilities especially constructed for the purpose and no trees may specifically felled for obtaining firewood.  
➢ Adequate ablution should be supplied to the site staff. These must be approved by the Engineer. Under no circumstances may open areas or surrounding bush be used as a toilet facility.  
➢ Regular inspections must be carried out to ensure toilets are kept clean.  
➢ Portable water must be supplied. This will be utilized for drinking, cooking and ablution. Great care is required and should be taken to ensure that the water supply is not contaminated in any way.  
➢ Bins and/or skips must be provided at convenient intervals for disposal of waste within the construction camp. Refuge generated from the campsite, construction area, storage area or any other area must be collected and placed in a suitably closed container daily. Once full, the refuse container must be emptied and contents disposed of at a licensed facility. | CO; ECO, ESO | During site establishment |
<table>
<thead>
<tr>
<th>No.</th>
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<th>RESPONSIBLE PARTY</th>
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</thead>
</table>
| A.8 | Hazardous Substances | ➢ Construction vehicles are to be maintained in good working order, to reduce the probability of leakage of fuels and lubricants;  
• Vehicles used during the construction phase must be parked in a designated area and drip trays should be used to prevent any oil leaks;  
• Formal waste management and sewerage systems must be put in place for contractors;  
• A walled concrete platform, dedicated store with adequate flooring or bermed area should be used to accommodate chemicals such as fuel, oil, paint, herbicide, and insecticides, as appropriate, in well-ventilated areas;  
• Storage of potentially hazardous materials should be above the current (i.e. not historic) 1:100-year flood line, or as agreed with the ECO. These materials include fuel, oil, cement, bitumen etc.;  
• Sufficient care must be taken when handling these materials to prevent pollution; | Contractor, PM, ESO, ECO | Throughout construction phase- when necessary |
<table>
<thead>
<tr>
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<th>FREQUENCY</th>
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<tbody>
<tr>
<td>A.9</td>
<td>Waste Management</td>
<td>➢ Oil residue must be treated with oil absorbent or a spill kit and this material must be removed to a registered waste site:&lt;br&gt;  • Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.&lt;br&gt;  • Store all litter carefully by keeping lids closed, so it cannot be washed or blown into the water course within the proposed development;&lt;br&gt;  • Provide bins for construction workers and staff at appropriate locations, particularly where food is consumed;&lt;br&gt;  • The construction site should be cleaned daily and litter removed;&lt;br&gt;  • Conduct on-going staff awareness programs to reinforce the need to avoid littering;&lt;br&gt;  • Skip waste containers should be maintained on-site. These should be kept covered and arrangements made for them to be collected regularly from the site by the local council.&lt;br&gt;  • All waste must be removed from the site and transported to a landfill site as approved by the relevant municipality.&lt;br&gt;  • No cement bags to be left on-site, all cement bags must be disposed at a registered landfill site.</td>
<td>CO; ECO, ESO</td>
<td>During site establishment; ongoing</td>
</tr>
</tbody>
</table>
## B. CONSTRUCTION PHASE ACTIVITIES: BIOPHYSICAL IMPACTS

### IMPACTS ASSOCIATED WITH THE WETLAND/RIPARIAN AREAS/WATERCOURSES

<table>
<thead>
<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
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<th>RESPONSIBLE PARTY</th>
<th>FREQUENCY</th>
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<tbody>
<tr>
<td>B.1</td>
<td>Loss of wetland area including hydric soils and hydrophytic vegetation</td>
<td>Wetland Report, 2017:</td>
<td>CO; ECO, ESO</td>
<td>Throughout development</td>
</tr>
<tr>
<td></td>
<td>Activities:</td>
<td>− The removal of hydric soils and hydrophytic vegetation</td>
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<tr>
<td></td>
<td>Potential nature of the impacts:</td>
<td>− Removal of the soils within the seep will lead to the desiccation of the soils within the affected area as the seep is feed predominantly through sub-surface hydrological movement.</td>
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<td>− The foundations of the road will cause a barrier to the hydrological flow through the seep, if a permeable road foundation is not used.</td>
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<td>− The road design must be porous in nature and follow the shortest route through the wetland systems. The porosity of the road is a primary driver in reducing the surface runoff from the road and therefore the deposition of sediment within the wetland systems.</td>
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<td>− The construction footprint must be kept to a minimum.</td>
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<td>− Protect as much indigenous vegetation as possible. Remove alien invasive species where construction activities are occurring and replace with indigenous vegetation.</td>
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<td></td>
<td>− Conduct a rescue and storage operation of hydrophytic vegetation prior to construction and replace this vegetation after construction in this area is completed.</td>
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<td></td>
<td>− Rehabilitation must be aimed at improving the status and function of the ecosystem within the channeled valley bottom i.e. through the removal of invasive alien species and the planting of indigenous species</td>
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<td></td>
<td>− On unstable soils a soil saver such as fiber netting or a fiber mat or geotextiles such as soil cells must be used. The sloped area must then be seeded and the mat placed on top to protect the bare soil.</td>
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</table>
The construction of a road within this system will alter the flow dynamics of water through the wetland, most likely channelling it along the road alignment.

- Change of flow from a diffuse system toward a more channelled path will allow for the faster movement of water, leading to a loss in sediment deposition and eventually leading to erosion within the wetland system.
- Disturbance to the plant community will make both wetland systems more prone to encroachment by alien invasive species.

The recovery of vegetation along the route alternative must be monitored and where re-vegetation is observed to not be occurring, then further remedial measures must be implemented.
### IMPACTS ASSOCIATED WITH THE WETLAND/RIPARIAN AREAS/WATERCOURSES

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>B.2</td>
<td>Soil erosion &amp; sedimentation of the watercourse</td>
<td>Wetland Report, 2017:</td>
<td>CO; ECO, ESO</td>
<td>Throughout development</td>
</tr>
</tbody>
</table>
|     | Activities:  
|     | − Excavations                                           | − In order to counter soil erosion along the existing road care must be taken at the design  |                   |                      |
|     | − Vegetation Clearing                                    |    stage, that the correct placement of water directing techniques be designed and specified  |                   |                      |
|     | Potential nature of the impacts:                         |    in a manner that will best mitigate the effects of stormwater runoff.                    |                   |                      |
|     | − Construction activities (i.e. excavations and vegetation clearing) expose soil to environmental factors including rainfall and wind. | − The use of sustainable drainage systems (SUDS) must be incorporated into the design of the road and associated drainage systems and include: |
|     | − The exposure to these factors will result in the removal of topsoil and the deposition of sediment into the B Section Channel. |    • The use of swales (a shallow vegetated channel to convey road runoff). |
|     | − Sedimentation of the deposited soil poses a risk to the geomorphological/functional integrity of the wetland systems. |    • The use of filter strips which are maintained grassed areas of land that are used to manage shallow overland stormwater runoff through several filtration processes in a similar manner to buffer strips. |
|     |                                                           |    • Other erosion protection measures can include using energy dissipaters to slow the velocity of water coming from any stormwater pipes. |                   |                      |
### IMPACTS ASSOCIATED WITH THE WETLAND/RIPARIAN AREAS/WATERCOURSES (Conti.)

<table>
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<tr>
<th>No.</th>
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</thead>
<tbody>
<tr>
<td>B.2</td>
<td><strong>Potential nature of the impact (continued from previous page...)</strong></td>
<td></td>
<td>CO; ECO, ESO</td>
<td>Throughout development</td>
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<tr>
<td></td>
<td>− Disturbance to the soils and vegetation associated with the wetlands will lead to changes in the hydrological and geomorphologic integrity of these systems. This can create head-cut erosion and/or erosion gullies in the wetland areas. Unchecked erosion will lead to the desiccation of the soils associated with the wetlands which will have knock on effects on the flora and fauna that utilise the wetland areas.</td>
<td>• It is important to maintain any SUDS feature that are installed along the road route. Un-maintained SUDS features may eventually fail operationally as a result of sediment build up and the effect this has on vegetation growth. If properly designed and regularly maintained, vegetated swales and other SUDS can last indefinitely and are far more cost effective that the maintenance of hardened or semi-hardened structures.</td>
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<td>− Compaction of soil will occur in the work area which will experience heavy vehicle traffic during construction. This will increase the soil bulk density, reduce the porosity and the hydraulic conductivity, impeding hydrological flow and leading to wetland degradation.</td>
<td>• The use of SUDS features can also be used to remediate parts of the wetland systems adjacent to the road that will be impacted through allowing for erosion control, attenuation of water which will promote vegetation growth in these areas.</td>
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<td></td>
<td>− In the longer-term, sediment movement as a result of inadequately designed roads and watercourse crossings (bridges and culverts) can lead to excessive erosion in sensitive environments.</td>
<td>− Topsoil stockpiles must be appropriately protected using for example silt fences or sand bag barriers.</td>
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<td>− Do not allow surface water or stormwater to be concentrated, or to flow down slopes without erosion protection measures being in place.</td>
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<td></td>
<td>− Install sediment barriers across the entire construction right-of-way, to prevent sediment flow into the wetland.</td>
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</table>
### IMPACTS ASSOCIATED WITH THE WETLAND/RIPARIAN AREAS/WATERCOURSES (Conti..)

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<tr>
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</tr>
</thead>
</table>
| B.2 | Potential nature of the impact (continued from previous page…) | - No stockpiling of any materials may take place adjacent to any of the wetlands. Erosion control measures must be implemented in areas sensitive to erosion and where erosion has already occurred such as edges of slopes, exposed soil etc. These measures include but are not limited to - the use of sand bags, hessian sheets, silt fences, retention or replacement of vegetation and geotextiles such as soil cells which must be used in the protection of slopes.  
- Vegetation clearing must not be undertaken more than 10 days in advance of the work front.  
- Vegetation clearing within the wetlands must only be undertaken when construction activity is actually underway at this point and such areas must be rehabilitated within 2 weeks of initial clearing occurring. The entire construction area must not be stripped of vegetation prior to commencing construction activities.  
- Disturbed sites must be rehabilitated as soon as construction in an area is complete or near complete and not left until the end of the project to be rehabilitated.  
- Where the road will be upgraded adjacent to the wetlands install sediment barriers along the edge of the construction servitude to contain sediment and spoil within the construction area.  
- Erosion protection measures must be installed at any pipe culverts or stormwater drainage pipes’ outlets located along the route. This is in addition to velocity control measures. | CO; ECO, ESO | Throughout development |
### IMPACTS ASSOCIATED WITH THE WETLAND/RIPARIAN AREAS/WATERCOURSES (Conti.)

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<th>No.</th>
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</table>
| B.3 | Pollution of water resources & soil activity (or source of pollution) | **Wetland Report, 2017**  
- All waste generated during construction is to be disposed of at a registered landfill site and washing of containers, wheelbarrows, spades, picks or any other equipment that has been contaminated with cement or chemicals adjacent to or within the wetland systems must be strictly prohibited.  
- Proper management and disposal of construction waste must occur during the construction of the development.  
- No release of any substance, these include cement, oil that could be toxic to fauna or faunal habitats; Wet cement and/or concrete must not be allowed to enter any of the wetland systems.  
- Portable toilets must be placed outside of the 1:100-year flood line of the channel or 30m away from the temporary boundary of the seep.  
- Construction camp or any depot for any substance which causes or is likely to cause pollution must be located within a distance of 100m of the water resources. | CO; ECO, ESO | Throughout development |

**Potential nature of the impact:**  
- Sediment release from a construction site into the receiving environment is one of the most common forms of waterborne pollution.  
- Furthermore, mismanagement of waste and pollutants including hydrocarbons, construction waste and other hazardous chemicals will result in these substances entering and polluting these sensitive environments either directly through surface runoff during rainfall events, or subsurface water movement.
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</table>
| B.3 | Potential nature of the impact: | - Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately – consult with a wetland/aquatic specialist if spills occur.  
- The design and use of SUDS which includes, but is not limited to, swales, filter strips and infiltration trenches that capture runoff, filter out the pollutants and allow for the diffuse release of water into the receiving environment is paramount to limiting the long-term effects of an increase in hardened surfaces adjacent to the seep and water course situated along the route. | CO; ECO, ESO | Throughout development |

The linked nature of the wetland systems (particularly the channelled valley bottom system) to downstream water resources will result in pollutants being carried downstream from the construction site having consequences on further downstream users.  
In addition to this, road surfaces are recognised as a source of various pollutants which can originate from a wide variety of sources. The pollutant concentration in road runoff can be highly variable and dependant on a wide variety of factors including location, traffic volumes, extent of dry period before a rainfall event, and nature of the road surface.
## IMPACTS ASSOCIATED WITH VEGETATION ALONG THE PROPOSED ROUTE

<table>
<thead>
<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
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</tr>
</thead>
<tbody>
<tr>
<td>B.4</td>
<td>Encroachment of alien invasive species</td>
<td><strong>Activity: Removal of vegetation</strong>&lt;br&gt;− Any removal of vegetation along the route will lead to a disturbance within the area having a negative impact on the functionality of the vegetation community.&lt;br&gt;− Alien invasive species occur within the wetland systems and these will further encroach into disturbed areas.&lt;br&gt;− Alien species generally out-compete indigenous species for water, light, space and nutrients as they are adaptable to changing conditions and are able to easily invade a wide range of ecological niches.</td>
<td>Wetland Report, 2017:&lt;br&gt;− Ongoing alien plant control must be undertaken along the route and particularly in the disturbed wetland areas. Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species.&lt;br&gt;− Construction staff and vehicles must stick to the road reserve.&lt;br&gt;− Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. This requirement is in fulfilment of the terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004). Areas which have been disturbed will be quickly colonised by invasive alien plant species.</td>
<td>CO, ESO</td>
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</tbody>
</table>
## IMPACTS ASSOCIATED WITH FAUNAL LIFE

<table>
<thead>
<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
<th>MITIGATION/ACTION REQUIRED</th>
<th>RESPONSIBLE PARTY</th>
<th>FREQUENCY</th>
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</thead>
</table>
| B.5 | Disruption of access to grazing areas: | - Selected workers must be made aware on the possible fauna that may be encountered along the Emadongeni Road.  
- Site workers are to be informed of any sensitive fauna on the site prior to construction activities commencing and be informed that poaching or disturbance is strictly prohibited.  
- Under no circumstances shall any fauna be handled, removed, killed or interfered with by the Proponent, Project Manager, Resident Engineer, contractors, engineers, and their employees, including subcontractors or their subcontractors’ employees. However, if construction activities are likely to injure, kill or interfere with any fauna encountered on the site, appropriate action must be taken to ensure their protection.  
- Any fauna found within the construction corridor must be moved to the closest point of natural or semi-natural vegetation outside the construction servitude. This includes those species perceived to be vermin (such as snakes and rats). The latter species may require the services of a specialist to catch and relocate dangerous/venomous species. | CO, ESO | Monitor daily |

---

**Activity:**
- Upgrading of the Emadongeni Road  
- Removal of vegetation within proposed development area.

**Potential nature of the impact:**
- Fauna will not be able to gain access to grazing areas that they frequently use.  
- Removal of indigenous vegetation during the construction phase could result in a disruption of eating patterns in local animal life, as their food source may be removed for construction purposes.
### IMPACTS ASSOCIATED WITH HANDLING OF CONSTRUCTION WASTE & HAZARDOUS SUBSTANCES

<table>
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<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
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<th>RESPONSIBLE PARTY</th>
<th>FREQUENCY</th>
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</thead>
</table>
| B.6 | Spillage of hazard substances: | − Every effort must be made to ensure that any chemicals or hazardous substances do not contaminate soil or ground water on site.  
− Temporary bunds must be constructed around chemical or fuel storage area and hazard signs indicating the nature of the stored facility or containment structure.  
− Spills in bunded areas must be cleaned up with a spill kit, and thereafter be disposed at a registered landfill site. Alternatively, the spilled material must be stored temporarily in a bunded area.  
− The bunded area must be located at least 50 meters away from the 1:100 year floodline.  
− Vehicles used during the construction phase must be parked in a designated area and drip trays must be placed underneath the vehicles to prevent any oil leaks from seeping into the soil.  
− Oil residue shall be treated with oil absorbent such as Drizit or similar and this material must be appropriately disposed at a registered landfill site.  
− It is recommended that the contractor uses a pre-mix cement to prevent potential spills on bare ground.  
− Plastic sheeting should be placed on bare ground when pouring the pre-mix cement. | CO, ESO; ECO | Monitor daily |
<table>
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<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
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<th>FREQUENCY</th>
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</thead>
<tbody>
<tr>
<td>B.7</td>
<td>Pollution &amp; contamination of construction and surrounding environment:</td>
<td>− Waste bins or skips must be placed on site for adequate temporary disposal of construction waste.</td>
<td>CO, ESO; ECO</td>
<td>Monitor daily</td>
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<tr>
<td></td>
<td><strong>Activity:</strong></td>
<td>− Bins must be closed with a lid to prevent wind or rain from carrying waste off-site into nearby water bodies, and to prevent littering of the construction area.</td>
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<td></td>
<td>− Storage and disposal of construction waste.</td>
<td>− Recycling material such as glass, paper and plastic must be encouraged among the construction workers.</td>
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<td></td>
<td><strong>Nature of the potential impact:</strong></td>
<td>− Construction rubble must be disposed in pre-agreed, demaricated spoil dumps that have been approved by the Engineer for temporary storage.</td>
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<td></td>
<td>− Improper storage of waste as well as improper disposal of construction waste (such as rubble, domestic waste) may lead to pollution and contamination of proposed construction area and the surrounding environment (Water resources, bare ground).</td>
<td>− Waste must be disposed at a registered landfill site.</td>
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<td>− The contractor must keep the landfill certificates or receipts on site which is to be produced to the Competent Authority upon request.</td>
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</table>
## IMPACTS ASSOCIATED WITH HANDLING OF CONSTRUCTION WASTE & HAZARDOUS SUBSTANCES (CONT..)

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<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
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<th>RESPONSIBLE PARTY</th>
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</table>
| B.8 | Pollution of water resources & soil:                | − Portable chemical toilets must be made available on site; these sanitation facilities must be situated 100metres from any water body.  
− The chemical toilet company will maintain and service the facilities every two weeks throughout the duration of the construction.  
− A registered chemical waste company is to be used to remove waste from chemical toilets on site and will be disposed at an appropriate and licensed waste disposal facility.  
− Care must be taken to avoid contamination of soils and water. | CO, ESO; ECO      | Monitor daily  |

**Activity:**
- The use of chemical ablution facilities on site.

**Nature of the potential impact:**
- Lack of proper sanitation facilities could lead to soil contamination and pollution of the water table.
- Improper disposal of chemical toilet waste may result in the contamination of water and soil.
<table>
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<tr>
<th>No.</th>
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<th>RESPONSIBLE PARTY</th>
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</thead>
</table>
| B.9 | Activity:      | − Noise will only be generated during the construction phase (from operating machinery, generators etc.).  
      | − The use of construction equipment.  
      | − Noise will only occur during the designated working hours (8:00 to 16:00) week days and closed during weekends.  
      | − The level of the noise generated will be low and below 70 decibels threshold limit.  
      | − No noise will be generated during the operational phase therefore, the impact is temporary in nature and can be minimised with affective monitoring and installing silencing equipment on all plant hire/machinery.  
      | − Nature of the potential impact:  
      | − During the construction period, there will be noise from construction vehicles, construction machinery and construction workers that may disturb the community peace as well as surrounding environment.  
      | | CO, ESO; ECO | Monitor daily. |
## IMPACTS ASSOCIATED WITH DUST EMISSIONS

<table>
<thead>
<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
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<th>FREQUENCY</th>
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<tr>
<td>B.10</td>
<td>Activity:</td>
<td>− Dust emissions from construction vehicles, construction equipment, and excavations. <strong>Nature of the potential impact:</strong> − During construction, dust particles are emitted into the atmosphere from construction vehicles, and excavations.</td>
<td>CO, ESO; ECO</td>
<td>Monitor weekly</td>
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<td>− The application of best management practices for dust suppression will also aid in reducing air pollution. During construction period areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust. − The construction vehicles must adhere to a speed limit of 30km/hr to avoid excessive dust emission. − Loads could be covered to avoid loss of material in transport, especially if material is transported off site. − Access and other cleared surfaces must be dampened whenever possible and especially in dry and windy/conditions to avoid excessive dust. − Suspend excavation during periods of high winds. − During the transfer of materials, drop heights should be minimised to control the dispersion of mater being transferred. − Vehicles are to be kept in good condition to minimise vehicular fumes. − Should excessive emissions be observed, the Contractor must remove the vehicle from the site immediately. − Emissions into the air can be minimised by ensuring regular maintenance of construction vehicles and equipment in order to reduce emission of exhaust fumes.</td>
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<td>Monthly</td>
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# C. SOCIAL AND ECONOMIC IMPACTS

## SAFETY OF LOCAL COMMUNITY

<table>
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<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
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<th>FREQUENCY</th>
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<tbody>
<tr>
<td>C.1</td>
<td><strong>Activity:</strong></td>
<td>- No construction staff must be permitted to trespass on private land.</td>
<td>CO, ESO; ECO</td>
<td>Monitor weekly</td>
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<tr>
<td></td>
<td>- Construction labourers working in close proximity to local community.</td>
<td>- Any construction personnel found to be trespassing on private land must be immediately subjected to a disciplinary hearing;</td>
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<td>Monthly</td>
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<td></td>
<td><strong>Nature of the potential impact:</strong></td>
<td>- Construction workers / construction vehicles must take heed of normal road safety regulations, thus all personnel must obey and respect the law of the road.</td>
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<td>- There is potential for construction labour to trespass onto neighbouring properties;</td>
<td>- A courteous and respectful driving manner must be enforced and maintained so as not to cause harm to any individual;</td>
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<td></td>
<td>- Construction personnel / construction vehicles – movement of construction personnel and vehicles may pose a potential health and safety risk to road users, landowners and local residents.</td>
<td>- A safe designated speed limit must be set by the project managers to limit possible road strikes and accidents.</td>
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## DISRUPTION OF THE SOCIAL DYNAMICS WITHIN THE LOCAL COMMUNITY

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<th>No.</th>
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</table>
| C.2 | Activity:       | − Should these impacts take place, it is only anticipated to most likely occur during the construction phase of the project. It is therefore advised that construction workers who are already housed within the Social Impact Zone of the proposed site, be employed as opposed to establishing temporary housing for workers.  
− It is not advised that temporary workers assimilate with the local communities and suitable accommodation in larger centres should be considered.  
− In order to mitigate most of these impacts the contractor should consider the establishment of a Community Monitoring Forum (CMF) in order to monitor the construction phase and the implementation of the recommended mitigation measures.  
− The CMF should be established before the construction phase commences, and should include key stakeholders, including representatives from local communities, local councillors, affected landowners and the contractor(s).  
− The CMF should also be briefed on the potential risks to the local community associated with construction workers. | CO, ESO; ECO | Monitor weekly monthly |
## D. POST-CONSTRUCTION PHASE

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<th>No.</th>
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<th>FREQUENCY</th>
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</table>
| D.1 | Construction Campsite  | - All structures temporally constructed within the construction camp are to be removed.  
- Disassemble all infrastructure units and remove components from the working and storage areas. This will include temporary office and storage structures and containers, water supply pipelines, water storage containers, waste storage containers, power supply, etc.  
- Drain all portable chemical toilets, with no spillage of the contents. Transfer the contents to an appropriate disposal site.  
- Disassemble all fencing around the camp and either sell, auction or donate the components to the local community or transfer the waste components to a disposal site or the contractors base. | Contractor         | The Contractor must monitor the site on a regular basis. |
<table>
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<tr>
<th>NO.</th>
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</table>
| D.2 | Pollution Control | − Remove all plastic linings used for pollution control and transfer to a registered disposal site.  
− Break up all concrete structures that have been created (e.g. working and parking surfaces) and remove concrete waste to a registered disposal site.  
− The camp site must be top soiled, re-grassed, and graded to reduce surface run-off.  
− Indigenous grasses must be used which are suitable to the area. | Engineer; Contractor | The Engineer & Contractor must monitor the site on a regular basis. |
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</table>
| D.3 | Materials and Infrastructure| − Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.  
− All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.  
− All leftover building materials must be returned to the depot or removed from the site.  
− The Contractor must repair any damage that the construction works has caused to neighboring properties.  
− Rehabilitate the construction campsite to the former natural state. i.e. Prior to construction and site establishment. | Engineer; Contractor | The Engineer & Contractor must monitor the site on a regular basis. |
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</table>
| D.4 | Waste removal/ disposal    | - Remove all leftover construction materials from the storage area and construction site and either sell, auction, donate to the local community or transfer to the Contractor’s base.  
- Drain all collection sumps and dispose of the contaminated liquid and solids at an approved disposal site.  
- Remove all construction debris, litter and domestic waste from the construction site and transfer to an appropriate disposal site.  
- Remove all waste receptacles and either donate to the local community, auction, or transfer to Contractor’s base.  
- Burying of rubble on site, or dumping in any watercourse is prohibited. A check must be done by the contractor before the site is handed over to the applicant. The contractor is to check that the stormwater channels and the drainage pipes are free from building rubble, spoil materials and waste materials.  
- Surfaces are to be checked for waste products from activities such as concreting or asphaltig and cleared in a manner approved by the ECO. | Engineer; Contractor | The Engineer & Contractor must monitor the site on a regular basis. |
### E. REHABILITATION PHASE

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<tr>
<th>NO.</th>
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<th>FREQUENCY</th>
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<tbody>
<tr>
<td>E.1</td>
<td>Alien Vegetation</td>
<td>- All areas that have been disturbed by construction activities (including the construction camp area) must be cleared of alien vegetation.</td>
<td>Contractor and ECO</td>
<td>The Contractor and ECO must monitor the site on a regular basis.</td>
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<td>- Existing and newly established alien vegetation must be removed from the property and replaced, where necessary, with suitable indigenous / endemic plant species. During this process, it is imperative that indigenous vegetation is not removed or disturbed.</td>
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<td>- All vegetation that has been cleared during construction is to be removed from site or used as much as per the re-vegetation specification, (except for seeding alien vegetation).</td>
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</table>
ALIEN PLANT CONTROL PROGRAMME

➢ Important factors influencing the effectiveness of a control programme

- Timeous implementation of control operations is important as alien plants are more susceptible to herbicides when they are young and lower herbicide rates can be used.
- Appropriate herbicides must be chosen. Care must be taken when applying herbicides and label prescriptions must be strictly adhered to. The ECO must be consulted when applying herbicides.
- A reputable company must be hired to undertake herbicide application.
- The ECO must be available to monitor/supervise such activities.

➢ Requirements for an effective alien vegetation control programme

- Identify the problem: extent, location, and species of problem plants.
- Identify any sensitive ecosystems, rare or endangered plants etc. which may be affected by a control programme. Identify the original ecosystem applicable to the area. The method of control will be influenced by the type of vegetation to which the area must restored.
- Identify an appropriate control method: mechanical or chemical, type of herbicide, application etc. (Mechanical and biological methods are preferred, compared to chemical methods)
- The cleared site or working areas must be monitored over a one-year period, and periodically over three years. A monitoring programme must be developed by a qualified vegetation specialist and regular follow-ups must form an integral component of the alien control programme.
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</table>
| E.2 | Alien Plant Control                 | Best practice measures that should be undertaken during clearing include the following:  
➢ Cut plants as low to ground as possible.  
➢ All alien plants must be removed carefully and exposed soil should be covered with cut vegetation or leaf litter that is free of weed seeds to ensure that re-growth will not occur.  
➢ Press any loosened soil down carefully and firmly and mulch with plant material where possible.  
➢ All alien seeds, fruit bulbs, tubers and stems must be collected and placed in a sealable container/plastic bag for disposal at a landfill site.  
➢ The roots system of mature trees including alien invasive play an important role in stabilizing soil and therefore the up-rooting of large mature specimen of trees is not advocated. It is better to fell the trees and paint the stump with the relevant herbicides. | Contractor        | The Contractor must monitor the site on a regular basis.                                                                                   |
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</table>
| E.2. | Alien Plant Control (Continued from previous page) | 1. **Hand pulling / hoeing**  
   - Hand pulling is most effective with small (30cm), immature or shallow rooted plants such as Bidens pilosa (Blackjack) and Tagetes minuta (Khaki weed) and Common morning glory (Ipomoea purpurea).  
   - Shake the excess sandy material from the plant, this makes the plant easier to stockpile and lighter to transport.  
   - However, make sure there is no seed on the plant first to eliminate the spread of seed while shaking, if seeds are present they need to be cut off and bagged.  
   2. **Chopping / Cutting / Slashing**  
   - This method is most effective for plants in the immature stage, or for plants that have relatively woody stems/ trunks, or larger root systems such as, but not limited, to Lantana camara (Lantana), Bougainvillea (Nyctaginaceae spp), This must be done in conjunction with chemical treatment of the cut stumps (application by painting the herbicide onto stumps cut approximately 100mm above the ground).  
   - This is an effective method for non-re-sprouters or in the case of re-sprouts (coppicing) it must be done in conjunction with chemical treatment of the cut stumps. | Contractor | The Contractor must monitor the site on a regular basis. |
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<th>NO.</th>
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<tr>
<td>E.2</td>
<td>Alien Plant Control (Continued from previous page)</td>
<td><strong>2. Chopping / Cutting / Slashing (Continued from previous page)</strong>&lt;br&gt;− Cut/slash the stem of the plant at approximately 100 mm to ground level.&lt;br&gt;− Paint all cut plants with an appropriate herbicide immediately after they have been cut.&lt;br&gt;− Stockpile removed material into piles after removing seeds or pods; collect all the seeds from the ground. All seeds must be put in a plastic bag that is tightly sealed. The seeds must be disposed of at the nearest garden refuse site.&lt;br&gt;− Cut stems can be used as firewood.&lt;br&gt;<strong>3. Ring barking</strong>&lt;br&gt;− Can be used with or without chemicals but is more successful when herbicide is used.&lt;br&gt;− Remove bark in a 300-400 mm band and paint herbicide immediately to exposed band. This method is suited to removal of the Melia azedarach (Syringa Tree) as well as any other alien tree species adjacent to the channel.&lt;br&gt;<strong>4. Tree Felling</strong>&lt;br&gt;− De-branch trees and remove all material. Branches can be chopped to small blocks and used as firewood (provided that they are not poisonous).&lt;br&gt;− Cut the tree down to approximately 150 mm from ground level.</td>
<td>Contractor</td>
<td>The Contractor must monitor the site on a regular basis.</td>
</tr>
<tr>
<td>NO.</td>
<td>ASPECT</td>
<td>ACTION REQUIRED</td>
<td>RESPONSIBLE PARTY</td>
<td>MONITORING FREQUENCY</td>
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</table>
| E.3 | Re-vegetation | - At the end of the construction phase, the site must be fully re-vegetated to match as closely as possible the pre-construction condition.  
- All areas of bare soil must be re-vegetated and rehabilitated. Open areas are to be re-planted as per the re-vegetation specification.  
- Only indigenous species should be used for landscaping. No exotic plants are to be introduced. It is important that the re-vegetation activities be planned in advance to ensure that seed and plant stockiest are able to supply the required volume when required. Only indigenous and preferably endemic plant species will be permitted on site.  
- The contractor is to water and maintain all planted vegetation until the end of the defects liability period and is to submit a method statement to the PM. | Contractor and ECO          | The Contractor and ECO must monitor the site on a regular basis. |
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<th>NO.</th>
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<th>MONITORING FREQUENCY</th>
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</table>
| E.4.| Land Rehabilitation | − All surfaces hardened due to construction activities are to be ripped and imported materials thereon removed.  
     |                   | − All rubble is to be removed from the site to an approved disposal site or approved by the Engineer.  
     |                   | − Burying of rubble on site is prohibited.  
     |                   | − Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer.  
<pre><code> |                   | − All embankments are to be trimmed, shaped and replanted to the satisfaction of the Engineer.                                                                                                           | Contractor and ECO                   | The Contractor and ECO must monitor the site on a regular basis. |
</code></pre>
<table>
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<tr>
<th>NO.</th>
<th>ASPECT</th>
<th>ACTION REQUIRED</th>
<th>PERSON RESPONSIBLE FOR MONITORING</th>
<th>MONITORING FREQUENCY</th>
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</table>
| E.5.| General | - A meeting is to be held on site between the Engineer, ECO, and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the PM.  
- Temporary roads which were used during the construction phase must be closed and access across these blocked.  
- All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer.  
- Once rehabilitation has been carried out in accordance with procedure agreed upon by all parties, a post-construction audit must take place to ensure final compliance. The Contractor must rectify any non-compliance highlighted in the audit, prior to vacating the site. | Contractor, Engineer and ECO | Completion of construction activities |
## F. OPERATIONAL PHASE: BIOPHYSICAL IMPACTS

### LOSS OF WETLAND AREA

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<th>NO.</th>
<th>ASPECT</th>
<th>ACTION REQUIRED</th>
<th>PERSON RESPONSIBLE FOR MONITORING</th>
<th>MONITORING FREQUENCY</th>
</tr>
</thead>
</table>
| F.1 | Activity: - Upgraded Emadongeni Mud Track  

**Nature of the potential impact:**  
- The foundations of the road will cause a barrier to the hydrological flow through the seep, if a permeable road foundation is not used  

**Wetland Study (2017):**  
- Protect as much indigenous vegetation as possible. Remove alien invasive species where construction activities are occurring and replace with indigenous vegetation.  
- On unstable soils a soil saver such as fiber netting or a fiber mat or geotextiles such as soil cells must be used. The sloped area must then be seeded and the mat placed on top to protect the bare soil | Contractor, Engineer and ECO | Completion of construction activities |
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<th>RESPONSIBLE PARTY</th>
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<tr>
<td>F.2</td>
<td>Activity:</td>
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<tr>
<td></td>
<td>− Upgraded Emadongeni Mud Track</td>
<td>Wetland Study (2017):</td>
<td>Contractor</td>
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<tr>
<td></td>
<td><em>Nature of the potential impact:</em></td>
<td>− Soil erosion along the new road leading to sedimentation of the water resources</td>
<td>The Contractor must monitor the site on a regular basis.</td>
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<td>− Do not allow surface water or stormwater to be concentrated, or to flow down slopes without erosion protection measures being in place.</td>
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<td>− Erosion protection measures must be installed at any pipe culverts or stormwater drainage pipes’ outlets located along the route. This is in addition to velocity control measures.</td>
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</table>
## POLLUTION OF WATER RESOURCES & SOIL

<table>
<thead>
<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
<th>MITIGATION/ACTION REQUIRED</th>
<th>RESPONSIBLE PARTY</th>
<th>FREQUENCY</th>
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<tbody>
<tr>
<td>F.3</td>
<td>Activity:</td>
<td>Wetland Study (2017):</td>
<td>Contractor</td>
<td>The Contractor must monitor the site on a regular basis.</td>
</tr>
</tbody>
</table>
|     | − Upgraded Emadongeni Mud Track. | − No release of any substance i.e. cement, oil that could be toxic to fauna or faunal habitats; Wet cement and/ or concrete must not be allowed to enter any of the wetland systems.  
− Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately – consult with a wetland/aquatic specialist if spills occur.  
− The design and use of SUDS which includes, but is not limited to, swales, filter strips and infiltration trenches that capture runoff, filter out the pollutants and allow for the diffuse release of water into the receiving environment is paramount to limiting the long-term effects of an increase in hardened surfaces adjacent to the wetland areas situated along the route. | | |

Nature of the potential impact:

− Road surfaces are recognised as a source of various pollutants which can originate from a wide variety of sources. The pollutant concentration in road runoff can be highly variable and dependant on a wide variety of factors including location, traffic volumes, extent of dry period before a rainfall event, and nature of the road surface.
− The increase in hardened surfaces as a result of the project will lead to the increase in the flushing of these pollutants into adjacent wetland systems during the operational phase of this development.
<table>
<thead>
<tr>
<th>No.</th>
<th>IMPACT/ACTIVITY</th>
<th>MITIGATION/ACTION REQUIRED</th>
<th>RESPONSIBLE PARTY</th>
<th>FREQUENCY</th>
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<td>F.4</td>
<td>Activity:</td>
<td></td>
<td>Contractor</td>
<td>The Contractor must monitor the site on a regular basis.</td>
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<td></td>
<td>− Upgraded Emadongeni Mud Track.</td>
<td>Wetland Study (2017):</td>
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<td>Nature of the potential impact:</td>
<td>− An alien invasive management programme must be incorporated into the Environmental Management Programme. This has been adequately addressed in the attached EMP.</td>
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<td></td>
<td>− Road surfaces are recognized as a source of various pollutants which can originate from a wide variety of sources. The pollutant concentration in road runoff can be highly variable and dependent on a wide variety of factors including location, traffic volumes, extent of dry period before a rainfall event, and nature of the road surface.</td>
<td>− Ongoing alien plant control must be undertaken along the route and particularly in the disturbed wetland areas. Areas which have been disturbed will be quickly colonized by invasive alien species.</td>
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<td></td>
<td>− The increase in hardened surfaces as a result of the project will lead to the increase in the flushing of these pollutants into adjacent wetland systems during the operational phase of this development.</td>
<td>− An ongoing management plan must be implemented for the clearing/eradication of alien species.</td>
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3. CONCLUSION

It is the proponents’ responsibility to ensure that this EMP is made binding on the contractor by including the EMP in the contract documentation. The contractor should thoroughly familiarise himself/herself with the requirements of the EMP and appoint an Environmental Site Officer (ESO) to oversee the implementation of the EMP on a day-to-day basis. Parties responsible for transgression of this EMP should be held responsible for any rehabilitation work deemed necessary, and any penalties that may be applicable to non-compliance. Monthly environmental audits should be undertaken by an independent ECO. The monthly audit reports must be distributed to all relevant role players and discussed at the monthly project meetings as to identify any environmental non-compliance issues and the remedial action thereof. The audit reports must be submitted to the competent authorities on a monthly basis.
APPENDICES

- APPENDIX A – COMPLAINTS REGISTER
- APPENDIX B – ENVIRONMENTAL INCIDENT REPORTING
- APPENDIX C – SPILL CONTINGENCY PLAN
APPENDIX A – COMPLAINTS REGISTER

The following table must be completed for each reported complaint. All complaints received must be investigated and a response (even if pending further investigation) is to be given to the complainant within 7 days. Add pages as necessary.

<table>
<thead>
<tr>
<th>TIME &amp; DATE</th>
<th>CONTACT DETAILS OF COMPLAINANT</th>
<th>NATURE OF COMPLAINT</th>
<th>INVESTIGATION UNDERTAKEN</th>
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APPENDIX A – ENVIRONMENTAL INCIDENT REPORTING

All environmental incidents occurring on the site must be recorded in the following table. Add pages as necessary.

<table>
<thead>
<tr>
<th>DATE &amp; TIME</th>
<th>LOCATION &amp; NATURE OF INCIDENT</th>
<th>ACTION TAKEN</th>
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APPENDIX C - SPILL CONTINGENCY PLAN

Name, address and job title of the owner or person in charge, management or control.

NAME

____________________________________________________________________________

________________________________________________________________________________

ADDRESS

________________________________________________________________________

________________________________________________________________________________

____________________________________________________________________________

JOBTITLE

________________________________________________________________________

________________________________________________________________________________

____________________________________________________________________________

Name, job title and 24-hour telephone number for the persons responsible for activating the spill contingency plan.

NAME

____________________________________________________________________________

________________________________________________________________________________

JOBTITLE

________________________________________________________________________

________________________________________________________________________________

____________________________________________________________________________

24-HOUR TELEPHONE NUMBER

A description of the facility, including - location, size and storage capacity

________________________________________________________________

________________________________________________________________

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________________________________________________________________
A description of the type and amount of contaminants normally stored at the location.

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Reporting is the notification of all parties involved. This can include internal as well as external reporting procedures. A description of a public reporting procedure used to alert anyone who may be affected by the spill is required.

REPORTING

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Clean-up is the removal of the contaminant from the environment. This should consider the possible scenarios or spill incidents that could occur at the facility including a worst case scenario.

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Disposal is the treatment of the contaminant such that it is no longer a threat to the environment. Contingency plans must contain appropriate disposal procedures for the materials stored at the facility.
The means by which the spill contingency plan is activated (i.e. procedures to activate appropriate response equipment and personnel).

A description of the training provided to employees to respond to a spill. A sound training program is necessary when dealing with an emergency situation. This program should include knowledge and the use of any response equipment.